Configuring UDLD

This chapter describes how to configure the UniDirectional Link Detection (UDLD) protocol. Release 12.2(33)SXI4 and later releases support fast UDLD, which provides faster detection times.

Note For complete syntax and usage information for the commands used in this chapter, see the Cisco IOS Master Command List, at this URL:

http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html

Tip For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html

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This chapter consists of these sections:

Understanding UDLD

Normal-mode UDLD classifies a link as unidirectional if the received UDLD packets do not contain information that is correct for the neighbor device. In addition to the functionality of normal mode UDLD, aggressive-mode UDLD puts ports into the errdisabled state if the relationship between two previously synchronized neighbors cannot be reestablished.

These sections describe how UDLD works:

UDLD Overview

The Cisco-proprietary UDLD protocol monitors the physical configuration of the links between devices and ports that support UDLD. UDLD detects the existence of unidirectional links. When a unidirectional link is detected, UDLD puts the affected port into the errdisabled state and alerts the user. UDLD can operate in either normal or aggressive mode.

For example, UDLD can help prevent these problems:

- Spanning tree topology loops caused by unidirectional links
- Incorrect cabling of unbundled fiber strands
- Transceiver or link hardware malfunction
- Incorrect or excessive flooding of packets
- Loss of traffic without notice (also known as black holing)

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

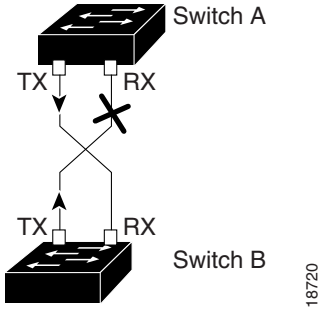
A unidirectional link occurs whenever traffic transmitted by the local device over a link is received by the neighbor, but traffic transmitted from the neighbor is not received by the local device. If one of the fiber strands in a pair is disconnected, as long as autonegotiation is active, the link does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

LAN ports with UDLD enabled periodically transmit UDLD packets to neighbor devices. If the packets are echoed back within a specific time frame (the message detection time is 3 times as long as the message interval, plus a timeout period) 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 in order for the protocol to successfully identify and disable unidirectional links.

Note By default, UDLD is disabled on nonfiber LAN ports to avoid sending unnecessary control traffic on this type of media because it is often used for access ports.

Figure 9-1 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 9-1 Unidirectional Link



UDLD Aggressive Mode

UDLD aggressive mode is disabled by default. Configure UDLD aggressive mode only on point-to-point links between network devices that support UDLD aggressive mode. With UDLD aggressive mode enabled, when a port on a bidirectional link that has a UDLD neighbor relationship established stops receiving UDLD packets, UDLD tries to reestablish the connection with the neighbor. After eight failed retries, the port is disabled.

To prevent spanning tree loops, the default nonaggressive UDLD 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 you enable UDLD aggressive mode, you receive additional benefits in the following situations:

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

In these cases, UDLD aggressive mode disables one of the ports on the link, which prevents traffic from being discarding.

Fast UDLD

Release 12.2(33)SXI4 and later releases support fast UDLD.

Fast UDLD is a per-port configuration option that supports UDLD message time intervals between 200 and 1000 milliseconds. Fast UDLD can be configured to provide subsecond unidirectional link detection. (Without fast UDLD, the message time intervals are 7 through 90 seconds).

When configuring fast UDLD, note the following guidelines and restrictions:

- Cisco IOS Software Modularity images do not support fast UDLD.
- Fast UDLD is disabled by default.
- Normal and aggressive mode both support fast UDLD.
- Fast UDLD ports do not support the **link debounce** command.
- Fast UDLD supports only point-to-point links between network devices that support fast UDLD.
- Configure fast UDLD on at least two links between each connected network device. Fast UDLD does not support single-link connections to neighbor devices.
- Fast UDLD does not report a unidirectional link if the same error occurs simultaneously on more than one link to the same neighbor device.
- Fast UDLD cannot detect unidirectional links when the CPU utilization exceeds 60 percent.
- Fast UDLD is supported on a limited number of ports:
  - 60 ports with a Supervisor Engine 720
  - 10 ports with a Supervisor Engine 32
  - 10 ports with a Cisco ME 6500 Series Ethernet Switch (ME6524)

Default UDLD Configuration

Table 9-1 shows the default UDLD configuration.

Table 9-1 UDLD Default Configuration

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

Configuring UDLD

These sections describe how to configure UDLD:

Enabling UDLD Globally

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

Command	Purpose
`Router(config)# udld {enable | aggressive}`	Enables UDLD globally on fiber-optic LAN ports. **Note** This command only configures fiber-optic LAN ports. Individual LAN port configuration overrides the setting of this command.

Enabling UDLD on LAN Ports

By default, UDLD is disabled on nonfiber-optic LAN ports. To enable UDLD on a LAN port, perform this task:

	Command	Purpose
Step 1	`Router(config)# interface type[1] slot/port`	Selects the LAN port to configure.
Step 2	`Router(config-if)# udld port [aggressive]`	Enables UDLD on a specific LAN port. Enter the **aggressive** keyword to enable aggressive mode. On a fiber-optic LAN port, this command overrides the **udld enable** global configuration command setting.
	`Router(config-if)# no udld port [aggressive]`	Disables UDLD on a nonfiber-optic LAN port. **Note** On a fiber-optic LAN port, the **no udld port** command reverts the LAN port configuration to the **udld enable** global configuration command setting.
Step 3	`Router# show udld type[1] slot/number`	Verifies the configuration.

1. *type* = **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

Disabling UDLD on Fiber-Optic LAN Ports

By default, UDLD is enabled on fiber-optic LAN ports. To disable UDLD on a fiber-optic LAN port, perform this task:

	Command	Purpose
Step 1	`Router(config)# interface` *type*[1] *slot/port*	Selects the LAN port to configure.
Step 2	`Router(config-if)# udld port disable`	Disables UDLD on a fiber-optic LAN port. **Note** The **no** form of this command, which reverts the port to the **udld enable** global configuration command setting, is only supported on fiber-optic LAN ports.
Step 3	`Router# show udld` *type*[1] *slot/number*	Verifies the configuration.

1. *type* = **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

Configuring the Global UDLD Probe Message Interval

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

	Command	Purpose
Step 1	`Router(config)# udld message time` *interval*	Configures the time between UDLD probe messages on ports that are in advertisement mode and are currently determined to be bidirectional; valid values are from 7 to 90 seconds.
Step 2	`Router# show udld` *type*[1] *slot/number*	Verifies the configuration.

1. *type* = **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

Configuring Fast UDLD

Release 12.2(33)SXI4 and later releases support fast UDLD. These sections describe how to configure fast UDLD:

- Configuring Fast UDLD on a Port, page 9-7
- Enabling Fast UDLD Error Reporting, page 9-7

Note You can configure fast UDLD on ports where UDLD is not enabled, but fast UDLD is active only when UDLD is enabled on the port.

Configuring Fast UDLD on a Port

To configure fast UDLD on a port, perform this task:

	Command	Purpose
Step 1	`Router(config-if)# udld fast-hello interval`	Configures the fast UDLD probe message interval on a port. **Note** • See the guidelines and restrictions in the "Fast UDLD" section on page 9-4. • When selecting the value, follow these guidelines: – Valid values are from 200 to 1000 milliseconds. – Adjust the fast UDLD probe message interval to the longest interval possible that will provide the desired link failure detection time. A shorter message interval increases the likelihood that UDLD will falsely report link failures under stressful conditions.
Step 2	`Router# show udld fast-hello`	Displays fast UDLD configuration and operational state.
Step 3	`Router# show udld fast-hello` *type*[1] *slot/number*	Verifies the per-port fast UDLD configuration and operational state.

1. *type* = **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

Enabling Fast UDLD Error Reporting

By default, fast UDLD error-disables ports with unidirectional links. You can globally enable fast UDLD to report unidirectional links with a message displayed on the console instead of error-disabling ports with unidirectional links.

Note When fast UDLD error reporting is enabled, you must manually take the action appropriate for the state of the link.

To globally enable fast UDLD error reporting, perform this task:

Command	Purpose
`Router(config)# udld fast-hello error-reporting`	Enables fast UDLD error reporting.

Resetting Disabled LAN Interfaces

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

Command	Purpose
`Router# udld reset`	Resets all LAN ports that have been shut down by UDLD.

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http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html

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