

Configure IP SLA Tracking for IPv4 Static Routes on an SG550XG Switch

Introduction

When using static routing, you may experience a situation where a static route is active, but the destination network is not reachable via the specified next hop. For example, if the static route in question has the lowest metric to the destination network and the status of the outgoing interface to the next hop is Up, however the connectivity is broken somewhere along the path to the destination network. In this case, the device can use the static route although it does not actually provide connectivity to the destination network. The Internet Protocol Service Level Agreement (IP SLA) Object tracking for static routes provides a mechanism to track the connectivity to the destination network via the next hop specified in the static route. If connectivity to the destination network is lost, the route state is set to Down, and if available, a different static route (which is in state Up) can be selected for routing traffic.

Similar to IP SLAs tracking for Virtual Router Redundancy Protocol (VRRP), IP SLAs object tracking for static routes also relies on IP SLAs operations to detect connectivity to destination networks. IP SLAs operation sends Internet Control Message Protocol (ICMP) packets to the address defined by the user (a host on the required destination network), and also defines the next hop to use for the ping operation. IP SLAs operation then monitors success or failure of replies from the host. A track object is used to track operation results and set the status to Up or Down, based on the success or failure of the ICMP destination. The track operation is assigned to a static route. If the track status is down, the static route state is set to Down. If track status is Up, the static route state remains Up.

The following describes the main terms used in this article:

- Operation - Each IP SLAs ICMP Echo operation sends a single ICMP Echo request to a target address at a configured frequency rate. It then waits for a response.
- Track Object State - Each tracking object maintains an operation state. The state is either Up or Down. After object creation, the state is set to Up. The following table specifies the conversion of the IP SLAs operation return code to the object state:

Operation Return Code Track Operation State

OK	Up
Error	Down

Note: If the IP SLAs operation specified by the track argument is not configured or is its schedule is pending, its state is OK. An application that is bound to a non-existing tracking object will receive the Up state.

- SLA Operation State - This can be either Scheduled, which means the operation begins immediately or Pending, which means it has been created but not activated.
- Timeout value - Specifies the interval time of waiting for the ICMP echo reply message or an ICMP error message.
- Return Code - After an operation has been finished, the operation return code is set according to the following:
 - ICMP Echo reply has been received - Return code is set to OK.
 - ICMP Error reply has been received - Return code is set to error.

- No any ICMP reply has been received - Return code is set to error.
- Configured Source IP address or Source interface is not accessible - Return code is set to error.
- Tracker - Tracks the results of operations.
- Delay - When the result of an IP SLA operation indicates that the state of the tracking object should change to X from Y, the tracking object performs the following actions:
- The state of the tracking object is not changed and the tracking object starts the delay timer for the interval.
- If during the time that the timer is set, the original state (Y) is received again, the timer is canceled, and the state remains Y.
- If the delay timer is expired, the state of the tracking object is changed to X and the X state is passed to the associated applications.

Objective

This article provides instructions on how to configure the IP SLA tracking settings for IPv4 static routes on your switch. In this scenario, the static route has been preconfigured.

Note: To learn how to configure an IPv4 static route on your switch, click [here](#).

Applicable Devices

- SG550XG Series

Software Version

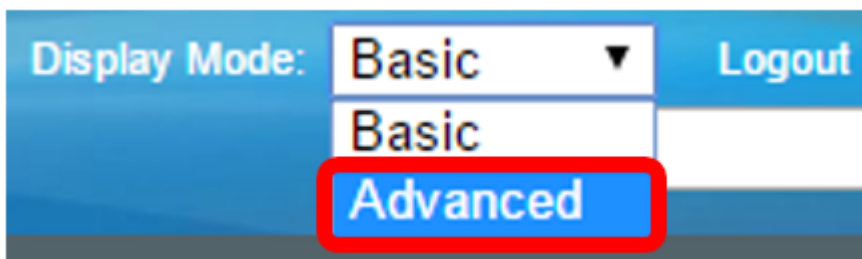
- 2.3.0.130

Configure IP SLA Tracking for IPv4 Static Routes

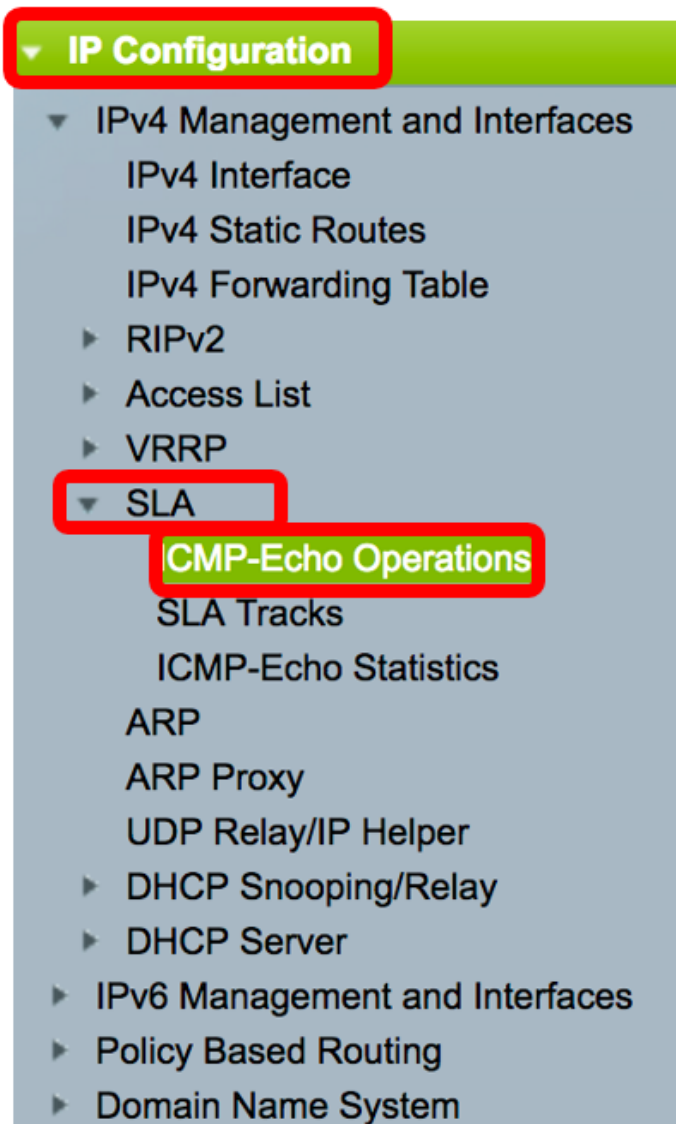
Configure ICMP Echo Operations

Step 1. Log in to the web-based utility of your switch then choose **Advanced** in the Display Mode drop-down list.

Note: The available menu options may vary depending on the device model. In this example, SG550XG-24T is used.

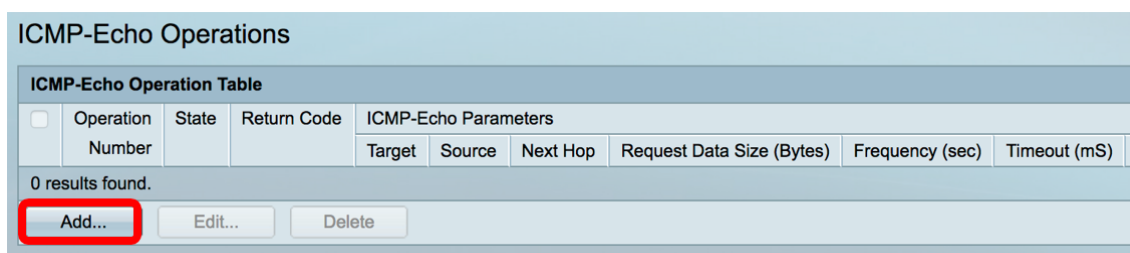


Step 2. Choose **IP Configuration > SLA > ICMP-Echo Operations**.



IP SLA ICMP-Echo operations can be configured in this page. These operations will be executed according to the frequency entered.

Step 3. To add a new operation, click **Add**.



Step 4. Enter an unused number in the *Operation Number* field.

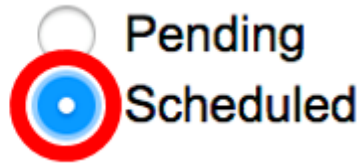
⚙️ Operation Number: (Range: 1 - 64)

Note: In this example, the operation number is 1.

Step 5. In the Operation State area, choose one from the following options:

- Pending - Operation is not activated.
- Scheduled - Operation is activated.

Operation State:



Note: In this example, Scheduled is chosen.

ICMP-Echo Parameters

Step 6. In the Operation Target area, choose how the operation target is defined:

- By IP - Enter the operation IP address of the target.
- By host name - Enter the operation host name of the target.

Note: If the IP SLA operation is for the Static Routes feature, the operation target is the IP address of the host in the remote network defined by the static route.

ICMP-Echo Parameters

⚙️ Operation Target: By IP By host name

192.168.1.1

Note: In this example, By IP is chosen and 192.168.1.1 is the specified destination target.

Step 7. If the source definition is not defined, the operation selects the source IP address nearest to the destination. To define the source definition, select from one of the following options:

- Auto - The source interface is based on Forwarding Table information.
- By address - If this option is chosen, choose a source IP address from the drop-down list.

Source Definition: Auto By address

192.168.100.126

Note: In this example, By address and 192.168.100.126 are chosen.

Step 8. In the Next Hop IP Address area, choose from the following options:

- None - No next hop address.
- User defined - If this option is chosen, enter the next hop IP address in the provided field.

Note: This parameter should be defined only for IP SLAs operations to be used in the static routes.

Next Hop IP Address: None User defined

192.168.100.1

Note: In this example, User defined is chosen and 192.168.100.1 is the defined next hop IP address.

Step 9. In the *Request Data Size* field, enter the request packet data size for an ICMP Echo operation. This data size is the payload portion of the ICMP packet, which makes a 64-byte IP packet. The range is from 28 up to 1472 Bytes and the default is 28 Bytes.

⚙ Request Data Size: Bytes (Range: 28 - 1472, Default: 28)

Note: In this example, the default value is used.

Step 10. In the *Frequency* field, enter the frequency with which the SLA operation is carried out (packets are sent). This value must be larger than the Timeout value. The range is from 10 to 500 seconds and the default value is 10 seconds.

⚙ Frequency: sec (Range: 10 - 500, Default: 10)

Note: In this example, the default value is used.

Step 11. In the *Timeout* field, enter the amount of time an IP SLA operation waits for a response to its request packet. It is recommended that the value of the milliseconds argument be based on the sum of the maximum round-trip time (RTT) value for the packets and the processing time of the IP SLAs operation. The range is from 50 to 5000 milliseconds and the default value is 2000 milliseconds.

⚙ Timeout: mS (Range: 50 - 5000, Default: 2000)

Note: In this example, the default value is used.

Step 12. Click **Apply** to save the settings then click **Close**.

Operation Number: (Range: 1 - 64)

Operation State: Pending
 Scheduled

ICMP-Echo Parameters

Operation Target: By IP
 By host name

Source Definition: Auto
 By address

Next Hop IP Address: None
 User defined

Request Data Size: Bytes (Range: 28 - 1472, Default: 28)

Frequency: sec (Range: 10 - 500, Default: 10)

Timeout: mS (Range: 50 - 5000, Default: 2000)

The ICMP-Echo operations status will be displayed as the following:

- State - Displays either Pending or Scheduled, as described in the Overview above.
- Return Code - Displays either OK or Error, as described in the Overview above.

ICMP-Echo Operations

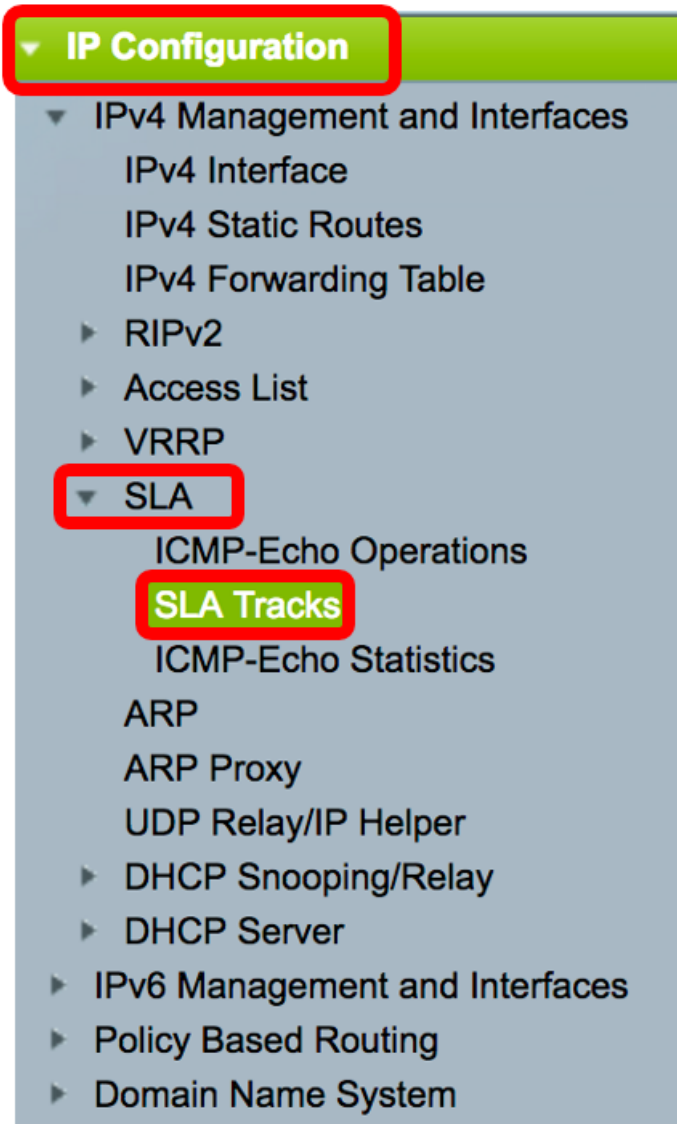
ICMP-Echo Operation Table									
Operation Number	State	Return Code	ICMP-Echo Parameters						
			Target	Source	Next Hop	Request Data Size (Bytes)	Frequency (sec)	Timeout (mS)	
1	Scheduled	OK	192.168.1.1	192.168.100.126	192.168.100.1	28	10	2000	

Step 13. (Optional) Repeat steps 3 to 11 to configure another ICMP Echo operation.

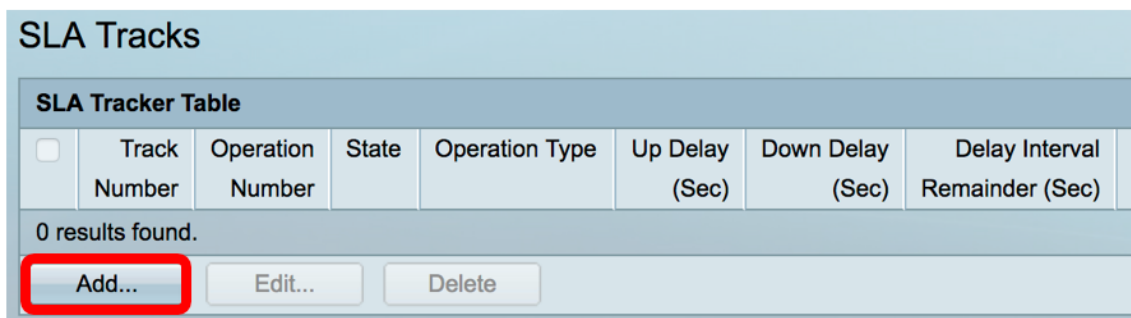
You should now have successfully verified the configured routing resources on your switch.

Configure SLA Tracking

Step 1. Choose **IP Configuration > SLA > SLA Tracks**.



Step 2. To add a new object, click **Add**.



Step 3. Enter an unused number in the *Track Number* field.

 Track Number: (Range: 1 - 64)

Note: In this example, the track number is 1.

Step 4. Choose an SLA operation from the Operation Number drop-down list.

Operation Number:

Note: In this example, the previously created operation number 1 is chosen.

Step 5. The Up Delay area specifies a period of time in seconds to delay state changes from Down to Up. To configure the Up Delay settings, choose from the following options:

- None - Change the state of the track immediately.
- Delay Period - Change the state of the track after a specific delay period. If this option is chosen, enter the delay period in the provided field. The range is from one up to 180 seconds.

Up Delay:

None
 Delay Period sec (Range: 1 - 180)

Note: In this example, the delay period of 5 seconds is defined.

Step 6. The Down Delay area specifies a period of time in seconds to delay state changes from Up to Down. To configure the Down Delay settings, choose from the following options:

- None - Change the state of the track immediately.
- Delay Period - Change the state of the track after a specific delay period. If this option is chosen, enter the delay period in the provided field. The range is from one up to 180 seconds.

Down Delay:

None
 Delay Period sec (Range: 1 - 180)

Note: In this example, the delay period of 2 seconds is defined.

Step 7. Click **Apply** to save the settings the click **Close**.

Track Number: (Range: 1 - 64)

Operation Number:

Up Delay: None
 Delay Period sec (Range: 1 - 180)

Down Delay: None
 Delay Period sec (Range: 1 - 180)

The status of the configured SLA Track objects are displayed in the SLA Tracker Table:

SLA Tracks

SLA Tracker Table							
<input type="checkbox"/>	Track Number	Operation Number	State	Operation Type	Up Delay (Sec)	Down Delay (Sec)	Delay Interval Remainder (Sec)
<input type="checkbox"/>	1	1	Up	ICMP-Echo	5	2	

- State - Displays one of the following states:
- Down - There is no connectivity to the route (packet returned Error return code).
- Up - There is connectivity to the route (packet returned OK return code).
- Operation Type - Can only display ICMP-Echo.
- Delay Interval Remainder (Sec) - How much of Delay period remains.

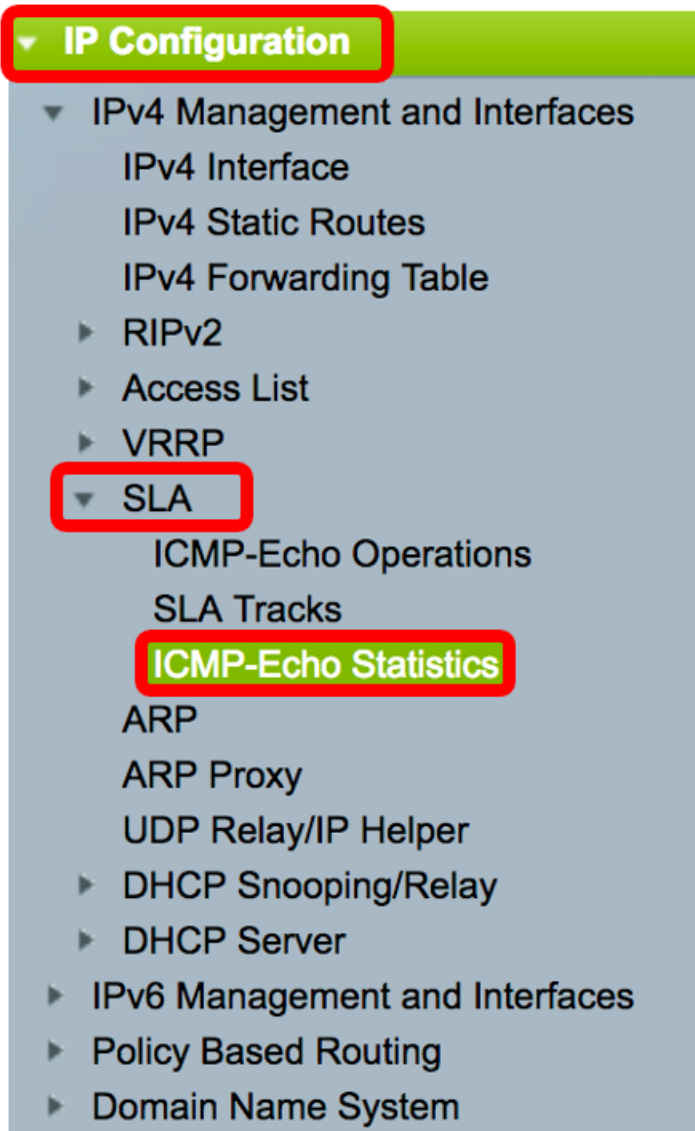
Step 8. (Optional) Click the **Save** button to save the settings to the startup configuration file.

The screenshot shows the Cisco configuration interface for a 4-Port 10GBase-T Stackable Managed Switch. At the top, there is a navigation bar with a "Save" button highlighted in a red box. Below the navigation bar, the "SLA Tracks" section is visible, containing the same "SLA Tracker Table" as shown in the previous image. The table has one entry with Track Number 1, Operation Number 1, State Up, Operation Type ICMP-Echo, Up Delay 5, Down Delay 2, and Delay Interval Remainder empty. Below the table are buttons for "Add...", "Edit...", and "Delete".

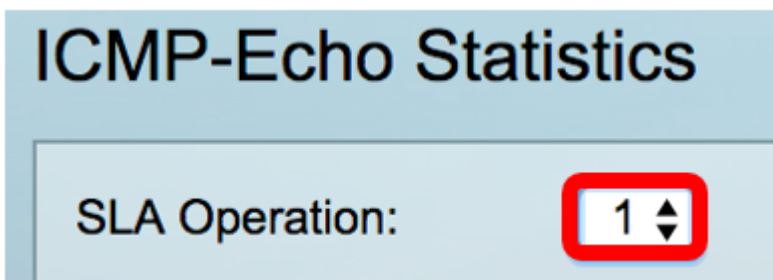
You should now have successfully configured SLA tracking for an IPv4 static route on your switch.

Display ICMP Echo Statistics

Step 1. Choose **IP Configuration > SLA > ICMP-Echo Statistics**.



Step 2. Choose the SLA Operation that you want to view from the SLA Operation drop-down list.



Note: In this example, operation 1 is chosen.

Step 3. (Optional) Choose a refresh rate from Refresh Rate drop-down list. This is the time period that passes before the statistics are refreshed. The options are:

- No Refresh - Statistics are not refreshed. In this example, this option is chosen.
- 15 sec - Statistics are refreshed every 15 seconds.
- 30 sec - Statistics are refreshed every 30 seconds.
- 60 sec - Statistics are refreshed every 60 seconds.

Refresh Rate:

No Refresh
 15 sec
 30 sec
 60 sec

The ICMP-Echo Statistics page displays the following:

- Operation Successes - Number of times the SLA track echo was successful.
- Operation Failures - Number of times the SLA track echo was successful.
- ICMP-Echo Requests - Number of request packets that were sent.
- ICMP-Echo Replies - Number of reply packets that were received.
- ICMP-Echo Errors - Number of error packets that were received.

ICMP-Echo Statistics

SLA Operation:

1 ▾

Refresh Rate:

No Refresh
 15 sec
 30 sec
 60 sec

Operation Successes: 135

Operation Failures: 15

ICMP-Echo Requests: 150

ICMP-Echo Replies: 135

ICMP-Echo Errors: 0

Step 4. (Optional) To clear the counters of the chosen SLA Operation, click the **Clear Counters** button.

Step 5. (Optional) To clear all statistics of all SLA operations, click the **Clear All Operations Counters** button.

Step 6. (Optional) Click **Refresh** to refresh the statistics page.

You should now have successfully displayed the ICMP Echo statistics of a specific SLA operation on your switch.