

Sun Ethernet Fabric Operating System

LLDP Administration Guide



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Using This Documentation

Oracle's Sun Ethernet Fabric Operating System Link-Layer Discovery Protocol (SEFOS LLDP) source code product provides an efficient Layer 2 neighbor-discovery mechanism as required by industry standards. LLDP enables devices to advertise information to peer devices on the same LAN and to learn information about peer devices. This guide explains the configuration of LLDP as a part of SEFOS. You should have a basic knowledge of the protocol as a prerequisite.

- "Product Notes" on page 1
- "Related Documentation" on page 2
- "Acronyms and Abbreviations" on page 2
- "CLI Command Modes" on page 3
- "Feedback" on page 3
- "Support and Accessibility" on page 4

Product Notes

Oracle Switch ES1-24:

<http://www.oracle.com/goto/ES1-24/docs>

Sun Network 10GbE Switch 72p:

<http://www.oracle.com/goto/SN-10GbE-72p/docs>

Sun Blade 6000 Ethernet Switched NEM 24p 10GbE:

<http://www.oracle.com/goto/SB6K-24p-10GbE/docs>

Related Documentation

Documentation	Links
All Oracle products	http://oracle.com/documentation
Oracle Switch ES1-24	http://www.oracle.com/goto/ES1-24/docs
Sun Network 10GbE Switch 72p	http://www.oracle.com/goto/SN-10GbE-72p/docs
Sun Blade 6000 Ethernet Switched NEM 24p 10GbE	http://www.oracle.com/goto/SB6K-24p-10GbE/docs
Sun Blade 6000 modular system	http://www.oracle.com/pls/topic/lookup?ctx=sb6000
Oracle Integrated Lights Out Manager (Oracle ILOM) 3.0	http://www.oracle.com/pls/topic/lookup?ctx=ilom30

For detailed information about the commands and options described in this document, refer to the *Sun Ethernet Fabric Operating System CLI Base Reference Manual*.

Acronyms and Abbreviations

Acronym or Abbreviation	Explanation
LAN	Local area network
LLDP	Link-Layer Discovery Protocol
LLDPDU	LLDP discovery unit
MI	Multiple instance
MIB	Management information base
MSAP	MAC service access point
NMS	Network management system
PEB	Provider edge bridge
PPVID	Port and protocol VLAN ID

Acronym or Abbreviation	Explanation
SNMP	Simple Network Mail Protocol
TLV	Type-Length-Value Protocol
VLAN	Virtual LAN

CLI Command Modes

The following table lists the configuration modes used in this document with their access and exit methods.

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Access SEFOS from Oracle ILOM with read-only rights (privilege level 1).	SEFOS>	Use <code>logout</code> or <code>exit</code> to return to the Oracle ILOM prompt.
Privileged EXEC	Access SEFOS from Oracle ILOM with full administrative rights (privilege level 15).	SEFOS#	Use the <code>logout</code> or <code>exit</code> command to return to the Oracle ILOM prompt.
Global Configuration	From User EXEC mode, use the <code>enable</code> command.	SEFOS(config)#	Use the <code>end</code> command to return to Privileged EXEC mode.
Interface Configuration	From Global Configuration mode, use the <code>interface interface-type interface-id</code> command.	SEFOS(config-if)#	Use the <code>exit</code> command to return to Global Configuration mode, or use the <code>end</code> command to return to Privileged EXEC mode.

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<http://www.oracle.com/goto/docfeedback>

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Protocol Description

This section describes the Oracle's SEFOS LLDP.

- ["Introduction" on page 5](#)

Introduction

Oracle's SEFOS LLDP enables devices attached to an IEEE 802 LAN to advertise their own information to other devices attached to the same IEEE 802 LAN and to learn about the other devices.

The advertised information includes:

- Major capabilities provided by the system incorporating that device.
- Management address or addresses of the entity or entities that provide management of those capabilities.
- Identification of the point of attachment to the IEEE 802 LAN, which is required by the management entity or entities.

The advertised information is learned and stored by recipients in a standard MIB. Thus, a NMS can access the information using SNMP.

Configuring LLDP

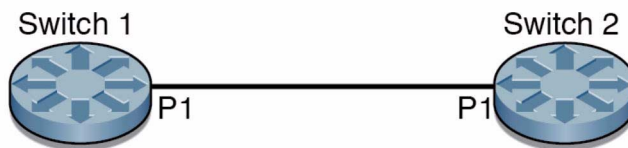
This section includes information and instructions for configuring LLDP. The information includes an example configuration on which the instructions are based. The instructions include user input that is also based on the example configuration.

These topics show how to configure LLDP:

- [“Configuration Topology” on page 7](#)
- [“Configuration Guidelines” on page 8](#)

Configuration Topology

All the configurations explained in this document are based on the following topology.



Switch 1 has the following configuration:

- Interface P1 exists and is operational.
- MAC address is 00:01:02:03:04:01.
- Default default IP address for the VLAN is 12.0.0.1.

Switch 2 has the following configuration:

- Interface P1 exists and is operational.
- MAC address is 00:02:02:03:04:01.
You can also use the preconfigured MAC address.
- Default VLAN IP address is 12.0.0.2.

Configuration Guidelines

The following guidelines must be performed to configure LLDP:

- Set the LLDP system control status to start before you make any changes to LLDP.
- For MI configuration, create and map the port to a switch before you configure LLDP on that port.
- For a particular VLAN, configure the VLAN name before you enable the VLAN name for transmission.
- Create and make operational (up) at least one IP interface before you enable the management-address TLV for transmission and before you configure the chassis ID subtype as network address.
- For the management-address TLV, the VLAN name TLV, and the port and protocol VLAN ID TLVs, you can use CLI commands to enable the transmission of all of the configured management addresses, VLAN names, and protocol groups. A new management address, VLAN name, or protocol group that is configured after you enable the transmission of the corresponding TLVs is not transmitted automatically. You must manually enable the new management address, VLAN name, or protocol group.

For example, with a typical configuration might be:

- `VLAN 1: 15.0.0.1`
- `VLAN 2: 16.0.0.1`
- `VLAN 3: 17.0.0.1` (added after enabling all of the management-address TLVs)

If management-address TLV is enabled to transmit all of the configured management addresses, then `15.0.0.1` and `16.0.0.1` are transmitted. However, `17.0.0.1` will not be transmitted because it was configured after management address TLV was enabled. The `VLAN 3` management address will be not transmitted until the TLV is enabled explicitly.

These procedures show how to configure LLDP:

- [“Default Settings” on page 9](#)
- [“Configure the LLDP System Control Status” on page 10](#)
- [“Configure the LLDP Module Status” on page 11](#)
- [“Configure LLDP Global Objects” on page 17](#)
- [“Configure the LLDP Admin Status” on page 18](#)
- [“Enable LLDP Optional TLVs” on page 20](#)
- [“Enabling a Specific Management Address” on page 21](#)
- [“Enable IEEE 802.1 Organizationally-Specific TLVs” on page 24](#)

- “Enabling a Particular VLAN Name” on page 26
- “Enable a Particular PPVID” on page 29
- “Enable IEEE 802.3 Organizationally-Specific TLVs” on page 32
- “Disable LLDP Basic Optional TLVs” on page 33
- “Disable IEEE 802.1 Organizationally-Specific TLVs” on page 34
- “Disable the IEEE 802.3 Organizationally-Specific TLVs” on page 36
- “Configure the LLDP Chassis-ID Subtype” on page 37
- “Configure the LLDP Port-ID Subtype” on page 38
- “Enable the LLDP Notification Status or Type” on page 39
- “Clear the LLDP Traffic Counters” on page 40
- “Clear the LLDP Remote Table” on page 41
- “View LLDP Errors” on page 42
- “Configure LLDP Trace Options” on page 42

Default Settings

The following contains the default configuration settings for the LLDP software.

Parameter	Default Setting
Global Configuration Objects	
System control status	Start
Module status	Disabled
Message transmit interval	30
Hold-time multiplier	4
Re-initialization delay	2
Tx delay	2
Notification interval	5
Chassis ID subtype	MAC address
Chassis ID	MAC address of default VLAN
Port Specific Configuration Objects	
Port ID subtype	Interface alias

Parameter	Default Setting
Port ID	Interface alias of the port
Admin status	Transmit and receive (TxAndRx)
Notification status	Disabled
Notification type	Misconfiguration notification type
Optional TLVs transmission status	Disabled
Trace input	Critical trace is enabled

Optional TLVs include the following:

- Basic optional TLVs
- IEEE 802.1 organizationally-specific TLVs
- IEEE 802.3 organizationally-specific TLVs

▼ Configure the LLDP System Control Status

This section describes how to configure the LLDP system control status, which is set to Start by default. You must set the LLDP system control status to Start before you make any configuration changes in LLDP.

1. In switch 1, shut down LLDP.

```
SEFOS# configure terminal
SEFOS(config)# shutdown lldp
SEFOS(config)# end
```

2. View the LLDP system control status.

```
SEFOS# show lldp

% Lldp Module is shutdown
```

3. Start LLDP.

```
SEFOS# configure terminal
SEFOS(config)# no shutdown lldp
SEFOS(config)# end
```

After the LLDP system control status is changed to Start, LLDP global configuration objects are set with default values.

4. View the default values for the global configuration objects of LLDP.

```
SEFOS# show lldp
LLDP is disabled
Transmit Interval: 30
Holdtime Multiplier: 4
Reinitialization Delay: 2
Tx Delay : 2
Notification Interval: 5
Chassis Id SubType: Mac Address
Chassis Id: 00:01:02:03:04:01
```

▼ Configure the LLDP Module Status

The LLDP module status is set to Disabled by default.

1. Enable LLDP in both switches.

```
SEFOS# configure terminal
SEFOS(config)# set lldp enable
SEFOS(config)# end
```

2. In switch 1, view the LLDP module status.

```
SEFOS# show lldp
LLDP is enabled
Transmit Interval: 30
Holdtime Multiplier: 4
Reinitialization Delay: 2
Tx Delay : 2
Notification Interval: 5
Chassis Id SubType: Mac Address
Chassis Id: 00:01:02:03:04:01
```

Enabling LLDP (that is, configuring the LLDP module status as Enabled) initiates the transmission of LLDPDUs with the mandatory TLVs (chassis-ID TLV, port-ID TLV, time-to-live TLV, and end of LLDPDU TLV) on all ports that are operational (up).

3. View the current status of the LLDP transmit-state-event machine and receive-state-event machine.

```
SEFOS# show lldp interface  
Ex0/1:  
...  
Tx SEM State: IDLE  
Rx SEM State: WAIT FOR FRAME  
...
```


4. View the LLDP local system information.

```
SEFOS# show lldp local
Capability Codes:
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Chassis Id SubType: Mac Address
Chassis Id   : 00:01:02:03:04:01
System Name  : <<name of system>>
System Description: SNMPV2
System Capabilities Supported: B,R
System Capabilities Enabled: B,R

Ex0/1 :
Port Id SubType: Interface Alias
Port Id       : Slot0/1
Port Description: Ethernet Interface
Enabled Tx Tlvs:

Extended 802.3 TLV Info
-MAC PHY Configuration & Status
Auto-Neg Support & Status: Not Supported, Disabled
Advertised Capability Bits: 0000
Operational MAU Type: 0
-Link Aggregation
Capability & Status: Not Capable, Not In Aggregation
Aggregated Port Id: 1
-Maximum Frame Size: 9216

Extended 802.1 TLV Info
-Port VLAN Id: 1
-Port & Protocol VLAN Id
Protocol VLAN IdSupportProtocol VLAN StatusTxStatus
-----
0           SupportedEnabledDisabled
-Vlan Name
Vlan Id  Vlan Name           TxStatus
-----  -----
1                               Disabled
-----
----
```

The preceding example shows the output from only one port. Similar output would appear for all ports. In addition, the value displayed for System Name displays the name of the product you are using.

5. View the LLDP traffic details.

```
SEFOS# show lldp traffic
Total Frames Out: 1
Total Entries Aged: 0
Total Frames In: 1
...
```

6. At switch 2, review the general the information about the neighbors.

```
SEFOS# show lldp neighbors
Capability Codes:
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis IDLocal IntfHold-timeCapabilityPort Id
-----
00:01:02:03:04:01Ex0/1120Slot0/1

Total Entries Displayed: 1
```

7. Review the detailed information about the neighbors.

```
SEFOS# show lldp neighbors detail
Capability Codes:
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis Id SubType: Mac Address
Chassis Id   : 00:01:02:03:04:01
Port Id SubType: Interface Alias
Port Id      : Slot0/1
Port Description: Not Advertised
System Name  : Not Advertised
System Desc  : Not Advertised
Local Intf   : Ex0/1
Time Remaining: 100 Seconds
System Capabilities Tlv: Not Advertised
Management Address: Not Advertised

Extended 802.3 TLV Info
-MAC PHY Configuration & Status
Auto Negotiation Tlv: Not Advertised
-Link Aggregation
Link Aggregation Tlv: Not Advertised
-Maximum Frame Size Tlv: Not Advertised
```

```
Extended 802.1 TLV Info
-Port VLAN Tlv: Not Advertised
-Port & Protocol VLAN Id
Protocol Vlan Tlv: Not Advertised
-Vlan Name
Vlan Name Tlv: Not Advertised
-----
Total Entries Displayed : 1
```

8. Review the information about a particular remote entry (a particular neighbor) by using the MSAP ID.

```
SEFOS# show lldp neighbors chassis-id 00:01:02:03:04:01 port-id Slot0/1 detail
Capability Codes:
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis Id SubType: Mac Address
Chassis Id   : 00:01:02:03:04:01
Port Id SubType: Interface Alias
Port Id      : Slot0/1
Port Description: Not Advertised
System Name  : Not Advertised
System Desc  : Not Advertised
Local Intf   : Ex0/1
Time Remaining: 101 Seconds
System Capabilities Tlv: Not Advertised
Management Address: Not Advertised

Extended 802.3 TLV Info
-MAC PHY Configuration & Status
Auto Negotiation Tlv: Not Advertised
-Link Aggregation
Link Aggregation Tlv: Not Advertised
-Maximum Frame Size Tlv: Not Advertised

Extended 802.1 TLV Info
-Port VLAN Tlv: Not Advertised
-Port & Protocol VLAN Id
Protocol Vlan Tlv: Not Advertised
-Vlan Name
Vlan Name Tlv: Not Advertised
-----
Total Entries Displayed: 1
```

9. Review the remote table statistics.

```
SEFOS# show lldp statistics  
Remote Table Last Change Time: 20700  
Remote Table Inserts: 1  
...
```

10. Disable LLDP on both switches.

```
SEFOS# configure terminal  
SEFOS(config)# set lldp disable  
SEFOS(config)# end
```

11. At switch 1, review the LLDP module status.

```
SEFOS# show lldp  
LLDP is disabled  
...
```

12. Review the current status of the LLDP transmit-state-event machine and the receive-state-event machine.

```
SEFOS# show lldp interface  
Ex0/1:  
Tx State : Enabled  
Rx State : Enabled  
Tx SEM State: INITIALIZE  
...
```

The preceding example shows output from only one port. Similar output would appear for all 24 ports.

13. Review the values of the LLDP traffic counters.

```
SEFOS# show lldp traffic  
Total Frames Out: 0  
Total Entries Aged: 0  
Total Frames In: 0  
Total Frames Received In Error: 0  
Total Frames Discarded: 0  
Total TLVs Unrecognized: 0  
Total TLVs Discarded: 0
```

14. At switch 2, review the information about the neighbors.

```
SEFOS# show lldp neighbors
Capability Codes:
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis IDLocal IntfHold-timeCapabilityPort Id
-----
Total Entries Displayed: 0
```

Disabling LLDP (that is, configuring the LLDP module status as Disabled) stops LLDP transmission and reception, and it clears the remote table information and LLDP traffic counters.

▼ Configure LLDP Global Objects

Global objects are system-specific objects that are common for all interfaces in the system.

1. At switch 1, change the global configuration of LLDP.

```
SEFOS# configure terminal
SEFOS(config)# lldp transmit-interval 15
SEFOS(config)# lldp holdtime-multiplier 2
SEFOS(config)# lldp reinitialization-delay 5
SEFOS(config)# lldp tx-delay 3
SEFOS(config)# lldp notification-interval 10
SEFOS(config)# lldp chassis-id-subtype local "switch"
SEFOS(config)# end
```

The values given to each parameter in this step are examples only.

2. Review the values of global configuration.

```
SEFOS# show lldp
LLDP is disabled
Transmit Interval: 15
Holdtime Multiplier: 2
Reinitialization Delay: 5
Tx Delay : 3
Notification Interval: 10
Chassis Id SubType: Local
Chassis Id: switch
```

3. Reset the LLDP global configuration to the default values.

```
SEFOS# configure terminal
SEFOS(config)# no lldp transmit-interval
SEFOS(config)# no lldp holdtime-multiplier
SEFOS(config)# no lldp reinitialization-delay
SEFOS(config)# no lldp tx-delay
SEFOS(config)# no lldp notification-interval
SEFOS(config)# lldp chassis-id-subtype mac-addr
SEFOS(config)# end
```

4. View the LLDP global configuration.

```
SEFOS# show lldp
LLDP is disabled
Transmit Interval: 30
Holdtime Multiplier: 4
Reinitialization Delay: 2
Tx Delay : 2
Notification Interval: 5

Chassis Id SubType: Mac Address
Chassis Id: 00:01:02:03:04:01
```

▼ Configure the LLDP Admin Status

By default, the LLDP admin status is set to transmit and receive (TxAndRx). You can change the LLDP admin status to change LLDP operational mode to any of the following values:

- **TxAndRx** - Transmit and receive (default)
- **TxOnly** - Transmit only
- **RxOnly** - Receive only
- **Disabled**

1. At both switches, view the LLDP default values of the admin status.

```
SEFOS# show lldp interface
Ex0/1:
Tx State : Enabled
Rx State : Enabled
...
```

2. At switch 1, configure the LLDP admin status as transmit only (TxOnly).

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no lldp receive
SEFOS(config-if)# exit
SEFOS(config)# end
```

3. Review the LLDP admin status.

```
SEFOS# show lldp interface extreme-ethernet 0/1
Ex0/1:
Tx State : Enabled
Rx State : Disabled
...
```

4. At switch 2, configure the LLDP admin status as receive only (RxOnly).

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no lldp transmit
SEFOS(config-if)# exit
SEFOS(config)# end
```

5. Review the configured LLDP admin status.

```
SEFOS# show lldp interface extreme-ethernet 0/1
Ex0/1:
Tx State : Disabled
Rx State : Enabled
...
```

6. At both switches, set the LLDP admin status to Disabled.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no lldp transmit
SEFOS(config-if)# no lldp receive
SEFOS(config-if)# exit
SEFOS(config)# end
```

7. Review the configured LLDP admin status.

```
SEFOS# show lldp interface extreme-ethernet 0/1
Ex0/1:
Tx State : Disabled
Rx State : Disabled
...
```

▼ Enable LLDP Optional TLVs

This section describes how to configure basic optional TLVs for transmission when the transmission status is set to `Disabled` by default. The following optional TLVs are in LLDP:

- Port description
- System name
- System description
- System capabilities

To enable the LLDP optional TLVs, perform the following steps:

1. At both switches, enable basic optional TLVs.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# lldp tlv-select basic-tlv port-descr
sys-name-sys-descr sys-capab mgmt-addr all
SEFOS(config)# end
```

2. At switch 1, review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
Port Id SubType: Interface Alias
Port Id      : Slot0/1
Port Description: Ethernet Interface
Enabled Tx Tlvs: Port Description, System Name,
                  System Description, System Capability, Management
Address
...
```


3. Review the local management address.

```
SEFOS# show lldp local mgmt-addr
Management AddressTxEnabledPorts
-----
12.0.0.1    Ex0/1
```

4. At switch 2, review the information about learned neighbors.

```
SEFOS# show lldp neighbors ex 0/1 detail
...
Port Description: Ethernet Interface
System Name : name_of_system
System Desc : SNMPV2
Local Intf  : Ex0/1
Time Remaining: 96 Seconds
System Capabilities Supported: B,R
System Capabilities Enabled: B,R
Management Addresses:
IfId SubTypeAddressOID
----
1009 IPv4    12.0.0.1  1 3 6 1 2 1 2 2 1 1
...
```

Enabling a Specific Management Address

Management address TLV transmission status is disabled by default. If a management address is configured for the system or the existing management address is changed, the TLV transmission status of the management address is disabled by default.

These procedures show how to enable a specific management address:

- [“Enable a New IP Address” on page 21](#)
- [“Enable an Existing IP Interface” on page 23](#)

▼ Enable a New IP Address

If a new IP address is configured for the system, then the address is not transmitted by default (that is, the TLV transmission status of the newly configured IP address is disabled).

1. At switch 1, create VLAN 2 with IP address 15.0.0.1:

```
SEFOS# configure terminal
SEFOS(config)# vlan 2
SEFOS(config-vlan)# ports extreme-ethernet 0/1
SEFOS(config-vlan)# end
SEFOS# configure terminal
SEFOS(config)# interface vlan 2
SEFOS(config-if)# ip address 15.0.0.1 255.255.255.0
SEFOS(config-if)# no shutdown
SEFOS(config-if)# end
```

2. Review the IP addresses that are configured for the system and the TLV transmission status of the addresses.

```
SEFOS# show lldp local mgmt-addr
Management AddressTxEnabledPorts
-----
12.0.0.1          Ex0/1
15.0.0.1
```

The TxEnabledPorts for management address 15.0.0.1 do not display any interfaces.

3. Enable the newly configured management address (15.0.0.1) for transmission.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# lldp tlv-select basic-tlv mgmt-addr ipv4
15.0.0.1
SEFOS(config)# end
```

4. Review the IP addresses that are configured for the system and the TLV transmission status of the addresses.

```
SEFOS# show lldp local mgmt-addr
Management AddressTxEnabledPorts
-----
12.0.0.1          Ex0/1
15.0.0.1          Ex0/1
```

5. At switch 2, review the neighbor information learned on interface `extreme-ethernet 0/1`.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
IfId SubTypeAddressOID
----
1009 IPv4 12.0.0.11 3 6 1 2 1 2 2 1 1
1010 IPv4 15.0.0.11 3 6 1 2 1 2 2 1 1
...
```

▼ Enable an Existing IP Interface

If the IP address for an existing IP interface is changed, the change to the address is treated as a deletion of one of the management addresses and an addition of a new management address by LLDP. Note that in the following instructions, `VLAN 2` is configured with IP address `15.0.0.1` and is enabled for the `extreme-ethernet` interface `0/1`.

1. At switch 1, change the IP address of `VLAN 2` to `16.0.0.1`:

```
SEFOS# configure terminal
SEFOS(config)# interface vlan 2
SEFOS(config-if)# shutdown
SEFOS(config-if)# ip address 16.0.0.1 255.255.255.0
SEFOS(config-if)# no shutdown
SEFOS(config-if)# end
```

The following list describes the impact of the change in the IP address:

- The entry corresponding to the old IP address of `VLAN 2` is deleted from the LLDP management address table.
- The entry corresponding to `16.0.0.1` is created.
- The TLV transmission status of `16.0.0.1` is disabled by default.

2. Review the IP addresses that are configured for the system and TLV transmission status of the addresses.

```
SEFOS# show lldp local mgmt-addr
Management AddressTxEnabledPorts
-----
12.0.0.1      Ex0/1
16.0.0.1
```

The TxEnabledPorts value for management address 16.0.0.1 does not display any interfaces. The newly configured IP address 16.0.0.1, has not advertised through extreme-ethernet interface, Ex0/1, and the entry corresponding to IP address 15.0.0.1 was deleted from the remote table.

3. At switch 2, review the learned neighbor information on the interface.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Management Addresses:
IfId SubTypeAddressOID
-----
1009 IPv4 12.0.0.11 3 6 1 2 1 2 2 1 1
...
```

The entry corresponding to IP address 15.0.0.1 was removed from the list of management addresses.

▼ Enable IEEE 802.1 Organizationally-Specific TLVs

This section describes how to configure IEEE 802.1 organizationally-specific TLVs for transmission when the transmission status is set to disabled by default.

- Port VLAN ID
- Port and protocol VLAN ID
- VLAN name

1. On both switches, configure VLAN name as `VLAN 1`.

```
SEFOS# configure terminal
SEFOS(config)# vlan 1
SEFOS(config-vlan)# ports extreme-ethernet 0/1 name vlan1
SEFOS(config-vlan)# end
```

2. On both switches, enable IEEE 802.1 organizationally-specific TLVs.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# lldp tlv-select dot1tlv port-vlan-id
protocol-vlan-id all vlan-name all
SEFOS(config)# end
```

3. At switch 1, review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
Port Id SubType: Interface Alias
Port Id      : Slot0/1
Port Description: Ethernet Interface
Enabled Tx Tlvs: Port Vlan
...
```

When the switch comes up, no protocol group is initially mapped to VLAN, so no entry is present in the VLAN module for the PPVID. A port and protocol VLAN entry is created in LLDP with the protocol VLAN ID value of 0, and the entry is transmitted after you enable PPVID TLV transmission.

4. Review information about the learned neighbors on a particular interface.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Extended 802.1 TLV Info
-Port VLAN Id: 1
-Port & Protocol VLAN Id
Protocol Vlan IdSupportStatus
-----
0                SupportedEnabled
-Vlan Name
Vlan Id    Vlan Name
-----
1          vlan1
-----
Total Entries Displayed: 1
```

Enabling a Particular VLAN Name

The VLAN name TLV transmission status is disabled by default. If you configure a new VLAN with a VLAN or the existing VLAN name is changed, the TLV transmission status of the VLAN name is disabled by default. Use one of the procedures in this section to enable a new VLAN name or to re-enable an existing VLAN name.

These procedures show how to enable a particular VLAN name:

- [“Enable a New VLAN Name” on page 26](#)
- [“Enable an Existing VLAN Name” on page 27](#)

▼ Enable a New VLAN Name

If you configure a new VLAN name, the VLAN name is not transmitted by default (that is, the TLV transmission status of the newly configured VLAN is disabled).

1. **At switch 1, create a VLAN with the VLAN ID set to 2, the VLAN name set to VLAN 2, and the extreme-ethernet 0/1 port as a member.**

```
SEFOS# configure terminal
SEFOS(config)# vlan 2

SEFOS(config-vlan)# ports extreme-ethernet 0/1 name vlan2
SEFOS(config-vlan)# end
```

2. **Review the TLV transmission status of the VLAN names in the local system information.**

```
SEFOS# show lldp local extreme-ethernet 0/1
...
-Vlan Name
Vlan IdVlan Name      TxStatus
-----
1          vlan1          Enabled
2          vlan2          Disabled
```

3. **Enable the configured VLAN name for transmission.**

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# lldp tlv-select dot1tlv vlan-name 2
SEFOS(config)# end
```

4. Review the TLV transmission status of the VLAN names.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
-Vlan Name
Vlan IdVlan Name      TxStatus
-----
1          vlan1              Enabled
2          vlan2              Enabled
-----
----
```

5. At switch 2, review learned neighbor information on interface extreme-ethernet 0/1.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
-Vlan Name
Vlan IdVlan Name
-----
1          vlan1
2          vlan2
-----
Total Entries Displayed: 1
```

▼ Enable an Existing VLAN Name

If you delete, then recreate, a VLAN, the VLAN name TLV transmission status is disabled. Use the instructions in this section to re-enable the VLAN name for transmission.

1. At switch 1, delete the VLAN (2 in this example) that is enabled for transmission:

```
SEFOS# configure terminal
SEFOS(config)# no vlan 2
SEFOS(config)# end
```

2. Review the local system and learned neighbor information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
-Vlan Name
Vlan IdVlan Name      TxStatus
-----
1          vlan1      Enabled
-----
---
```

The entry corresponding to VLAN 2 is not displayed because the transmission has not been enabled.

3. At switch 2, review the learned neighbor information on the extreme-ethernet 0/1 interface.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
-Vlan Name
Vlan Id    Vlan Name
-----
1          vlan1
-----

Total Entries Displayed: 1
```

The entry corresponding to VLAN 2 is not displayed because transmission has not been enabled.

4. At switch 1, recreate the VLAN with the VLAN ID set to 2, the VLAN name set to vlan 2, and the extreme-ethernet 0/1 interface as member port.

```
SEFOS# configure terminal
SEFOS(config)# vlan 2
SEFOS(config-vlan)# ports extreme-ethernet 0/1 name vlan2
SEFOS(config-vlan)# end
```

5. Review the TLV transmission status of the VLAN names in the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
-Vlan Name
Vlan IdVlan Name      TxStatus
-----
-----
```


1	vlan1	Enabled
2	vlan2	Disabled

▼ Enable a Particular PPVID

The PPDVID TLV transmission status is disabled by default. If you configure a new PPVID, the TLV transmission status of the VLAN name is disabled by default. If you configure a new PPVID, the PPVID is not transmitted by default (the TLV transmission status of the newly configured PPVID is disabled).

1. At switch 1, create and map protocols-group 10 to VLAN 2.

```
SEFOS# configure terminal
SEFOS(config)# map protocol ip enet-v2 protocols-group 10
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# switchport map protocols-group 10 vlan 2
SEFOS(config-if)# end
```

2. Review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
Extended 802.1 TLV Info
-Port VLAN Id: 1
-Port & Protocol VLAN Id
Protocol VLAN Id   Support   Protocol VLAN Status   TxStatus
-----
2                 SupportedEnabledDisabled
...
```

3. Enable the transmission of protocol VLAN ID TLVs.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# lldp tlv-select dot1tlv port-vlan-id
protocol-vlan-id 2
SEFOS(config-if)# end
```

4. Review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
Extended 802.1 TLV Info
-Port VLAN Id: 1
-Port & Protocol VLAN Id
Protocol VLAN Id  Support    Protocol VLAN Status  TxStatus
-----
2                Supported  Enabled              Enabled
```

5. At switch 2, review the learned neighbor information on the interface extreme-ethernet 0/1.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Extended 802.1 TLV Info
-Port VLAN Id: 1
-Port & Protocol VLAN Id
Protocol Vlan IdSupportStatus
-----
2                Supported Enabled
...
```

6. At switch 1, delete the PPVID (that is, unmap protocols-group 10 in the extreme-ethernet 0/1 interface).

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no switchport map protocols-group 10
SEFOS(config)# end
```

7. Review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
Extended 802.1 TLV Info
-Port VLAN Id : 1
-Port & Protocol VLAN Id
Protocol VLAN Id  Support    Protocol VLAN Status  TxStatus
-----
0                Supported  Enabled              Disabled
...
```

No entry is displayed for the port-and-protocol VLAN ID.

8. At switch 2, review the learned neighbor information on the extreme-ethernet 0/1 interface.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Extended 802.1 TLV Info
-Port VLAN Id: 1
-Port & Protocol VLAN Id
Protocol Vlan Tlv: Not Advertised
...
```

No entry is displayed for the port-and-protocol VLAN ID.

9. At switch 1, recreate the PPVID (that is, create and map protocols-group 10 to VLAN 2).

```
SEFOS# configure terminal
SEFOS(config)# map protocol ip enet-v2 protocols-group 10
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# switchport map protocols-group 10 vlan 2
SEFOS(config-if)# end
```

10. Review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
Extended 802.1 TLV Info
-Port VLAN Id: 1
-Port & Protocol VLAN Id
Protocol VLAN Id      Support      Protocol VLAN Status      TxStatus
-----
2           Supported      Enabled                    Disabled
...
```

11. At switch 2, review the learned neighbor information on the extreme-ethernet 0/1 interface.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Extended 802.1 TLV Info
-Port VLAN Id: 1
-Port & Protocol VLAN Id
Protocol Vlan Tlv: Not Advertised
...
```

▼ Enable IEEE 802.3 Organizationally-Specific TLVs

This section describes how to configure IEEE 802.3 organizationally-specific TLVs for transmission when the transmission status is set to disabled by default. The following basic optional TLVs are in LLDP:

- Medium access control layer and the physical layer configuration and status
- Link aggregation
- Max frame size

1. At both switches, configure the LLDP module status as enabled.

See “Configure the LLDP Module Status” on page 11.

2. Enable the IEEE 802.3 organizationally-specific TLVs on the extreme-ethernet 0/1 interface.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# lldp tlv-select dot3tlv macphy-config
link-aggregation max-framesize
SEFOS(config)# end
```

3. At switch 1, review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
Enabled Tx Tlvs: Mac Phy, Link Aggregation, Max Frame Size
...
```

4. At switch 2, review the information about the learned neighbors on the interface.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Extended 802.3 TLV Info
-MAC PHY Configuration & Status
Auto-Neg Support & Status: Supported, Disabled
Advertised Capability Bits: 0000
-Link Aggregation
Capability & Status: Not Capable, Not In Aggregation
Aggregated Port Id: 1
-Maximum Frame Size: 9216
...
```

▼ Disable LLDP Basic Optional TLVs

1. At both switches, configure the LLDP module status as enabled.
See “Configure the LLDP Module Status” on page 11.
2. At both switches, configure VLAN name as `vlan 1`.

```
SEFOS# configure terminal
SEFOS(config)# vlan 1
SEFOS(config-vlan)# ports extreme-ethernet 0/1 name vlan 1
SEFOS(config-vlan)# end
```

3. At both switches, enable all of the TLVs by executing the instructions in the following sections.
 - See “Enable LLDP Optional TLVs” on page 20.
 - See “Enable IEEE 802.1 Organizationally-Specific TLVs” on page 24.
 - See “Enable IEEE 802.3 Organizationally-Specific TLVs” on page 32.
4. At both switches, disable the basic optional TLVs.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no lldp tlv-select basic-tlv port-descr sys-name
sys-descr sys-capab mgmt-addr all
SEFOS(config)# end
```

5. At switch 1, review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
Enabled Tx Tlvs: Port Vlan, Mac Phy, Link Aggregation,
...
```

The enabled TLVs do not display any basic optional TLVs because basic they are disabled.

6. At switch 2, review the information about the learned neighbors on the interface.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Port Description: Not Advertised
System Name : Not Advertised
System Desc : Not Advertised
```

```
Local Intf : Ex0/1
Time Remaining: 104 Seconds
System Capabilities Tlv: Not Advertised
Management Address: Not Advertised
...
```

▼ Disable IEEE 802.1 Organizationally-Specific TLVs

1. At both switches, configure the LLDP module status as enabled.
See [“Configure the LLDP Module Status”](#) on page 11.
2. At both switches, configure VLAN name as `vlan 1`.

```
SEFOS# configure terminal
SEFOS(config)# vlan 1
SEFOS(config-vlan)# ports extreme-ethernet 0/1 name vlan 1
SEFOS(config-vlan)# end
```

3. At both switches, enable all of the TLVs by executing the instructions in the following sections.
 - See [“Enable LLDP Optional TLVs”](#) on page 20.
 - See [“Enable IEEE 802.1 Organizationally-Specific TLVs”](#) on page 24.
 - See [“Enable IEEE 802.3 Organizationally-Specific TLVs”](#) on page 32.
4. At both switches, disable the IEEE 802.1 organizationally-specific TLVs.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no lldp tlv-select dot1tlv port-vlan-id
protocol-vlan-id all vlan-name all
SEFOS(config)# end
```

5. At switch 1, review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
Enabled Tx Tlvs: Port Description, System Name,
                  System Description, System Capability,
                  Management Address, Mac Phy, Link Aggregation,
                  Max Frame Size
...
Extended 802.1 TLV Info
-Port VLAN Id: 1
-Port & Protocol VLAN Id
Protocol VLAN IdSupportProtocol VLAN StatusTxStatus
-----
0          SupportedEnabledDisabled
-Vlan Name
Vlan Id  Vlan Name          TxStatus
-----  -----
1          vlan1            Disabled
-----
---
```

Enabled Tx TLVs do not display any IEEE 802.1 organizationally-specific TLVs. In addition, PPVIDs and VLAN name TLVs are disabled because IEEE 802.1 organizationally-specific TLVs are disabled.

6. At switch 2, review the information about the learned neighbors on the interface.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Extended 802.1 TLV Info
-Port VLAN Tlv: Not Advertised
-Port & Protocol VLAN Id
Protocol Vlan Tlv: Not Advertised
-Vlan Name
Vlan Name Tlv: Not Advertised
-----
Total Entries Displayed: 1
```

▼ Disable the IEEE 802.3 Organizationally-Specific TLVs

1. At both switches, configure the LLDP module status as enabled.

See “Configure the LLDP Module Status” on page 11.

2. At both switches, configure VLAN name as `vlan 1`.

```
SEFOS# configure terminal
SEFOS(config)# vlan 1
SEFOS(config-vlan)# ports extreme-ethernet 0/1 name vlan 1
SEFOS(config-vlan)# end
```

3. At both switches, enable all of the TLVs by executing the instructions in the following sections.

- See “Enable LLDP Optional TLVs” on page 20.
- See “Enable IEEE 802.1 Organizationally-Specific TLVs” on page 24.
- See “Enable IEEE 802.3 Organizationally-Specific TLVs” on page 32.

4. At both switches, disable the IEEE 802.3 organizationally-specific TLVs.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no lldp tlv-select dot3tlv macphy-config
link-aggregation max-framesize
SEFOS(config)# end
```

5. At switch 1, review the local system information.

```
SEFOS# show lldp local extreme-ethernet 0/1
...
Enabled Tx Tlvs: Port Description, System Name,
                 System Description, System Capability,
                 Management Address, Port Vlan
...
```

The enabled Tx TLVs do not display any IEEE 802.3 organizationally-specific TLVs because the IEEE 802.3 organizationally-specific TLVs are disabled.

6. At switch 2, review the information about the learned neighbors on the interface.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Extended 802.3 TLV Info
-MAC PHY Configuration & Status
Auto Negotiation Tlv: Not Advertised
-Link Aggregation
Link Aggregation Tlv: Not Advertised
-Maximum Frame Size Tlv: Not Advertised
...
```

▼ Configure the LLDP Chassis-ID Subtype

You can configure the chassis ID subtype with any of the following values:

- Chassis component
- Interface alias
- Port component
- MAC address
- Network address
- Interface name
- Local

While configuring the chassis-ID subtype as a chassis component, port component, or local setting, you must include an input string in the command for setting the chassis ID.

1. At both switches, configure the LLDP chassis ID subtype.

```
SEFOS# configure terminal
SEFOS(config)# lldp chassis-id-subtype chassis-comp "chassis"
SEFOS(config)# set lldp enable
SEFOS(config)# end
```

2. At switch 1, review the local system information on extreme-ethernet 0/1.

```
SEFOS# show lldp
...
Chassis Id SubType: Chassis Component
Chassis Id : chassis
```

3. At switch 2, review the detailed information of the learned, remote entry on `extreme-ethernet 0/1`.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Chassis Id SubType: Chassis Component
Chassis Id   : chassis
...
```

▼ Configure the LLDP Port-ID Subtype

You can configure the port-ID subtype with any of the following values:

- Interface alias
- Port component
- MAC address
- Network address
- Interface name
- Local

While configuring the port-ID subtype as the port component or local setting, you must provide an input string in the command for setting the port ID.

1. At both switches, configure the LLDP port ID subtype.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# lldp port-id-subtype mac-addr
SEFOS(config-if)# exit
SEFOS(config)# set lldp enable
SEFOS(config)# end
```

2. At switch 1, review the local system information on `extreme-ethernet 0/1`.

```
SEFOS# show lldp local extreme-ethernet 0/1
Port Id SubType: Mac Address
Port Id       : 00:01:02:03:04:01
...
```

3. At switch 2, review the information of the learned, remote entry on extreme-ethernet 0/1.

```
SEFOS# show lldp neighbors extreme-ethernet 0/1 detail
...
Port Id SubType: Mac Address
Port Id      : 00:01:02:03:04:01
...
```

▼ Enable the LLDP Notification Status or Type

By default, the notification status is disabled, and the notification type is Mis-configuration. The notification type can be set to either of the following values:

- Mis-configuration
- Remote table change

Setting the notification type to mis-configuration enables LLDP to send notification to SNMP manager when mis-configuration is observed in the system. Setting the notification type to remote table change enables LLDP to send notifications to the SNMP manager whenever remote table changes occur with the configured notification interval between successive notifications.

1. At switch 1, review the default notification status and type.

```
SEFOS# show lldp interface extreme-ethernet 0/1
...
Notification Status: Disabled
Notification Type: Mis-configuration
```

2. Configure the LLDP notification type.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# lldp notification
SEFOS(config)# end
```

3. Review the notification status.

```
SEFOS# show lldp interface extreme-ethernet 0/1
...
Notification Status: Enabled
Notification Type: Mis-configuration
```

4. Configure the notification type.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# lldp notification remote-table-chg
mis-configuration
SEFOS(config)# end
```

5. Review the notification type.

```
SEFOS# show lldp interface extreme-ethernet 0/1
...
Notification Type: RemoteTableChg and MisConfiguration
```

6. Reset the notification status and type to the default value.

```
SEFOS# configure terminal
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no lldp notification
SEFOS(config)# end
```

7. Review the notification type.

```
SEFOS# show lldp interface extreme-ethernet 0/1
...
Notification Status: Disabled
Notification Type: Mis-configuration
```

▼ Clear the LLDP Traffic Counters

LLDP traffic counters are updated whenever LLDP operates in transmit and receive-transmit only modes.

1. At both switches, configure the LLDP module status as enabled.

See [“Configure the LLDP Module Status”](#) on page 11.

2. At both switches, enter the Global Configuration mode.

```
SEFOS# configure terminal
```

3. Allow both switches to transmit LLDPDUs, then clear LLDP traffic counters.

```
SEFOS(config)# clear lldp counters  
SEFOS(config)# end
```

4. On both switches, review the traffic counter values.

```
SEFOS# show lldp traffic  
Total Frames Out: 0  
Total Entries Aged: 0  
Total Frames In: 0  
Total Frames Received In Error: 0  
Total Frames Discarded: 0  
Total TLVS Unrecognized: 0  
Total TLVs Discarded: 0
```

▼ Clear the LLDP Remote Table

LLDP remote table is updated whenever LLDP operates in the transmit and receive-receive only modes.

1. At both switches, configure the LLDP module status as enabled.
See [“Configure the LLDP Module Status”](#) on page 11.
2. On both switches, enter the Global Configuration mode.

```
SEFOS# configure terminal
```

3. Allow both switches to learn the neighbors, then clear the LLDP remote table.

```
SEFOS(config)# clear lldp table  
SEFOS(config)# end
```

4. On both switches, review the remote table.

```
SEFOS# show lldp neighbors  
Capability Codes:  
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,  
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other  
  
Chassis IDLocal IntfHold-timeCapabilityPort Id  
-----  
Total Entries Displayed: 0
```

▼ View LLDP Errors

The following list contains explanations of the errors:

- **Memory allocation failures** - The number of times that memory allocation failed in LLDP.
 - **Queue overflows** - The number of times the input queue overflowed in LLDP.
 - **Table overflows** - The number of times remote-table overflows occurred in LLDP (the number of times a remote table has dropped the newly learned neighbor entry because of insufficient space in a remote system table).
- **At both switches, review the LLDP errors.**

```
SEFOS# show lldp errors
Total Memory Allocation Failures: 0
Total Input Queue Overflows: 0
Total Table Overflows: 0
```

▼ Configure LLDP Trace Options

This section contains instructions on how to configure the LLDP trace options. By default, only the critical trace setting is enabled.

1. **At switch 1, review the current setting for the default trace option.**

```
SEFOS# debug lldp
LLDP critical debugging is on
```

2. **Enable all of the trace options.**

```
SEFOS# debug lldp all
```

3. **Review the setting for the trace option.**

```
SEFOS# debug lldp
LLDP all debugging is on
```

4. **Disable all of the trace options.**

```
SEFOS# no debug lldp all
```

5. Review the trace options.

```
SEFOS# debug lldp
```

No traces are displayed after you disable all of the traces.

6. Enable packet dump, neighbor update, and VLAN name TLV traces.

```
SEFOS# debug lldp pkt-dump neigh-updt tlv vlan-name
```

7. Review the trace options.

```
SEFOS# debug lldp  
LLDP packet dump debugging is on  
LLDP Neighbor Update debugging is on  
LLDP Vlan Name tlv debugging is on
```

8. Disable the neighbor update trace.

```
SEFOS# no debug lldp neigh-updt
```

9. Review the trace options.

```
SEFOS# debug lldp  
LLDP packet dump debugging is on  
LLDP Vlan Name tlv debugging is on
```

The neighbor update trace is not displayed.

