IP SLAs—Analyzing IP Service Levels Using the FTP Operation

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This module describes how to use the Cisco IOS IP Service Level Agreements (SLAs) FTP operation to measure the response time between a Cisco device and a File Transfer Protocol (FTP) server to retrieve a file. The IP SLAs FTP operation supports an FTP GET request only. IP SLAs is a portfolio of technology embedded in most devices that run Cisco IOS software, which allows Cisco customers to analyze IP service levels for IP applications and services, to increase productivity, to lower operational costs, and to reduce the frequency of network outages. IP SLAs uses active traffic monitoring—the generation of traffic in a continuous, reliable, and predictable manner—for measuring network performance. This module also demonstrates how the results of the FTP operation can be displayed and analyzed to determine the capacity of your network. The FTP operation can be used also for troubleshooting FTP server performance.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for the IP SLAs FTP Operation" section on page 11.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

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Prerequisites for the IP SLAs FTP Operation

Before configuring the IP SLAs FTP operation you should be familiar with the "Cisco IOS IP SLAs Overview" chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4.

Information About the IP SLAs FTP Operation

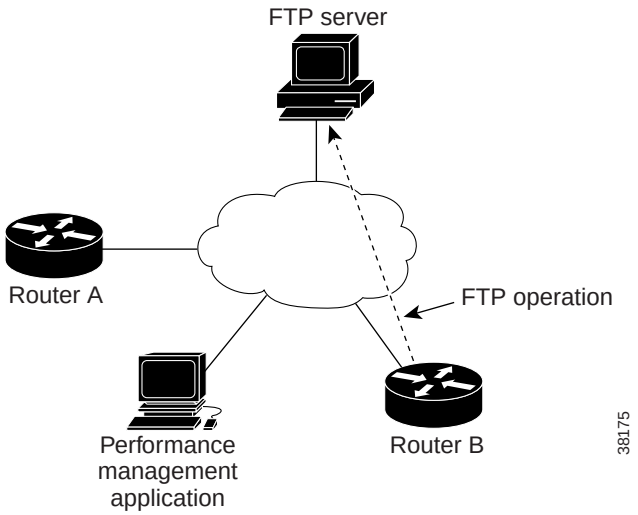
To perform the tasks required to analyze FTP server response times using IP SLA, you should understand the following concept:

FTP Operation

The FTP operation measures the round-trip time (RTT) between a Cisco device and an FTP server to retrieve a file. FTP is an application protocol, part of the Transmission Control Protocol (TCP)/IP protocol stack, used for transferring files between network nodes.

In Figure 1 Router B is configured as the source IP SLAs device and an FTP operation is configured with the FTP server as the destination device.

Figure 1 FTP Operation



Connection response time is computed by measuring the time taken to download a file to Router B from the remote FTP server using FTP over TCP. This operation does not use the IP SLAs Responder.

Note To test the response time to connect to an FTP port (Port 21), use the IP SLAs TCP Connect operation.

Both active and passive FTP transfer modes are supported. The passive mode is enabled by default. Only the FTP GET (download) operation type is supported. The URL specified for the FTP GET operation must be in one of the following formats:

- ftp://username:password@host/filename
- ftp://host/filename

If the username and password are not specified, the defaults are anonymous and test, respectively.

FTP carries a significant amount of data traffic and can affect the performance of your network. The results of an IP SLAs FTP operation to retrieve a large file can be used to determine the capacity of the network but retrieve large files with caution because the FTP operation will consume more bandwidth. The FTP operation also measures your FTP server performance levels by determining the RTT taken to retrieve a file.

How to Configure the IP SLAs FTP Operation

This section contains the following procedure:

- Configuring and Scheduling an FTP Operation on the Source Device, page 3 (required)

Configuring and Scheduling an FTP Operation on the Source Device

To measure the response time between a Cisco device and an FTP server to retrieve a file, use the IP SLAs FTP operation. The IP SLAs FTP operation only supports FTP GET (download) requests. This operation does not require the IP SLAs Responder to be enabled so there are no tasks to be performed on the destination device.

Perform one of the following tasks in this section, depending on whether you want to configure a basic FTP operation or configure an FTP operation with optional parameters:

- Configuring and Scheduling a Basic FTP Operation on the Source Device, page 3
- Configuring and Scheduling an FTP Operation with Optional Parameters on the Source Device, page 5

Configuring and Scheduling a Basic FTP Operation on the Source Device

Perform this task to enable an FTP operation without any optional parameters.

Note For information on scheduling a group of operations, see the "IP SLAs—Multiple Operation Scheduling" chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4.

SUMMARY STEPS

1. **enable**
2. **configure terminal**

3. **ip sla monitor** *operation-number*
4. **type ftp operation get url** *url* [**source-ipaddr** {*ip-address* | *hostname*}] [**mode** {**passive** | **active**}
5. **frequency** *seconds*
6. **exit**
7. **ip sla monitor schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*] [**ageout** *seconds*] [**recurring**]
8. **exit**

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 monitor** *operation-number* **Example:** `Router(config)# ip sla monitor 10`	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.
Step 4	**type ftp operation get url** *url* [**source-ipaddr** {*ip-address* | *hostname*}] [**mode** {**passive** | **active**} **Example:** `Router(config-sla-monitor)# type ftp operation get url ftp://username:password@hostip/test.cap`	Defines an FTP operation and enters IP SLA Monitor FTP configuration mode.
Step 5	**frequency** *seconds* **Example:** `Router(config-sla-monitor-ftp)# frequency 30`	(Optional) Sets the rate at which a specified IP SLAs operation repeats.
Step 6	**exit** **Example:** `Router(config-sla-monitor-ftp)# exit`	Exits IP SLA Monitor FTP configuration mode and returns to global configuration mode.

	Command or Action	Purpose
Step 7	**ip sla monitor schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*] [**ageout** *seconds*] [**recurring**] **Example:** `Router(config)# ip sla monitor schedule 10 start-time now life forever`	Configures the scheduling parameters for an individual IP SLAs operation.
Step 8	**exit** **Example:** `Router(config)# exit`	(Optional) Exits the global configuration mode and returns to privileged EXEC mode.

Examples

The following example shows the configuration of an IP SLAs operation type of FTP to retrieve a file named test.cap. The FTP operation number 10 is scheduled to start immediately and run indefinitely.

```
ip sla monitor 10
 type ftp operation get url ftp://username:password@hostip/test.cap
 frequency 30
!
ip sla monitor schedule 10 life forever start-time now
```

What to Do Next

To view and interpret the results of an IP SLAs operation use the **show ip sla monitor statistics** command. Checking the output for fields that correspond to criteria in your service level agreement will help you determine whether the service metrics are acceptable.

Configuring and Scheduling an FTP Operation with Optional Parameters on the Source Device

Perform this task to enable an FTP operation on the source device and configure some optional IP SLAs parameters. The source device is the location at which the measurement statistics are stored.

Note For information on scheduling a group of operations, see the "IP SLAs—Multiple Operation Scheduling" chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla monitor** *operation-number*
4. **type ftp operation get url** *url* [**source-ipaddr** {*ip-address* | *hostname*}] [**mode** {**passive** | **active**}
5. **buckets-of-history-kept** *size*
6. **distributions-of-statistics-kept** *size*
7. **enhanced-history** [**interval** *seconds*] [**buckets** *number-of-buckets*]
8. **filter-for-history** {**none** | **all** | **overThreshold** | **failures**}

9. **frequency** *seconds*
10. **hours-of-statistics-kept** *hours*
11. **lives-of-history-kept** *lives*
12. **owner** *owner-id*
13. **statistics-distribution-interval** *milliseconds*
14. **tag** *text*
15. **threshold** *milliseconds*
16. **timeout** *milliseconds*
17. **exit**
18. **ip sla monitor schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*] [**ageout** *seconds*] [**recurring**]
19. **exit**
20. **show ip sla monitor configuration** [*operation-number*]

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 monitor** *operation-number* **Example:** `Router(config)# ip sla monitor 10`	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.
Step 4	**type ftp operation get url** *url* [**source-ipaddr** {*ip-address* | *hostname*}] [**mode** {**passive** | **active**} **Example:** `Router(config-sla-monitor)# type ftp operation get url ftp://username:password@hostip/filename`	Defines an FTP operation and enters IP SLA Monitor FTP configuration mode.
Step 5	**buckets-of-history-kept** *size* **Example:** `Router(config-sla-monitor-ftp)# buckets-of-history-kept 25`	(Optional) Sets the number of history buckets that are kept during the lifetime of an IP SLAs operation.

	Command or Action	Purpose
Step 6	**distributions-of-statistics-kept** *size* **Example:** `Router(config-sla-monitor-ftp)# distributions-of-statistics-kept 5`	(Optional) Sets the number of statistics distributions kept per hop during an IP SLAs operation.
Step 7	**enhanced-history** [**interval** *seconds*] [**buckets** *number-of-buckets*] **Example:** `Router(config-sla-monitor-ftp)# enhanced-history interval 900 buckets 100`	(Optional) Enables enhanced history gathering for an IP SLAs operation.
Step 8	**filter-for-history** {**none** | **all** | **overThreshold** | **failures**} **Example:** `Router(config-sla-monitor-ftp)# filter-for-history failures`	(Optional) Defines the type of information kept in the history table for an IP SLAs operation.
Step 9	**frequency** *seconds* **Example:** `Router(config-sla-monitor-ftp)# frequency 30`	(Optional) Sets the rate at which a specified IP SLAs operation repeats.
Step 10	**hours-of-statistics-kept** *hours* **Example:** `Router(config-sla-monitor-ftp)# hours-of-statistics-kept 4`	(Optional) Sets the number of hours for which statistics are maintained for an IP SLAs operation.
Step 11	**lives-of-history-kept** *lives* **Example:** `Router(config-sla-monitor-ftp)# lives-of-history-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-sla-monitor-ftp)# owner admin`	(Optional) Configures the Simple Network Management Protocol (SNMP) owner of an IP SLAs operation.
Step 13	**statistics-distribution-interval** *milliseconds* **Example:** `Router(config-sla-monitor-ftp)# statistics-distribution-interval 10`	(Optional) Sets the time interval for each statistics distribution kept for an IP SLAs operation.
Step 14	**tag** *text* **Example:** `Router(config-sla-monitor-ftp)# tag TelnetPollServer1`	(Optional) Creates a user-specified identifier for an IP SLAs operation.

	Command or Action	Purpose
Step 15	**threshold** *milliseconds* **Example:** `Router(config-sla-monitor-ftp)# threshold 10000`	(Optional) Sets the upper threshold value for calculating network monitoring statistics created by an IP SLAs operation.
Step 16	**timeout** *milliseconds* **Example:** `Router(config-sla-monitor-ftp)# timeout 10000`	(Optional) Sets the amount of time an IP SLAs operation waits for a response from its request packet.
Step 17	**exit** **Example:** `Router(config-sla-monitor-ftp)# exit`	Exits FTP configuration submode and returns to global configuration mode.
Step 18	**ip sla monitor schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*] [**ageout** *seconds*] [**recurring**] **Example:** `Router(config)# ip sla monitor schedule 10 start-time now life forever`	Configures the scheduling parameters for an individual IP SLAs operation.
Step 19	**exit** **Example:** `Router(config)# exit`	(Optional) Exits global configuration mode and returns to privileged EXEC mode.
Step 20	**show ip sla monitor configuration** [*operation-number*] **Example:** `Router# show ip sla monitor configuration 10`	(Optional) Displays configuration values including all defaults for all IP SLAs operations or a specified operation.

Examples

The following sample output shows the configuration of all the IP SLAs parameters (including defaults) for the FTP operation number 10.

```
Router# show ip sla monitor configuration 10

Complete Configuration Table (includes defaults)
Entry number: 10
Owner: FTP-Test
Tag: FTP-Test
Type of operation to perform: ftp
Source address: 0.0.0.0
FTP URL: ftp://username:password@hostip/filename
Type Of Service parameters: 128
Operation timeout (milliseconds): 30000
Operation frequency (seconds): 30
Next Scheduled Start Time: Start Time already passed
Group Scheduled: FALSE
Life (seconds): Forever
Entry Ageout (seconds): never
Recurring (Starting Everyday): FALSE
```

```
Status of entry (SNMP RowStatus): Active
Threshold (milliseconds): 30000
Number of statistic hours kept: 2
Number of statistic distribution buckets kept: 1
Statistic distribution interval (milliseconds): 20
Number of history Lives kept: 0
Number of history Buckets kept: 15
```

Troubleshooting Tips

Use the **debug ip sla monitor trace** and **debug ip sla monitor error** commands to help troubleshoot issues with the FTP operation.

What to Do Next

To view and interpret the results of an IP SLAs operation use the **show ip sla monitor statistics** command. Checking the output for fields that correspond to criteria in your service level agreement will help you determine whether the service metrics are acceptable.

Configuration Examples for the IP SLAs FTP Operation

This section contains the following configuration example:

- Configuring an FTP Operation: Example, page 9

Configuring an FTP Operation: Example

The following example shows how to configure an FTP operation as shown in Figure 1 from Router B to the FTP server. The operation is scheduled to start every day at 1:30 a.m. In this example, the file named test.cap is to be retrieved from the host, cisco.com, with a password of abc using FTP in active mode.

Router B Configuration

```
ip sla monitor 10
 type ftp operation get url ftp://user1:abc@test.cisco.com/test.cap mode active
 frequency 20
 tos 128
 timeout 40000
 tag FLL-FTP
ip sla monitor schedule 10 start-time 01:30:00 recurring
```

Where to Go Next

- If you want to configure multiple Cisco IOS IP SLAs operations at once, see the "IP SLAs—Multiple Operation Scheduling" chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4.
- If you want to configure threshold parameters for an IP SLAs operation, see the "IP SLAs—Proactive Threshold Monitoring" chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4.

- If you want to configure other types of IP SLAs operations, see the "Where to Go Next" section of the "Cisco IOS IP SLAs Overview" chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4.

Additional References

The following sections provide references related to the IP SLAs FTP operation.

Related Documents

Related Topic	Document Title
Overview of Cisco IOS IP SLAs	"Cisco IOS IP SLAs Overview" chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4
Cisco IOS IP SLAs commands: complete command syntax, defaults, command mode, command history, usage guidelines, and examples	*Cisco IOS IP SLAs Command Reference*, Release 12.4

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
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml

Feature Information for the IP SLAs FTP Operation

Table 1 lists the features in this module and provides links to specific configuration information. Only features that were introduced or modified in Cisco IOS Release 12.3(14)T or a later release appear in the table. *Not all features may be supported in your Cisco IOS software release*.

For information on a feature in this technology that is not documented here, see the "Cisco IOS IP SLAs Features Roadmap."

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

Cisco IOS software images are specific to a Cisco IOS software release, a feature set, and a platform. Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Note Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for the IP SLAs FTP Operation

Feature Name	Releases	Feature Information
IP SLAs FTP Operation	12.3(14)T	The Cisco IOS IP SLAs File Transfer Protocol (FTP) operation allows you to measure the network response time between a Cisco device and an FTP server to retrieve a file.