UniDirectional Link Detection (UDLD) Protocol

First Published: March 28, 2013

This document describes how to configure the UniDirectional Link Detection (UDLD) protocol on the Cisco ASR 1000 Series Aggregation Services Routers.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest information about features and caveats, see the release notes document pertaining to your platform and software release. To find information about the features documented in this module and to view a list of the releases in which each feature is supported, see the Feature Information for Configuring UDLD on Cisco ASR 1000 Series Aggregation Services Routers, on page 11.

Use the Cisco Feature Navigator to find information about platform support and Cisco IOS and Cisco Catalyst operating system software image support. To access the Cisco Feature Navigator, go to http://www.cisco.com/go/cfn . An account on Cisco.com is not required.

Contents

Restrictions for the UDLD Protocol

Currently, the UDLD protocol on the Cisco ASR 1000 Series Aggregation Services Routers has the following limitations:

- High Availability (HA) is not supported, but when the Ethernet port is up and UDLD is enabled on the port, the UDLD automatically performs the detection.
- Only Gigabit Ethernet, 10 Gigabit Ethernet, and Fast Ethernet interfaces are supported.
- Supports only the basic UDLD functions.

Information About the UDLD Protocol

These sections describe how UDLD works:

UDLD Overview

The Cisco-proprietary UDLD protocol allows the devices connected through fiber optic or copper (for example, Category 5 cabling) Ethernet cables that are connected to the LAN ports to monitor the physical configuration of the cables and detect whether a unidirectional link exists. When a unidirectional link is detected, the UDLD shuts down the affected LAN port and alerts the corresponding user, because unidirectional links cause a variety of problems, including spanning tree topology loops.

UDLD is a Layer 2 protocol that works with the Layer 1 protocols to determine the physical status of a link. In Layer 1, auto negotiation takes care of physical signaling and fault detection. UDLD performs tasks that auto negotiation cannot perform, such as detecting the identities of neighbors and shutting down misconnected LAN ports. When you enable both auto negotiation and UDLD, the Layer 1 and Layer 2 detections work together to prevent physical and logical unidirectional connections and the malfunctioning of other protocols.

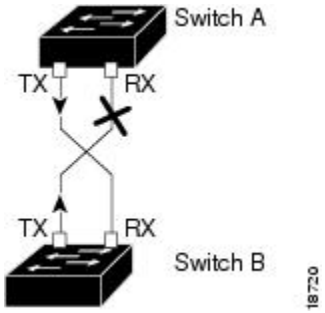
A unidirectional link occurs whenever the traffic transmitted by a local device over a link is received by a neighbor, but traffic transmitted from the neighbor is not received by the local device. If one of the fiber strands in a pair is disconnected, the link does not stay up as long as the auto negotiation is active. In such a scenario, the logical link is undetermined, and the UDLD does not take any action. If both the fibers are working normally in Layer 1, the UDLD in Layer 2 determines whether those fibers are connected correctly and whether the traffic is flowing bidirectionally between the correct neighbors. This check cannot be performed by auto negotiation because auto negotiation operates in Layer 1.

The Cisco ASR 1000 Series Aggregation Services Routers periodically transmit the UDLD packets to the neighbor devices on LAN ports where UDLD is enabled. If the packets are echoed back within a specific timeframe and they are lacking a specific acknowledgment (echo), the link is flagged as unidirectional and the LAN port is shut down. Devices on both ends of the link must support UDLD for the protocol to successfully identify and disable the unidirectional links.

Note By default, the UDLD is disabled on all ports to avoid sending unnecessary traffic.

The following figure shows an example of a unidirectional link condition. Switch B successfully receives traffic from Switch A on the port. However, Switch A does not receive traffic from Switch B on the same port. UDLD detects the problem and disables the port.

Figure 1: Unidirectional Link



Configuring the UDLD Aggressive Mode

Configure the UDLD aggressive mode only on the point-to-point link between the network devices that support the UDLD aggressive mode. With UDLD aggressive mode enabled, a port on a bidirectional link that has a UDLD neighbor relationship established stops receiving the UDLD packets. The UDLD tries to re-establish the connection with the neighbor; the port is disabled after eight failed retries.

To prevent spanning tree loops, nonaggressive UDLD with the default interval of 15 seconds is fast enough to shut down a unidirectional link before a blocking port transitions to the forwarding state (with default spanning tree parameters).

When the UDLD aggressive mode is enabled, the UDLD will error disable the ports on the link to prevent the traffic from being discarded under the following scenarios:

- One side of a link has a port (either Tx and Rx) stuck.
- One side of a link remains up while the other side of the link has gone down.

Default UDLD Configuration

The following table shows the default UDLD configuration.

Table 1: UDLD Default Configuration

Feature	Default Value
UDLD global enable state	Globally disabled
UDLD aggressive mode	Disabled
UDLD per-port enable state for fiber-optic media	Disabled
UDLD per-port enable state for twisted-pair (copper) media	Disabled on all Ethernet 10/100 and 1000BASE-TX LAN ports

How to Configure the UDLD Protocol

These sections describe how to configure the UDLD protocol:

Enabling UDLD Globally

To globally enable the UDLD on all fiber-optic LAN ports, perform this task:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **udld** {**enable** | **aggressive**}

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router# enable`	Enables the privileged EXEC mode. Enter your password, if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**udld** {**enable**	**aggressive**} **Example:** `no udld {enable | aggressive}` **Example:** *`Router(config)#`* **`udld enable`**	Enables the UDLD globally on fiber-optic LAN ports. **Note** This command configures only the fiber-optic LAN ports. Individual LAN port configuration overrides the setting of this command. Use the no form of this command to disable the UDLD globally on fiber-optic LAN ports.

Enabling UDLD on Individual LAN Interfaces

To enable the UDLD on individual LAN interfaces, perform this task:

SUMMARY STEPS

1. **enable**
2. configure terminal
3. **interface** *type slot/port*
4. **udld port [aggressive]**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable**	**Enables the privileged EXEC mode.**

	Command or Action	Purpose
	Example: `Router> enable`	**Enter your password, if prompted.**
Step 2	configure terminal **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**interface** *type slot/port* **Example:** `Router(config)# interface gigabitethernet2/2`	Selects the LAN port to configure.

Step 4	**udld port [aggressive]**
	Example:
	`no udld port [aggressive]`
	Example:
	`Router(config)# udld port aggressive`
		Enables UDLD on a specific LAN port. Enter the aggressive keyword to enable the aggressive mode. On a fiber-optic LAN port, this command overrides the udld enable global configuration command setting.
		Use the no form of this command to disable the UDLD on a nonfiber-optic LAN port.
		`On fiber-optic LAN ports, the no udld port command reverts the LAN port configuration to the udld enable global configuration command setting.`

Disabling UDLD on Fiber-Optic LAN Interfaces

To disable the UDLD on individual fiber-optic LAN ports, perform this task:

SUMMARY STEPS

1. **enable**
2. configure terminal
3. **interface** *type slot/port*
4. **udld port disable**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	**Enables the privileged EXEC mode.** **Enter your password, if prompted.**
Step 2	configure terminal **Example:**	Enters the global configuration mode.

	Command or Action	Purpose
	`Router# configure terminal`	
Step 3	**interface** *type slot/port* **Example:** `Router(config)# interface gigabitethernet2/2`	Selects the LAN port to configure.

Step 4	**udld port disable**
	Example:
	`no udld port disable`
	Example:
	`Router(config)# udld port disable`
		Disables UDLD on a fiber-optic LAN port.
		Use the no form of this command to revert to the **udld enable** global configuration command setting.
		Note This command is supported only on the fiber-optic LAN ports.

Configuring the UDLD Probe Message Interval

To configure the time between UDLD probe messages on ports that are in the advertisement mode and are currently determined to be bidirectional, perform this task:

SUMMARY STEPS

1. **enable**
2. configure terminal
3. **udld message time** *interval*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	**Enables the privileged EXEC mode.** **Enter your password, if prompted.**
Step 2	configure terminal **Example:** `Router# configure terminal`	Enters the global configuration mode.
Step 3	**udld message time** *interval* **Example:** `no udld message` **Example:**	Configures the time between the UDLD probe messages on the ports that are in the advertisement mode and are currently determined to be bidirectional. Valid values are from 7 to 90 seconds. Use the no form of this command to return to the default value (15 seconds).

	Command or Action	Purpose
	`Router(config)# udld message time 60`	

Resetting the Disabled LAN Interfaces Manually

To reset all the LAN ports that have been shut down by UDLD, perform this task:

SUMMARY STEPS

1. **enable**
2. udld reset

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	**Enables the privileged EXEC mode.** **Enter your password, if prompted.**
Step 2	udld reset **Example:** `Router# udld reset`	Resets all the LAN ports that have been shut down by UDLD.

Resetting the Disabled LAN Interfaces Automatically

To automatically reset all the LAN ports that have been shut down by UDLD, perform this task:

SUMMARY STEPS

1. **enable**
2. configure terminal
3. udld recovery
4. udld recovery interval interval

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	**Enables the privileged EXEC mode.** **Enter your password, if prompted.**
Step 2	configure terminal **Example:**	Enters the global configuration mode.

	Command or Action	Purpose
	`Router# configure terminal`	

Step 3	udld recovery
	Example:
	`no udld recovery`
	Example:
	`Router(config)# udld recovery`
		Enables the recovery timer for the UDLD error disabled state.
		Use the no form of this command to disable the recovery timer for the UDLD error disabled state.

Step 4	udld recovery interval interval
	Example:
	`no udld recovery interval`
	Example:
	`Router(config)# udld recovery interval 100`
		Specifies the time to recover from a UDLD error disabled state. Valid values are from 30 to 86400 seconds.
		Use the no form of this command to return to the default value (300 seconds).

Debugging UDLD

To enable the debugging of an UDLD activity, perform this task:

SUMMARY STEPS

1. **enable**
2. **debug udld** {events | packets | registries}

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	**Enables the privileged EXEC mode.** **Enter your password, if prompted.**
Step 2	**debug udld** {events | packets | registries} **Example:** `no debug udld {events	packets	registries}` **Example:** `Router# debug udld events`	Enables the debugging of UDLD process events, packets, or registry events. Use the no form of this command to disable the debugging of UDLD process events, packets, or registry events.

Configuration Examples for UDLD Protocol

The secion provides the following configuration examples:

Example: Verifying a UDLD Configuration, on page 9

Example: Verifying Information About Neighbors, on page 9

Example: Displaying all the UDLD Interface Statuses, on page 9

Example: Verifying a UDLD Configuration

The following example show how to use the show command to verify an UDLD configuration:

Sample Output for the show udld interface-id Command

```
Router# show udld gigabitethernet2/2
Interface Gi2/2
---
Port enable administrative configuration setting: Follows device default
Port enable operational state: Enabled
Current bidirectional state: Bidirectional
Current operational state: Advertisement
Message interval: 60
Time out interval: 5
No multiple neighbors detected

 Entry 1
---
 Expiration time: 146
 Device ID: 1
 Current neighbor state: Bidirectional
 Device name: 0050e2826000
 Port ID: 2/1
 Neighbor echo 1 device: SAD03160954
 Neighbor echo 1 port: Gi1/1
 Message interval: 5
 CDP Device name: 066527791
```

Example: Verifying Information About Neighbors

The following example shows how to view the information pertaining to neighbors:

Sample Output for the show udld neighbors Command

```
Router# show udld neighbors
Port     Device Name                    Device ID    Port-ID OperState
-------- ------------------------------ ------------ ------- --------------
Gi3/1    SAL0734K5R2                    1            Gi4/1   Bidirectional
Gi4/1    SAL0734K5R2                    1            Gi3/1   Bidirectional
```

Example: Displaying all the UDLD Interface Statuses

The follwing example shows how to display all the UDLD interface statuses:

Sample Output for the show udld Command

```
Router# show udld
Interface Gi0/0/0
---
Port enable administrative configuration setting: Follows device default
Port enable operational state: Disabled
Current bidirectional state: Unknown
Interface Gi0/0/1
---
Port enable administrative configuration setting: Follows device default
Port enable operational state: Disabled
Current bidirectional state: Unknown
Interface Fa0/1/0
---
Port enable administrative configuration setting: Disabled
Port enable operational state: Disabled
Current bidirectional state: Unknown
Interface Fa0/1/1
---
Port enable administrative configuration setting: Disabled
Port enable operational state: Disabled
.
.
.
```

Additional References

The following sections provide references related to the UniDirectional Link Detection (UDLD) protocol on the Cisco ASR 1000 Series Aggregation Services Routers.

Related Documents

Related Topic	Document Title
Cisco IOS Configuration Fundamentals	Cisco IOS Configuration Fundamentals Command Reference

Standards

Standard	Title
No new or modified standards are supported by this feature.	—

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use the Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC[1]	Title
RFC 5171	Cisco Systems UniDirectional Link Detection (UDLD) Protocol

[1] Not all the supported RFCs are listed.

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for Configuring UDLD on Cisco ASR 1000 Series Aggregation Services Routers

The following table lists the features in this module and provides links to specific configuration information. Only features that were introduced or modified in Cisco IOS Release 3.9S or later appear in the table.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the corresponding command reference documentation.

Use the Cisco Feature Navigator to find information about platform support and software image support. The Cisco Feature Navigator enables you to determine which Cisco IOS and Cisco Catalyst operating system software images support a specific software release, feature set, or platform. To access the Cisco Feature Navigator, go to http://www.cisco.com/go/cfn . An account on Cisco.com is not required.

Table 2: Feature Information for Configuring UDLD on Cisco ASR 1000 Series Aggregation Services Routers

Feature Name	Releases	Feature Information
UniDirectional Link Detection (UDLD) protocol	3.9S	The Cisco-proprietary UDLD protocol allows devices connected through fiber-optic or copper (for example, Category 5 cabling) Ethernet cables connected to LAN ports to monitor the physical configuration of the cables and detect when a unidirectional link exists. When a unidirectional link is detected, UDLD shuts down the affected LAN port and alerts users. Unidirectional links can cause a variety of problems, including spanning tree topology loops. In Cisco IOS XE Release 3.9S, this feature was implemented on the Cisco ASR 1000 Series Aggregation Services Routers. The following sections provide information about this feature: