



# Link Layer Discovery Protocol Configuration Guide

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# 1. Introduction to LLDP

Link Layer Discovery Protocol (LLDP) is a media-independent link layer protocol used by network devices for advertising their identity, capabilities to neighbors on a LAN segment. LLDP runs over the data-link layer only, allowing two systems running different network layer protocols to learn about each other.

LLDP supports a set of attributes that it uses to discover neighbor devices. These attributes contain type, length, and value descriptions and are referred to as TLVs. LLDP supported devices can use TLVs to receive and send information to their neighbors. Details such as configuration information, device capabilities, and device identity can be advertised using this protocol.

## 1.1. Guidelines

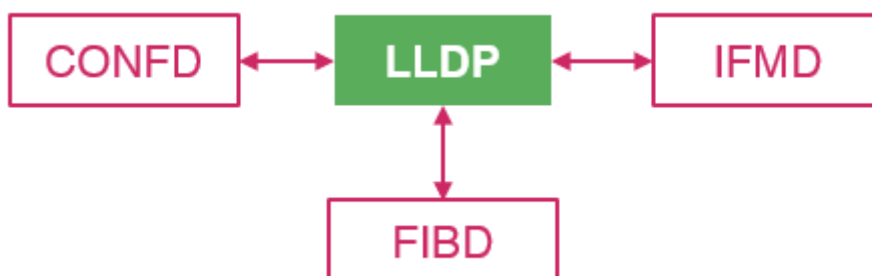
- All LLDP packets are sent to the CPU for further processing.
- LLDP packets will be lower priority packets when compared with the routing protocol packets. In case of a congestion, the LLDP packets may be policed.

## 1.2. Limitations

- The LLDP currently does not intend to work on bundle interfaces.

## 1.3. Interactions with other features

RBFS provides various daemons that run as background processes. LLDP interacts with these daemons for accessing necessary configurations.



The table below shows the interactions of LLDP with the other daemons of RBFS.

<b>Daemon Name</b>	<b>Daemon Description</b>	<b>Interaction Details</b>
Confd	Configuration	<p><i>Confd</i> stores all the LLDP configuration information. LLDP subscribes for the following tables of <i>Confd</i>:</p> <ul style="list-style-type: none"><li>• global.lldp.config</li><li>• global.lldp.interface.config</li></ul>
IFMD	Interface Monitoring	<p>LLDP is enabled on the physical interface. LLDP subscribes to the IFP table to find the status of the physical link. An LLDP message can be sent only to those interfaces whose link state is UP.</p>
FIBD	Forwarding Information Base	<p><i>FIBD</i> subscribes for the LLDP interface table which has all the information required for enabling LLDP on the interface. This is used to program in VPP. Any neighbor detected, VPP will notify and this detection is stored in the FIBD table for tracking purpose. Each time a message is received from the neighbor, it will be updated in this table. Thus, the history of the messages received from the neighbor is tracked. This information is stored in one of the FIBD tables. LLDP subscribes to this table to find its neighbor.</p>

## 2. LLDP Configuration

This section describes how to enable and configure LLDP.

### 2.1. Default LLDP Configuration

The table below shows the default LLDP configuration. To change the default settings, use the LLDP global configuration and LLDP interface-level configuration commands.

Table 1. Default LLDP Configuration

Feature	Default Setting
LLDP global state	Enabled
LLDP holdtime (before discarding)	120 seconds
LLDP transmission interval (packet update frequency)	30 seconds
LLDP interface state	Enabled

### 2.2. LLDP Global Configuration Commands

You need to configure all the LLDP configuration commands under the config mode (default mode) in CLI.

#### Config Mode

To enter into the configuration mode, enter the following command:

```
root@rtbrick:~$ cli
root@rtbrick: cfg>
```

#### 2.2.1. Enabling or Disabling LLDP

LLDP is enabled by default. The command "set lldp admin-status disable" is used to disable it. If you want to re-enable it, run the "set lldp admin-status enable" command.

To disable or enable LLDP globally, enter the following command:

```
set lldp admin-status [disable | enable]
```

#### Command arguments

Disable	Disables LLDP.
---------	----------------

Enable	Enables LLDP.
--------	---------------

## Example

```
root@rtbrick:~# configure terminal
root@rtbrick:~# set lldp admin-status enable
root@rtbrick:~# commit
root@rtbrick:~# show config
{
  "data": {
    "rtbrick-config:lldp": {
      "admin-status": "enable"
    }
  }
}
```

### 2.2.1.1. Deleting LLDP Configuration

You can delete the LLDP configuration so that default configuration will be restored, that means, LLDP will be enabled in the system.

To delete the LLDP configuration, enter the following command:

**delete lldp admin-status [disable | enable]**

## Example

```
root@rtbrick:~# configure terminal
root@rtbrick:~# delete lldp admin-status disable
root@rtbrick:~# commit
root@rtbrick:~# show config
{
  "data": {
    "rtbrick-config:lldp": {
    }
  }
}
```

### 2.2.2. Configuring System Name

To configure a system name that is sent to the neighbors in the system name TLV, enter the following command.

**set lldp system-name <system name>**



If the system name is not configured, it is fetched from BDS.

## Command arguments

system-name	LLDP global system name to be sent to the neighbor
-------------	--

### Example

```

root@rtbrick:~# configure terminal
root@rtbrick:~# set lldp system-name rtbrick
root@rtbrick:~# commit
root@rtbrick:~# show config
{
  "data": {
    "rtbrick-config:lldp": {
      "system-name": "rtbrick"
    }
  }
}

```

### 2.2.2.1. Deleting System Name

The delete command allows you to delete the system-name configuration and set the default system name fetched from BDS.

### Example

```

root@rtbrick:~# configure terminal
root@rtbrick:~# delete lldp system-name rtbrick
root@rtbrick:~# commit
root@rtbrick:~# show config
{
  "data": {
    "rtbrick-config:lldp": {
    }
  }
}

```

### 2.2.3. Configuring System Description

To configure a system description that can be sent to the neighbor, enter the following command.

**set lldp system-description** <system-description>

### Command arguments

system-name	LLDP global system description to be sent to the neighbor
-------------	---

### Example



```
root@rtbrick: cfg> set lldp system-description "this is rtbrick system"
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
      "system-description": "this is rtbrick system"
    }
  }
}
```

### 2.2.3.1. Deleting the System Description Configuration

The delete command allows you to delete the system-description configuration from LLDP.

#### Example

```
root@rtbrick: cfg> delete lldp system-description "this is rtbrick system"
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
    }
  }
}
```

### 2.2.4. Configuring the Packet Transmission Interval

This interval specifies how often interfaces retransmit advertisements to their neighbors. To configure the interval (in seconds) at which LLDP packets are sent from the interfaces on which LLDP is configured, enter the following command.

**set lldp tx-interval** <advertisement-interval>

#### Command arguments

advertisement-interval	interval(in seconds) at which LLDP packets are sent to neighbors. Default interval value is 30 seconds. The transmission interval range is 1 through 3600 seconds.
------------------------	--

#### Example

```

root@rtbrick: cfg> set lldp tx-interval 40
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
      "tx-interval": 40
    }
  }
}

```

### 2.2.4.1. Deleting the Packet Transmission Interval Configuration

The delete command allows you to delete Packet Transmission Interval Configuration and set it to the default (30 sec).

#### Example

```

root@rtbrick: cfg> delete lldp tx-interval 40
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
    }
  }
}

```

### 2.2.5. Configuring the LLDP Transmission Holdtime

Specifies the amount of time (in seconds) a receiving device maintains the neighbor information before aging your device. If the timer expires and no LLDP packet was received, the neighbor will be marked as DOWN. The following command is used to configure the holdtime.

**set lldp tx-hold** <transmit-hold-time>

#### Command arguments

transmit-hold-time	Specifies the amount of time (in seconds) a receiving device maintains the neighbor information before aging your device. If the timer expires and no LLDP packet was received, the neighbor will be marked as DOWN. Default value is 120 seconds. The hold-time range is 1 through 360000.
--------------------	---

#### Example

```
root@rtbrick: cfg> set lldp tx-hold 150
root@rtbrick: cfg> commit

root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
      "tx-hold": 150
    }
  }
}
```

### 2.2.5.1. Deleting the LLDP Transmission Holdtime Configuration

The delete command allows you to delete the transmission Holdtime configuration and set it to the default (120 sec).

#### Example

```
root@rtbrick: cfg> delete lldp tx-hold 150
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
    }
  }
}
```

## 2.3. Interface level LLDP Configuration Commands

### 2.3.1. Enabling and Disabling LLDP on an Interface

By default, LLDP is enabled on all supported interfaces. You can disable it on an individual interface using the "set lldp interface ifp-name disable" command. If you want to re-enable it, run the "set lldp interface ifp-name enable" command.

To disable/enable LLDP on an interface, enter the following command:

```
set lldp interface <interface-name> admin-status [disable | enable]
```

#### Command arguments

interface-name	Name of the interface on which you are enabling/disabling LLDP
----------------	--



- Interface level configuration will override the global lldp enable/disable functionality.

## Example

```
root@rtbrick: cfg> set lldp interface ifp-0/0/1 admin-status enable
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
      "interface": [
        {
          "interface-name": "ifp-0/0/1",
          "admin-status": "enable"
        }
      ]
    }
  }
}

root@rtbrick: cfg> set lldp interface ifp-0/0/1 admin-status disable
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
      "interface": [
        {
          "interface-name": "ifp-0/0/1",
          "admin-status": "disable"
        }
      ]
    }
  }
}
```

### 2.3.1.1. Deleting the LLDP Enable/Disable Configuration on an Interface

The delete command allows you to delete the LLDP Enable/Disable Configuration on an Interface and enable the global lldp enable/disable configuration

## Example

```

root@rtbrick: cfg> delete lldp interface ifp-0/0/1 admin-status disable
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
      "interface": [
        {
          "interface-name": "ifp-0/0/1",
        }
      ]
    }
  }
}

```

## 2.3.2. Configuring the Port Description

To configure the port description that is sent to the neighbor, enter the following command.

**set lldp interface** <interface-name> **port-desc** <port-desc>



If the port description is not configured, the description configured under interface from IFMD is taken as LLDP port description.

### Command arguments

interface-name	Name of the interface
port-desc	LLDP port description to be sent to the neighbor

### Example

```

root@rtbrick: cfg> set lldp interface ifp-0/0/1 port-description "this is port ifp-
0/0/1"
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
      "interface": [
        {
          "interface-name": "ifp-0/0/1",
          "port-description": "this is port ifp-0/0/1"
        }
      ]
    }
  }
}

```

### 2.3.2.1. Deleting the Port Description Configuration

The delete command allows you to port description configuration.

#### Example

```
root@rtbrick: cfg> delete lldp interface ifp-0/0/1 port-description "this is port ifp-
0/0/1"
root@rtbrick: cfg> commit
root@rtbrick: cfg> show config
{
  "data": {
    "rtbrick-config:lldp": {
      "interface": [
        {
          "interface-name": "ifp-0/0/1",
        }
      ]
    }
  }
}
```

## 3. LLDP Show Commands

All the LLDP show commands has to be configured under the operation mode in CLI.

### Operation Mode

To enter into the operation mode, enter the below commands:

```
root@rtbrick:~$ cli
root@rtbrick: cfg> switch-mode operation
Activating syntax mode : op [operation]
root@rtbrick: op>
```

### 3.1. Displaying LLDP System Summary

To display the summary information such as system name, frequency of transmissions, the holdtime for packets being sent, TLVs, and and the disabled TLVs, enter the following command:

**show lldp summary**

#### Example

```
root@rtbrick: op> show lldp summary
Mode: global
System hostname: fwdd-r1
Transmit interval: 30 sec
Transmit holdtime: 120 sec
```

### 3.2. Displaying LLDP Interface Summary

To display the information about interfaces where LLDP is enabled, enter the following command:

**show lldp interface**

#### Example

```

root@rtbrick: op> show lldp interface
Interface name      Status  MAC address      Description
ifp-0/0/0           Down   7a:77:6a:01:00:01  Physical interface #0 from node
0, chip 0
ifp-0/0/1           Up     7a:77:6a:01:00:02  Physical interface #1 from
node 0, chip 0
ifp-0/0/2           Up     7a:77:6a:01:00:05  Physical interface #2 from
node 0, chip 0

```

### 3.3. Displaying LLDP Neighbors

To display the information of all neighbor, enter the following command:

**show lldp neighbor**

#### Example

```

root@rtbrick: op> show lldp neighbor
Neighbor name      Status  Remote port ID   Local port ID   Neighbor MAC address
Last received     Last sent
fwd-r2            Up     ifp-0/0/1        ifp-0/0/1
7a:1a:c9:00:00:01 0:00:05 ago      0:00:05 ago
fwd-r2            Up     ifp-0/0/2        ifp-0/0/2
7a:1a:c9:00:00:04 0:00:05 ago      0:00:05 ago

```

### 3.4. Displaying LLDP Neighbor Detail

To display the information in detail about a specific LLDP neighbor or all neighbors enter the following command:

**show lldp neighbor [detail | <interface-name>]**

interface-name	Name of the interface on which neighbor is formed
----------------	---

#### Example to show all neighbors



```
root@rtbrick: op> show lldp neighbor detail

Neighbor: fwdd-r2
  Neighbor MAC address: 7a:1a:c9:00:00:01
  Neighbor port ID: ifp-0/0/1
  Neighbor port description: Physical interface #1 from node 0, chip 0
  Neighbor TTL: 121
  Neighbor timeout: 121000
  Local interface: ifp-0/0/1
  Local MAC address: 7a:77:6a:01:00:02
  Local port description: Physical interface #1 from node 0, chip 0
  Packets sent: 35
  Packets received: 36
  Neighbor status: Up

Neighbor: fwdd-r2
  Neighbor MAC address: 7a:1a:c9:00:00:04
  Neighbor port ID: ifp-0/0/2
  Neighbor port description: Physical interface #2 from node 0, chip 0
  Neighbor TTL: 121
  Neighbor timeout: 121000
  Local interface: ifp-0/0/2
  Local MAC address: 7a:77:6a:01:00:05
  Local port description: Physical interface #2 from node 0, chip 0
  Packets sent: 35
  Packets received: 36
  Neighbor status: Up
```

### Example to show a specific neighbor

```
root@rtbrick: op> show lldp neighbor ifp-0/0/1
Neighbor: fwdd-r2
  Neighbor MAC address: 7a:1a:c9:00:00:01
  Neighbor port ID: ifp-0/0/1
  Neighbor port description: Physical interface #1 from node 0, chip 0
  Neighbor TTL: 121
  Neighbor timeout: 121000
  Local interface: ifp-0/0/1
  Local MAC address: 7a:77:6a:01:00:02
  Local port description: Physical interface #1 from node 0, chip 0
  Packets sent: 148
  Packets received: 149
  Neighbor status: Up
```

## 4. Monitoring and Maintaining LLDP

This section explains the commands that help you monitor and maintain LLDP on your device.

### 4.1. Clearing LLDP Neighbor

To reset the neighbor and clear the LLDP counters, enter the following command:

```
clear lldp neighbor all
```

#### Command Modes

```
rtb lldpd
```

#### Example to reset all the neighbors

```
leaf:lldpd> clear lldp neighbor all
```

#### Example to reset a specific neighbor

```
leaf:lldpd> clear lldp neighbor memif-0/1/1
```