Configuring IP SLAs DLSw+ Operations

This module describes how to configure the IP Service Level Agreements (SLAs) Data Link Switching Plus (DLSw+) operation to measure and analyze the DLSw+ protocol stack and network response time between DLSw+ peers.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

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

Prerequisites

A connected DLSw+ peer between the source and destination networking devices must be configured.

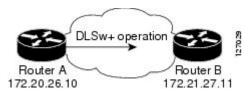## Information About IP SLAs DLSw+ Operations

DLSw+ Operation

The Cisco IOS IP SLAs DLSw+ operation measures the DLSw+ protocol stack and network response time between DLSw+ peers. DLSw+ is the enhanced Cisco version of RFC 1795. DLSw+ tunnels non-routable

Layer 2 traffic such as Systems Network Architecture (SNA) traffic over IP backbones via TCP. The networking devices performing the tunneling of non-routable traffic into TCP/IP are referred to as DLSw+ peers. DLSw+ peers normally communicate through TCP port 2065. The destination networking device does not have to be a Cisco router if it supports RFC 1795.

In the figure below, Router A is configured as the source IP SLAs device and a DLSw+ operation is configured with Router B as the remote DLSw+ peer. Router A and Router B are configured as connected DLSw+ peers. The peer (destination device) does not have to run a Cisco IOS IP SLA-capable image.

Figure 1: DLSw+ Operation

Network response time is computed by measuring the round-trip time (RTT) taken to connect to the remote DLSw+ peer using TCP. This operation does not use the IP SLAs Responder.

How to Configure IP SLAs DLSw+ Operations

Configuring IP SLAs DLSw+ Operations

Note   There is no need to configure an IP SLAs responder on the destination device.

Perform one of the following tasks:

Configuring a Basic DLSw+ Operation on the Source Device

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla** *operation-number*
4. **dlsw peer-ipaddr** *ip-address*
5. **frequency** *seconds*
6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	**Purpose**
Step 2	**configure terminal** **Example:** Router# configure terminal	Enters global configuration mode.
Step 3	**ip sla** *operation-number* **Example:** Router(config)# ip sla 10	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.
Step 4	**dlsw peer-ipaddr** *ip-address* **Example:** Router(config-ip-sla)# dlsw peer-ipaddr 172.21.27.11	Defines a DLSw+ operation and enters IP SLA DLSw+ configuration mode.
Step 5	**frequency** *seconds* **Example:** Router(config-ip-sla-dlsw)# frequency 30	(Optional) Sets the rate at which a specified IP SLAs operation repeats.
Step 6	**end** **Example:** Router(config-ip-sla-dlsw)# end	Exits to privileged EXEC mode.

Configuring an IP SLAs DLSw+ Operation with Optional Parameters on the Source Device

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla** *operation-number*
4. **dlsw peer-ipaddr** *ip-address*
5. **history buckets-kept** *size*
6. **history distributions-of-statistics-kept** *size*
7. **history enhanced** [**interval** *seconds*] [**buckets** *number-of-buckets*]
8. **history filter** {**none** | **all** | **overThreshold** | **failures**}
9. **frequency** *seconds*
10. **history hours-of-statistics-kept** *hours*
11. **history lives-kept** *lives*
12. **owner** *owner-id*
13. **request-data-size** *bytes*
14. **history statistics-distribution-interval** *milliseconds*
15. **tag** *text*

16. **threshold** *milliseconds*
17. **timeout** *milliseconds*
18. **end**

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Router# configure terminal	Enters global configuration mode.
Step 3	**ip sla** *operation-number* **Example:** Router(config)# ip sla 10	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.
Step 4	**dlsw peer-ipaddr** *ip-address* **Example:** Router(config-ip-sla)# dlsw peer-ipaddr 172.21.27.11	Defines a DLSw+ operation and enters IP SLA DLSw configuration mode.
Step 5	**history buckets-kept** *size* **Example:** Router(config-ip-sla-dlsw)# history buckets-kept 25	(Optional) Sets the number of history buckets that are kept during the lifetime of an IP SLAs operation.
Step 6	**history distributions-of-statistics-kept** *size* **Example:** Router(config-ip-sla-dlsw)# history distributions-of-statistics-kept 5	(Optional) Sets the number of statistics distributions kept per hop during an IP SLAs operation.
Step 7	**history enhanced** [**interval** *seconds*] [**buckets** *number-of-buckets*] **Example:** Router(config-ip-sla-dlsw)# history enhanced interval 900 buckets 100	(Optional) Enables enhanced history gathering for an IP SLAs operation.
Step 8	**history filter** {**none** | **all** | **overThreshold** | **failures**} **Example:**	(Optional) Defines the type of information kept in the history table for an IP SLAs operation.

	Command or Action	Purpose
	Router(config-ip-sla-dlsw)# history filter failures	
Step 9	**frequency** *seconds* **Example:** Router(config-ip-sla-dlsw)# frequency 30	(Optional) Sets the rate at which a specified IP SLAs operation repeats.
Step 10	**history hours-of-statistics-kept** *hours* **Example:** Router(config-ip-sla-dlsw)# hours-of-statistics-kept 4	(Optional) Sets the number of hours for which statistics are maintained for an IP SLAs operation.
Step 11	**history lives-kept** *lives* **Example:** Router(config-ip-sla-dlsw)# history lives-kept 5	(Optional) Sets the number of lives maintained in the history table for an IP SLAs operation.
Step 12	**owner** *owner-id* **Example:** Router(config-ip-sla-dlsw)# owner admin	(Optional) Configures the Simple Network Management Protocol (SNMP) owner of an IP SLAs operation.
Step 13	**request-data-size** *bytes* **Example:** Router(config-ip-sla-dlsw)# request-data-size 64	(Optional) Sets the protocol data size in the payload of an IP SLAs operation's request packet.
Step 14	**history statistics-distribution-interval** *milliseconds* **Example:** Router(config-ip-sla-dlsw)# history statistics-distribution-interval 10	(Optional) Sets the time interval for each statistics distribution kept for an IP SLAs operation.
Step 15	**tag** *text* **Example:** Router(config-ip-sla-dlsw)# tag TelnetPollServer1	(Optional) Creates a user-specified identifier for an IP SLAs operation.
Step 16	**threshold** *milliseconds* **Example:** Router(config-ip-sla-dlsw)# threshold 10000	(Optional) Sets the upper threshold value for calculating network monitoring statistics created by an IP SLAs operation.

	Command or Action	Purpose
Step 17	**timeout** *milliseconds* **Example:** Router(config-ip-sla-dlsw)# timeout 10000	(Optional) Sets the amount of time an IP SLAs operation waits for a response from its request packet.
Step 18	**end** **Example:** Router(config-ip-sla-dlsw)# exit	Exits to privileged EXEC mode.

Scheduling IP SLAs Operations

Before you begin

- All IP Service Level Agreements (SLAs) operations to be scheduled must be already configured.
- The frequency of all operations scheduled in a multioperation group must be the same.
- The list of one or more operation ID numbers to be added to a multioperation group must be limited to a maximum of 125 characters in length, including commas (,).

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. Enter one of the following commands:
    - **ip sla schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {[*hh*:*mm*:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*}] [**ageout** *seconds*] [**recurring**]
    - **ip sla group schedule** *group-operation-number operation-id-numbers* {**schedule-period** *schedule-period-range* | **schedule-together**} [**ageout** *seconds*] **frequency** *group-operation-frequency* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm* [:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm* [:*ss*]}]
4. **end**
5. **show ip sla group schedule**
6. **show ip sla configuration**

DETAILED STEPS

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

	Command or Action	Purpose
	`Device# configure terminal`	

Step 3	Enter one of the following commands:
	
	• **ip sla schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {[*hh*:*mm*:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*}] [**ageout** *seconds*] [**recurring**]
	
	• **ip sla group schedule** *group-operation-number operation-id-numbers* {**schedule-period** *schedule-period-range* | **schedule-together**} [**ageout** *seconds*] **frequency** *group-operation-frequency* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm* [:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm* [:*ss*]}]
	
	Example:
	
	`Device(config)# ip sla schedule 10 life forever start-time now`
	
	`Device(config)# ip sla group schedule 10 schedule-period frequency`
	
	`Device(config)# ip sla group schedule 1 3,4,6-9 life forever start-time now`
	
	`Device(config)# ip sla schedule 1 3,4,6-9 schedule-period 50 frequency range 80-100`
		• Configures the scheduling parameters for an individual IP SLAs operation.
		
		• Specifies an IP SLAs operation group number and the range of operation numbers for a multioperation scheduler.

Step 4	**end** **Example:** `Device(config)# end`	Exits global configuration mode and returns to privileged EXEC mode.
Step 5	**show ip sla group schedule** **Example:** `Device# show ip sla group schedule`	(Optional) Displays IP SLAs group schedule details.
Step 6	**show ip sla configuration** **Example:** `Device# show ip sla configuration`	(Optional) Displays IP SLAs configuration details.

Troubleshooting Tips

- If the IP SLAs operation is not running and not generating statistics, add the **verify-data** command to the configuration of the operation (while configuring in IP SLA configuration mode) to enable data verification. When data verification is enabled, each operation response is checked for corruption. Use

the **verify-data** command with caution during normal operations because it generates unnecessary overhead.

- Use the **debug ip sla trace** and **debug ip sla error** commands to help troubleshoot issues with an IP SLAs operation.

What to Do Next

To add proactive threshold conditions and reactive triggering for generating traps (or for starting another operation) to an IP SLAs operation, see the "Configuring Proactive Threshold Monitoring" section.

operation)

To display and interpret the results of an IP SLAs operation, use the **show ip sla statistics** command. Check the output for fields that correspond to criteria in your service level agreement to determine whether the service metrics are acceptable.

Configuration Examples for IP SLAs DLSw+ Operations

Example IP SLAs DLSw+ Operation Configuration

The following example shows the configuration for a DLSw+ operation from Router A to Router B, a remote DLSw+ peer. Router B is configured as a DLSw+ peer and Router A is specified as the remote (connected) DLSw+ peer. Router A is then configured as a DLSw+ peer with Router B as the connected DLSw+ peer, and the IP SLAs DLSw+ operation parameters are configured. The operation is scheduled to start immediately and run for 7200 seconds (2 hours).

Router B Configuration

```
configure terminal
dlsw local-peer peer-id 172.21.27.11
dlsw remote-peer 0 tcp 172.20.26.10
```

Router A Configuration

```
dlsw local-peer peer-id 172.20.26.10
dlsw remote-peer 0 tcp 172.21.27.11
ip sla 14
 dlsw peer-ipaddr 172.21.27.11
 frequency 50
 timeout 50000
 tag DLSw-Test
 exit
ip sla schedule 14 life 7200 start-time now
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
Cisco IOS IP SLAs commands	*Cisco IOS IP SLAs Command Reference*
Cisco IOS IP SLAs: general information	Configuring IOS IP SLAs Overview chapter of the *Cisco IOS IP SLAs Configuration Guide*.

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

MIBs

MIBs	MIBs Link
CISCO-RTTMON-MIB	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFCs	Title
RFC 1795	Data Link Switching: Switch-to-Switch Protocol

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for Cisco IOS IP SLAs DLSw+ Operations

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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

Table 1: Feature Information for Cisco IOS IP SLAs DLSw+ Operations

Feature Name	Releases	Feature Information
IP SLAs DLSw+ Operation	12.3(14)T 15.0(1)S	The Cisco IOS IP SLAs Data Link Switching Plus (DLSw+) operation allows you to schedule and measure the DLSw+ protocol stack and network response time between DLSw+ peers