

# Junos<sup>®</sup> OS for EX Series Ethernet Switches

## Link Layer Discovery Protocol (LLDP) on EX9200 Switches

Release

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# About the Documentation

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## Documentation and Release Notes

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To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at <http://www.juniper.net/books>.

## Supported Platforms

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For the features described in this document, the following platforms are supported:

- EX Series

## Using the Examples in This Manual

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If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

## Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

```
system {
  scripts {
    commit {
      file ex-script.xml;
    }
  }
}
interfaces {
  fxp0 {
    disable;
    unit 0 {
      family inet {
        address 10.0.0.1/24;
      }
    }
  }
}
```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

```
[edit]
user@host# load merge /var/tmp/ex-script.conf
load complete
```

## Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

```
commit {
  file ex-script-snippet.xml; }
```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:



```
[edit]
user@host# edit system scripts
[edit system scripts]
```

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

```
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the **load** command, see the *CLI User Guide*.

## Documentation Conventions

Table 1 on page ix defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

Table 2 on page ix defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
Fixed-width text like this	Represents output that appears on the terminal screen.	<pre>user@host&gt; show chassis alarms</pre> <p>No alarms currently active</p>
<i>Italic text like this</i>	<ul style="list-style-type: none"> <li>Introduces or emphasizes important new terms.</li> <li>Identifies guide names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul>	<ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS CLI User Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	<p>Configure the machine's domain name:</p> <pre>[edit] root@# set system domain-name domain-name</pre>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> <li>To configure a stub area, include the <b>stub</b> statement at the <code>[edit protocols ospf area area-id]</code> hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>
< > (angle brackets)	Encloses optional keywords or variables.	<b>stub</b> <default-metric <i>metric</i> >;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	<b>broadcast</b>   <b>multicast</b> <i>(string1   string2   string3)</i>
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	<b>community name members [</b> <i>community-ids</i> <b>]</b>
Indentation and braces ( { } )	Identifies a level in the configuration hierarchy.	<pre>[edit] routing-options {   static {     route default {       nexthop <i>address</i>;       retain;     }   } }</pre>
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
<b>GUI Conventions</b>		
<b>Bold text like this</b>	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .

## Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can provide feedback by using either of the following methods:

- Online feedback rating system—On any page at the Juniper Networks Technical Documentation site at <http://www.juniper.net/techpubs/index.html>, simply click the stars to rate the content, and use the pop-up form to provide us with information about your experience. Alternately, you can use the online feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>.
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## Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

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- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>

- Download the latest versions of software and review release notes:  
<http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications:  
<http://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum:  
<http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

## Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

## PART 1

# Overview

- [LLDP on page 3](#)



## CHAPTER 1

# LLDP

- [LLDP Overview on page 3](#)

### LLDP Overview

---

The Link Layer Discovery Protocol (LLDP) is an industry-standard, vendor-neutral method to allow networked devices to advertise capabilities, identity, and other information onto a LAN. The Layer 2 protocol, detailed in IEEE 802.1AB-2005, replaces several proprietary protocols implemented by individual vendors for their equipment.

LLDP allows network devices that operate at the lower layers of a protocol stack (such as Layer 2 bridges and switches) to learn some of the capabilities and characteristics of LAN devices available to higher layer protocols, such as IP addresses. The information gathered through LLDP operation is stored in a network device and is queried with SNMP. Topology information can also be gathered from this database.

Some of the information that can be gathered by LLDP (only minimal information is mandatory) is:

- System name and description
- Port name and description
- VLAN name and identifier
- IP network management address
- Capabilities of the device (for example, switch, router, or server)
- MAC address and physical layer information
- Power information
- Link aggregation information



**NOTE:** LLDP media endpoint discovery (LLDP-MED) is not supported on T Series routers.

LLDP frames are sent at fixed intervals on each port that runs LLDP. LLDP protocol data units (LLDP PDUs) are sent inside Ethernet frames and identified by their destination Media Access Control (MAC) address (**01:80:C2:00:00:0E**) and Ethertype (**0x88CC**).

Mandatory information supplied by LLDP is chassis ID, port ID, and a time-to-live value for this information.

LLDP is a powerful way to allow Layer 2 devices to gather details about other network-attached devices.

**Related  
Documentation**

- [Configuring LLDP on page 9](#)
- [Tracing LLDP Operations on page 25](#)
- [Example: Configuring LLDP on page 7](#)



## PART 2

# Configuration

- [Configuration Examples on page 7](#)
- [Configuration Tasks on page 9](#)
- [Configuration Statements on page 13](#)



## CHAPTER 2

# Configuration Examples

- [Example: Configuring LLDP on page 7](#)

### Example: Configuring LLDP

---

The following example configures LLDP on interface **ge-1/1/1** but disables LLDP on all other interfaces, explicitly configures the default values for all automatically enabled features, and configures a value of 30 seconds for the LLDP configuration notification interval and a value of 30 seconds for the physical topology trap interval.

```
[edit]
protocols {
  lldp {
    advertisement-interval 30;
    hold-multiplier 4;
    interface all {
      disable;
    }
    interface ge-1/1/1;
    lldp-configuration-notification-interval 30;
    ptopo-configuration-maximum-hold-time 300;
    ptopo-configuration-trap-interval 30;
    transmit-delay 2;
  }
}
```

You verify operation of LLDP with several show commands:

- **show lldp <detail>**
- **show lldp neighbors *interface-name***
- **show lldp statistics *interface-name***
- **show lldp local-information**
- **show lldp remote-global-statistics**

You can clear LLDP neighbor information or statistics globally or on an interface:

- **clear lldp neighbors *interface-name***
- **clear lldp statistics *interface-name***

You can display basic information about LLDP with the **show lldp detail** command:

```
user@host> show lldp detail
LLDP                : Enabled
Advertisement interval : 30 Second(s)
Transmit delay       : 2 Second(s)
Hold timer           : 4 Second(s)
Notification interval : 30 Second(s)
Config Trap Interval : 300 Second(s)
Connection Hold timer : 60 Second(s)
```

Interface	LLDP	Neighbor count
ge-1/1/1	Enabled	0

LLDP basic TLVs supported:

Chassis identifier, Port identifier, Port description, System name, System description, System capabilities, Management address.

LLDP 802 TLVs supported:

Link aggregation, Maximum frame size, MAC/PHY Configuration/Status, Port VLAN ID, Port VLAN name.

For more details about the output of these commands, see the [CLI Explorer](#).

**Related  
Documentation**

- [LLDP Overview on page 3](#)
- [Configuring LLDP on page 9](#)
- [Tracing LLDP Operations on page 25](#)

## CHAPTER 3

# Configuration Tasks

- [Configuring LLDP on page 9](#)

## Configuring LLDP

---

You configure LLDP by including the **lldp** statement and associated parameters at the **[edit protocols]** hierarchy level. The complete set of LLDP statements follows:

```
lldp {  
  advertisement-interval seconds;  
  disable;  
  hold-multiplier number;  
  interface (all | interface-name) {  
    disable;  
  }  
  lldp-configuration-notification-interval seconds;  
  port-id-subtype {  
    interface-name;  
    locally-assigned;  
  }  
  ptopo-configuration-maximum-hold-time seconds;  
  ptopo-configuration-trap-interval seconds;  
  traceoptions {  
    file filename <files number> <size size> <world-readable | no-world-readable>;  
    flag flag <flag-modifier> <disable>;  
  }  
  transmit-delay seconds  
}
```

The following statements have default values:

- **advertisement-interval**—The default value is 30 seconds. The allowable range is from 5 through 32768 seconds.
- **hold-multiplier**—The default values is 4. The allowable range is from 2 through 10.
- **ptopo-configuration-maximum-hold-time**—The default value is 300 seconds. The allowable range is from 1 through 2147483647 seconds.
- **transmit-delay**—The default values is 2 seconds. The allowable range is from 1 through 8192 seconds.

The following statements must be explicitly configured:

- **lldp-configuration-notification-interval**—The allowable range is from 0 through 3600 seconds. There is no default value.
- **ptopo-configuration-trap-interval**—The allowable range is from 1 through 2147483647 seconds. There is no default value.

To disable LLDP on all or a particular interface, include the **interfaces** statement at the **[edit protocols lldp]** hierarchy level:

```
interface (all | interface-name) {  
  disable;  
}
```

To disable LLDP on all interfaces, use the **all** option. To disable LLDP on a particular interface, include the **disable** statement with the interface name.

To configure LLDP on a T Series router within a TX Matrix, you must specify the interface name in the LLDP configuration for the TX Matrix. For information about interface names for TX Matrix routers, see *TX Matrix Router Chassis and Interface Names*. For information about FPC numbering, see *Routing Matrix with a TX Matrix Router FPC Numbering*



**NOTE:** The **interface-name** must be the physical interface (for example, **ge-1/0/0**) and not a logical interface (unit).

The advertisement interval determines the frequency that an LLDP interface sends LLDP advertisement frames. The default value is 30 seconds. The allowable range is from 5 through 32768 seconds. You adjust this parameter by including the **advertisement-interval** statement at the **[edit protocols lldp]** hierarchy level.

The hold multiplier determines the multiplier to apply to the advertisement interval. The resulting value in seconds is used to cache learned LLDP information before discard. The default value is 4. When used with the default advertisement interval value of 30 seconds, this makes the default cache lifetime 120 seconds. The allowable range of the hold multiplier is from 2 through 10. You adjust this parameter by including the **hold-multiplier** statement at the **[edit protocols lldp]** hierarchy level.

The transmit delay determines the delay between any two consecutive LLDP advertisement frames. The default value is 2 seconds. The allowable range is from 1 through 8192 seconds. You adjust this parameter by including the **transmit-delay** statement at the **[edit protocols lldp]** hierarchy level.

The physical topology configuration maximum hold time determines the time interval for which an agent device maintains physical topology database entries. The default value is 300 seconds. The allowable range is from 1 through 2147483647 seconds. You adjust this parameter by including the **ptopo-configuration-maximum-hold-time** statement at the **[edit protocols lldp]** hierarchy level.

The LLDP configuration notification interval determines the period for which trap notifications are sent to the SNMP Master Agent when changes occur in the database

of LLDP information. This capability is disabled by default. The allowable range is from 0 (disabled) through 3600 seconds. You adjust this parameter by including the **lldp-configuration-notification-interval** statement at the **[edit protocols lldp]** hierarchy level.

The physical topology configuration trap interval determines the period for which trap notifications are sent to the SNMP Master Agent when changes occur in the global physical topology statistics. This capability is disabled by default. The allowable range is from 0 (disabled) through 3600 seconds. The LLDP agent sends traps to the SNMP Master Agent if this interval has a value greater than 0 and there is any change during the **lldp-configuration-notification-interval** trap interval. You adjust this parameter by including the **ptopo-configuration-trap-interval** statement at the **[edit protocols lldp]** hierarchy level.

By default, LLDP generates the SNMP index of the interface for the port ID Type, Length, and Value (TLV). Starting with Junos OS Release 12.3R1, you can generate the interface name as the port ID TLV by including the **interface-name** statement at the **[edit protocols lldp port-id-subtype]** hierarchy level. When configure the **interface-name** statement on the remote LLDP neighbor, the **show lldp neighbors** command displays the interface name in the **Port ID** field rather than the SNMP index of the interface, which is displayed by default. If you change the default behavior of generating the SNMP index of the interface as the Port ID TLV, you can reenable the default behavior by including the **locally-assigned** statement at the **[edit protocols lldp port-id-subtype]** hierarchy level.

#### Related Documentation

- [LLDP Overview on page 3](#)
- [Tracing LLDP Operations on page 25](#)
- [Example: Configuring LLDP on page 7](#)
- *TX Matrix Router Chassis and Interface Names*
- *Miscellaneous Commands for a Routing Matrix with a TX Matrix Router*





## CHAPTER 4

# Configuration Statements


- [lldp](#) on page 14
- [advertisement-interval](#) on page 15
- [disable](#) on page 16
- [hold-multiplier](#) on page 16
- [interface](#) on page 17
- [lldp-configuration-notification-interval](#) on page 18
- [ptopo-configuration-maximum-hold-time](#) on page 18
- [ptopo-configuration-trap-interval](#) on page 19
- [traceoptions \(Protocols LLDP\)](#) on page 20
- [transmit-delay](#) on page 22

## lldp

---

<b>Syntax</b>	<pre>lldp {     advertisement-interval <i>seconds</i>;     disable;     hold-multiplier <i>number</i>;     interface (all   <i>interface-name</i>) {         disable;     }     lldp-configuration-notification-interval <i>seconds</i>;     port-id-subtype {         interface-name;         locally-assigned;     }     ptopo-configuration-maximum-hold-time <i>seconds</i>;     ptopo-configuration-trap-interval <i>seconds</i>;     traceoptions {         file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>maximum-file-size</i>&gt; &lt;world-readable           no-world-readable&gt;;         flag <i>flag</i> &lt;disable&gt;;     } }</pre>
<b>Hierarchy Level</b>	[edit protocols], [edit routing-instances <i>routing-instance-name</i> protocols]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	(MX Series and T Series routers and EX Series switches only) Specify LLDP configuration parameters.
<b>Options</b>	The statements are explained separately.
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring LLDP on page 9</a></li></ul>

## advertisement-interval

<b>Syntax</b>	<code>advertisement-interval seconds;</code>
<b>Hierarchy Level</b>	[edit protocols <a href="#">lldp</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">lldp</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6 for MX Series and T Series routers. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
<b>Description</b>	<p>For MX Series and T Series routers and EX Series switches, configure an interval for LLDP advertisement.</p> <p>For switches configured for Link Layer Discovery Protocol, configure the frequency at which LLDP advertisements are sent.</p> <p>The <b>advertisement-interval</b> value must be greater than or equal to four times the <b>transmit-delay</b> value, or an error will be returned when you attempt to commit the configuration.</p>
	<div>  <p><b>NOTE:</b> The default value of <b>transmit-delay</b> is 2 seconds. If you configure the <b>advertisement-interval</b> as less than 8 seconds and you do not configure a value for <b>transmit-delay</b>, the default value of <b>transmit-delay</b> is automatically changed to 1 second in order to satisfy the requirement that the <b>advertisement-interval</b> value must be greater than or equal to four times the <b>transmit-delay</b> value.</p> </div>
<b>Default</b>	Disabled.
<b>Options</b>	<p><b>seconds</b>—Interval between LLDP advertisement.</p> <p><b>Default:</b> 30</p> <p><b>Range:</b> 5 through 32768</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring LLDP on page 9</a></li> <li>• <code>show lldp</code></li> <li>• <a href="#">Configuring LLDP (CLI Procedure)</a></li> <li>• <a href="#">Understanding 802.1X and LLDP and LLDP-MED on EX Series Switches</a></li> <li>• <code>transmit-delay</code></li> <li>• <a href="#">Understanding LLDP</a></li> </ul>

## disable

---


<b>Syntax</b>	disable;
<b>Hierarchy Level</b>	[edit protocols <a href="#">lldp</a> ], [edit protocols <a href="#">lldp interface</a> (all   <i>interface-name</i> )], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">lldp</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">lldp interface</a> (all   <i>interface-name</i> )]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	(MX Series and T Series routers and EX Series switches) Disable LLDP globally or on an interface.  For information about interface names, see <i>Interface Naming Overview</i> . For information about interface names for TX Matrix routers, see <i>TX Matrix Router Chassis and Interface Names</i> . For information about FPC numbering on TX Matrix routers, see <i>Routing Matrix with a TX Matrix Router FPC Numbering</i> .
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring LLDP on page 9</a></li></ul>

## hold-multiplier

---

<b>Syntax</b>	hold-multiplier <i>number</i> ;
<b>Hierarchy Level</b>	[edit protocols <a href="#">lldp</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">lldp</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	(MX Series and T Series routers and EX series switches only) Configure a value for the LLDP hold multiplier.  Hold timer interval in seconds to cache learned LLDP information before discarding.
<b>Options</b>	<i>number</i> —Advertisement interval multiplier for LLDP cache discard. <b>Default:</b> 4 (giving 120 second LLDP cache lifetime with other defaults) <b>Range:</b> 2 through 10
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring LLDP on page 9</a></li></ul>

## interface

<b>Syntax</b>	interface (all   <i>interface-name</i> ) { <b>disable</b> ; }
<b>Hierarchy Level</b>	[edit protocols <b>lldp</b> ], [edit routing-instances <i>routing-instance-name</i> protocols <b>lldp</b> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	(MX Series and T Series routers and EX Series switches only) Specify an LLDP interface.
<b>Options</b>	<i>interface-name</i> —A valid physical interface name.
<div>  <p><b>NOTE:</b> On MX Series and T Series routers, you run LLDP on a physical interface, such as ge-1/0/0, and not at the logical interface (unit) level.</p> <p>For information about interface names, see <i>Interface Naming Overview</i>. For information about interface names for TX Matrix routers, see <i>TX Matrix Router Chassis and Interface Names</i>. For information about FPC numbering on TX Matrix routers, see <i>Routing Matrix with a TX Matrix Router FPC Numbering</i>.</p> </div>	
	<b>all</b> —Run LLDP on all interfaces.
	<b>disable</b> —Disable LLDP on the specified interface
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring LLDP on page 9</a></li> </ul>

## lldp-configuration-notification-interval

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<b>Syntax</b>	lldp-configuration-notification-interval <i>seconds</i> ;
<b>Hierarchy Level</b>	[edit protocols <a href="#">lldp</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">lldp</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	(MX Series and T Series routers and EX Series switches only) Configure a time for the period of SNMP trap notifications to the Master Agent to wait regarding changes in database information.
<b>Options</b>	<b>seconds</b> —Time for the period of SNMP trap notifications about the LLDP database. This feature is disabled by default. <b>Range:</b> 0 through 3600
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring LLDP on page 9</a></li></ul>

## ptopo-configuration-maximum-hold-time

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<b>Syntax</b>	ptopo-configuration-maximum-hold-time <i>seconds</i> ;
<b>Hierarchy Level</b>	[edit protocols <a href="#">lldp</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">lldp</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	(MX Series and T Series routers and EX Series switches only) Configure a time to maintain dynamic topology entries.
<b>Options</b>	<b>seconds</b> —Time to maintain interval dynamic topology entries. <b>Default:</b> 300 <b>Range:</b> 1 through 2147483647
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring LLDP on page 9</a></li></ul>

## ptopo-configuration-trap-interval

---

<b>Syntax</b>	<code>ptopo-configuration-trap-interval <i>seconds</i>;</code>
<b>Hierarchy Level</b>	[edit protocols <a href="#">lldp</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">lldp</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	(MX Series and T Series routers and EX Series switches only) Configure a time for the period of SNMP trap notifications to the Master Agent to wait regarding changes in topology global statistics.
<b>Options</b>	<b><i>seconds</i></b> —Time for the period of SNMP trap notifications about global statistics. This feature is disabled by default. <b>Range:</b> 0 through 3600
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring LLDP on page 9</a></li></ul>

## traceoptions (Protocols LLDP)

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<b>Syntax</b>	<pre>traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>maximum-file-size</i>&gt; &lt;world-readable       no-world-readable&gt;;     flag <i>flag</i> &lt;disable&gt;; }</pre>
<b>Hierarchy Level</b>	[edit protocols <a href="#">lldp</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">lldp</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	Set LLDP protocol-level tracing options.
<b>Default</b>	The default LLDP protocol-level trace options are inherited from the global <b>traceoptions</b> statement.
<b>Options</b>	<p><b>disable</b>—(Optional) Disable the tracing operation. One use of this option is to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>file <i>filename</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name in quotation marks. We recommend that you place spanning-tree protocol tracing output in the file <b>/var/log/stp-log</b>.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you must also specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000 files <b>Default:</b> 1 trace file only</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the LLDP-specific tracing options:</p> <ul style="list-style-type: none"><li>• <b>all</b>—Trace all operations.</li><li>• <b>config</b>—Log configuration events.</li><li>• <b>interface</b>—Trace interface update events.</li><li>• <b>protocol</b>—Trace protocol information.</li><li>• <b>rtsock</b>—Trace socket events.</li><li>• <b>vlan</b>—Trace vlan update events.</li></ul>



The following are the global tracing options:

- **all**—All tracing operations.
- **config-internal**—Trace configuration internals.
- **general**—Trace general events.
- **normal**—All normal events. This is the default. If you do not specify this option, only unusual or abnormal operations are traced.
- **parse**—Trace configuration parsing.
- **policy**—Trace policy operations and actions.
- **regex-parse**—Trace regular-expression parsing.
- **route**—Trace routing table changes.
- **state**—Trace state transitions.
- **task**—Trace protocol task processing.
- **timer**—Trace protocol task timer processing.

**no-world-readable**—(Optional) Prevent any user from reading the log file. This is the default. If you do not include this option, tracing output is appended to an existing trace file.

**size maximum-file-size**—(Optional) Maximum size of each trace file, in kilobytes (KB) or megabytes (MB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When the **trace-file** again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you must also specify a maximum number of trace files with the **files** option.

**Syntax:** **xk** to specify KB, **xm** to specify MB, or **xg** to specify GB

**Range:** 10 KB through the maximum file size supported on your system

**Default:** 1 MB

**world-readable**—(Optional) Allow any user to read the log file.

<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	• <a href="#">Tracing LLDP Operations on page 25</a>

## transmit-delay

---

<b>Syntax</b>	<code>transmit-delay <i>seconds</i>;</code>
<b>Hierarchy Level</b>	[edit protocols <a href="#">lldp</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">lldp</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	(MX Series and T Series routers and EX Series switches only) Configure a delay between two successive LLDP advertisements.
<b>Options</b>	<b><i>seconds</i></b> —Delay between two successive LLDP advertisements. <b>Default:</b> 2 <b>Range:</b> 1 through 8192
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring LLDP on page 9</a></li></ul>

## PART 3

# Administration

- [Routine Monitoring on page 25](#)



# Routine Monitoring

- [Tracing LLDP Operations on page 25](#)

## Tracing LLDP Operations

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To trace LLDP operational traffic, you can specify options in the global **traceoptions** statement included at the **[edit routing-options]** hierarchy level, and you can specify LLDP-specific options by including the **traceoptions** statement:

```
traceoptions {
  file filename <files number> <size size> <world-readable | no-world-readable>;
  flag flag <flag-modifier> <disable>;
}
```

You can include this statement at the following hierarchy levels:

- **[edit protocols lldp]**
- **[edit routing-instances routing-instance-name protocols lldp]**

You can specify the following LLDP-specific options in the LLDP **traceoptions** statement:

- **all**—Trace all operations.
- **config**—Log configuration events.
- **interface**—Trace interface update events.
- **protocol**—Trace protocol information.
- **rtsock**—Trace real-time socket events.
- **vlan**—Trace VLAN update events.



**NOTE:** Use the trace flag **all** with caution. This flag may cause the CPU to become very busy.

For general information about tracing and global tracing options, see the statement summary for the global **traceoptions** statement in the *Junos OS Routing Protocols Library for Routing Devices*.

- Related Documentation**
- [LLDP Overview on page 3](#)
  - [Configuring LLDP on page 9](#)
  - [Example: Configuring LLDP on page 7](#)