IP SLAs—Analyzing IP Service Levels Using the DNS Operation

First Published: May 2, 2005
Last Updated: August 29, 2006

This module describes how to use the Cisco IOS IP Service Level Agreements (SLAs) DNS operation to measure the difference between the time taken to send a Domain Name System (DNS) request and receive a reply. 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 DNS operation can be displayed and analyzed to determine the DNS lookup time which is a critical element for determining the performance of a DNS or web server.

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 DNS 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.

Contents

CISCO SYSTEMS

Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Prerequisites for the IP SLAs DNS Operation

Before configuring the IP SLAs DNS 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 DNS Operation

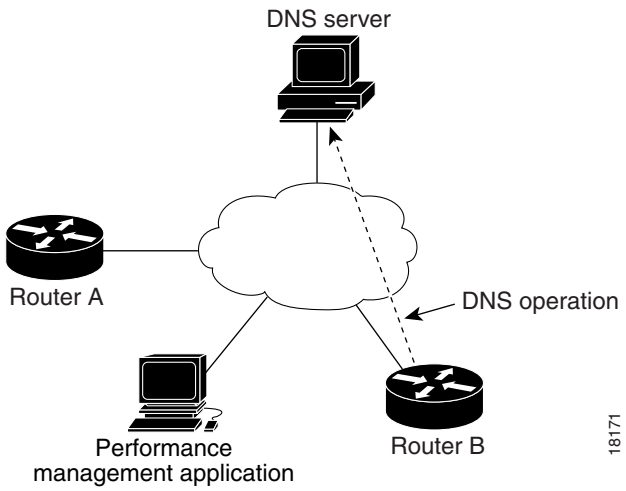
To perform the tasks required to analyze DNS lookup times using IP SLA, you should understand the following concept:

DNS Operation

The DNS operation measures the difference between the time taken to send a DNS request and receive a reply. DNS is used in the Internet for translating names of network nodes into addresses. The IP SLAs DNS operation queries for an IP address if you specify a host name, or queries for a host name if you specify an IP address.

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

Figure 1 DNS Operation



Connection response time is computed by measuring the difference between the time taken to send a request to the DNS server and the time a reply is received by Router B. The resulting DNS lookup time can help you analyze your DNS performance. Faster DNS lookup times translate to a faster web server access experience.

How to Configure the IP SLAs DNS Operation

This section contains the following procedure:

- Configuring and Scheduling a DNS Operation on the Source Device, page 3 (required)

Configuring and Scheduling a DNS Operation on the Source Device

To measure the difference between the time taken to send a DNS request and the time a reply is received by a Cisco device, use the IP SLAs DNS operation. 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 DNS operation or configure a DNS operation with optional parameters:

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

Configuring and Scheduling a Basic DNS Operation on the Source Device

Perform this task to enable a DNS 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 dns target-addr** {*target-hostname* | *target-ip-address*} **name-server** *ip-address* [**source-ipaddr** {*ip-address* | *hostname*} **source-port** *port-number*]
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 dns target-addr** {*target-hostname* | *target-ip-address*} **name-server** *ip-address* [**source-ipaddr** {*ip-address* | *hostname*} **source-port** *port-number*] **Example:** `Router(config-sla-monitor)# type dns target-addr www.cisco.com name-server 172.20.2.132`	Defines a DNS operation and enters IP SLA Monitor DNS configuration mode.
Step 5	**frequency** *seconds* **Example:** `Router(config-sla-monitor-dns)# frequency 60`	(Optional) Sets the rate at which a specified IP SLAs operation repeats.
Step 6	**exit** **Example:** `Router(config-sla-monitor-dns)# exit`	Exits DNS configuration submode and returns to global configuration mode.
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 global configuration mode and returns to privileged EXEC mode.

Examples

The following example shows the configuration of an IP SLAs operation type of DNS to find the IP address of the hostname cisco.com. The DNS operation number 11 is scheduled to start immediately and run indefinitely.

```
ip sla monitor 11
 type dns target-addr www.cisco.com name-server 172.20.2.132
 frequency 60
 exit
ip sla monitor schedule 11 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 a DNS Operation with Optional Parameters on the Source Device

Perform this task to enable a DNS 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 dns target-addr** {*target-hostname* | *target-ip-address*} **name-server** *ip-address* [**source-ipaddr** {*ip-address* | *hostname*} **source-port** *port-number*]
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 dns target-addr** {*target-hostname* | *target-ip-address*} **name-server** *ip-address* [**source-ipaddr** {*ip-address* | *hostname*} **source-port** *port-number*] **Example:** `Router(config-sla-monitor)# type dns target-addr www.cisco.com name-server 172.20.2.132`	Defines a DNS operation and enters IP SLA Monitor DNS configuration mode.
Step 5	**buckets-of-history-kept** *size* **Example:** `Router(config-sla-monitor-dns)# buckets-of-history-kept 25`	(Optional) Sets the number of history buckets that are kept during the lifetime of an IP SLAs operation.
Step 6	**distributions-of-statistics-kept** *size* **Example:** `Router(config-sla-monitor-dns)# 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-dns)# enhanced-history interval 900 buckets 100`	(Optional) Enables enhanced history gathering for an IP SLAs operation.

	Command or Action	Purpose
Step 8	**filter-for-history** {**none** | **all** | **overThreshold** | **failures**} **Example:** `Router(config-sla-monitor-dns)# 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-dns)# 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-dns)# 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-dns)# 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-dns)# 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-dns)# 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-dns)# tag TelnetPollServer1`	(Optional) Creates a user-specified identifier for an IP SLAs operation.
Step 15	**threshold** *milliseconds* **Example:** `Router(config-sla-monitor-dns)# 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-dns)# 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-dns)# exit`	Exits DNS configuration submode and returns to global configuration mode.

	Command or Action	Purpose
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 DNS operation number 11.

```
Router# show ip sla monitor configuration 11

Complete Configuration Table (includes defaults)
Entry number: 11
Owner: DNS-Test
Tag: DNS-Test
Type of operation to perform: dns
Target address: www.cisco.com
Source address: 0.0.0.0
Source port: 0
Operation timeout (milliseconds): 9000
Operation frequency (seconds): 60
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): 5000
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
History Filter Type: None
```

Troubleshooting Tips

Use the **debug ip sla monitor trace** and **debug ip sla monitor error** commands to help troubleshoot issues with an IP SLAs 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 DNS Operation

This section contains the following configuration example:

- Configuring a DNS Operation: Example, page 9

Configuring a DNS Operation: Example

The following example shows how to configure a DNS operation as shown in Figure 1 from Router B to the DNS server (IP address 172.20.2.132). The operation is scheduled to start immediately. In this example, the target address is a hostname—cisco.com—and the DNS operation will query the DNS server for the IP address associated with the hostname www.cisco.com. No configuration is required at the DNS server.

Router B Configuration

```
ip sla monitor 11
 type dns target-addr www.cisco.com name-server 172.20.2.132
 frequency 50
 timeout 8000
 tag DNS-Test
ip sla monitor schedule 11 start-time now
```

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 DNS 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 DNS 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 DNS Operation

Feature Name	Releases	Feature Information
IP SLAs DNS Operation	12.3(14)T	The Cisco IOS IP SLAs Domain Name System (DNS) operation allows you to measure the difference between the time taken to send a DNS request and receive a reply.