

# Configuring IP SLAs DNS Operations

This module describes how to configure the IP Service Level Agreements (SLAs) Domain Name System (DNS) operation to measure the difference between the time taken to send a DNS request and receive a reply. 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.


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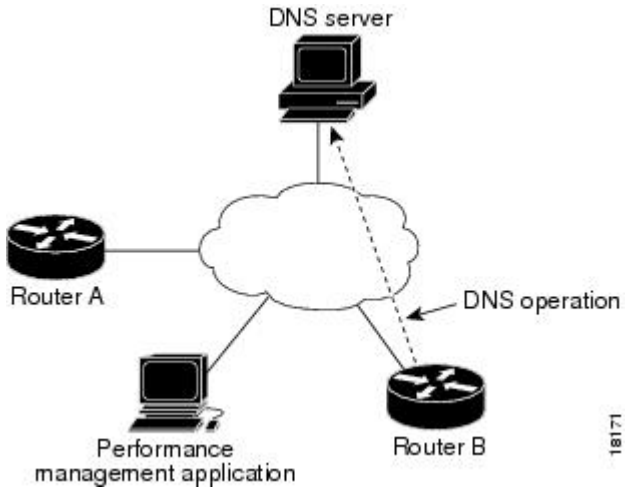

# Information About IP SLAs DNS Operations

## 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 the figure below Device 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 Device 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 IP SLAs DNS Operations

## Configuring an IP SLAs DNS Operation on the Source Device

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

Perform one of the following tasks:

### Configuring a Basic DNS Operation on the Source Device

#### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla** *operation-number*
4. **dns** {*destination-ip-address* | *destination-hostname*} **name-server** *ip-address* [**source-ip** {*ip-address* | *hostname*} **source-port** *port-number*]
5. **frequency** *seconds*
6. **end**

### DETAILED STEPS

**Procedure**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **ip sla** *operation-number*<br>**Example:**<br>`Device(config)# ip sla 10` | Begins configuration for an IP SLAs operation and enters IP SLA configuration mode. |
| **Step 4** | **dns** {*destination-ip-address* \| *destination-hostname*} **name-server** *ip-address* [**source-ip** {*ip-address* \| *hostname*} **source-port** *port-number*]<br>**Example:**<br>`Device(config-ip-sla)# dns host1 name-server 172.20.2.132` | Defines a DNS operation and enters IP SLA DNS configuration mode. |
| **Step 5** | **frequency** *seconds*<br>**Example:**<br>`Device(config-ip-sla-dns)# frequency 60` | (Optional) Sets the rate at which a specified IP SLAs operation repeats. |
| **Step 6** | **end**<br>**Example:**<br>`Device(config-ip-sla-dns)# end` | Exits to privileged EXEC mode. |

## Configuring a DNS Operation with Optional Parameters on the Source Device

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla** *operation-number*
4. **dns** {*destination-ip-address* | *destination-hostname*} **name-server** *ip-address* [**source-ip** {*ip-address* | *hostname*} **source-port** *port-number*]
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. **history statistics-distribution-interval** *milliseconds*
14. **tag** *text*
15. **threshold** *milliseconds*
16. **timeout** *milliseconds*
17. **end**

## DETAILED STEPS

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **ip sla** *operation-number*<br>**Example:**<br>`Device(config)# ip sla 10` | Begins configuration for an IP SLAs operation and enters IP SLA configuration mode. |
| **Step 4** | **dns** {*destination-ip-address* \| *destination-hostname*} **name-server** *ip-address* [**source-ip** {*ip-address* \| *hostname*} **source-port** *port-number*]<br>**Example:**<br>`Device(config-ip-sla)# dns host1 name-server 172.20.2.132` | Defines a DNS operation and enters IP SLA DNS configuration mode. |
| **Step 5** | **history buckets-kept** *size*<br>**Example:**<br>`Device(config-ip-sla-dns)# history buckets-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** | **history distributions-of-statistics-kept** *size*<br>**Example:**<br>`Device(config-ip-sla-dns)# 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*]<br>**Example:**<br>`Device(config-ip-sla-dns)# history enhanced interval 900 buckets 100` | (Optional) Enables enhanced history gathering for an IP SLAs operation. |
| **Step 8** | **history filter** {**none** \| **all** \| **overThreshold** \| **failures**}<br>**Example:**<br>`Device(config-ip-sla-dns)# history filter failures` | (Optional) Defines the type of information kept in the history table for an IP SLAs operation. |
| **Step 9** | **frequency** *seconds*<br>**Example:**<br>`Device(config-ip-sla-dns)# frequency 30` | (Optional) Sets the rate at which a specified IP SLAs operation repeats. |
| **Step 10** | **history hours-of-statistics-kept** *hours*<br>**Example:**<br>`Device(config-ip-sla-dns)# history 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*<br>**Example:**<br>`Device(config-ip-sla-dns)# 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*<br>**Example:**<br>`Device(config-ip-sla-dns)# owner admin` | (Optional) Configures the Simple Network Management Protocol (SNMP) owner of an IP SLAs operation. |
| **Step 13** | **history statistics-distribution-interval** *milliseconds*<br>**Example:**<br>`Device(config-ip-sla-dns)# history statistics-distribution-interval 10` | (Optional) Sets the time interval for each statistics distribution kept for an IP SLAs operation. |
| **Step 14** | **tag** *text*<br>**Example:** | (Optional) Creates a user-specified identifier for an IP SLAs operation. |

| | Command or Action | Purpose |
|---|---|---|
| | `Device(config-ip-sla-dns)# tag TelnetPollServer1` | |
| **Step 15** | **threshold** *milliseconds*<br>**Example:**<br>`Device(config-ip-sla-dns)# threshold 10000` | (Optional) Sets the upper threshold value for calculating network monitoring statistics created by an IP SLAs operation. |
| **Step 16** | **timeout** *milliseconds*<br>**Example:**<br>`Device(config-ip-sla-dns)# timeout 10000` | (Optional) Sets the amount of time an IP SLAs operation waits for a response from its request packet. |
| **Step 17** | **end**<br>**Example:**<br>`Device(config-ip-sla-dns)# end` | 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

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | Enter one of the following commands:<br>• **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**]<br>• **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*]}]<br>**Example:**<br>`Device(config)# ip sla schedule 10 life forever start-time now`<br>`Device(config)# ip sla group schedule 10 schedule-period frequency`<br>`Device(config)# ip sla group schedule 1 3,4,6-9 life forever start-time now`<br>`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.<br>• Specifies an IP SLAs operation group number and the range of operation numbers for a multioperation scheduler. |
| **Step 4** | **end**<br>**Example:**<br>`Device(config)# end` | Exits global configuration mode and returns to privileged EXEC mode. |
| **Step 5** | **show ip sla group schedule**<br>**Example:**<br>`Device# show ip sla group schedule` | (Optional) Displays IP SLAs group schedule details. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 6** | **show ip sla configuration**<br>**Example:**<br>`Device# show ip sla configuration` | (Optional) Displays IP SLAs configuration details. |

## Troubleshooting Tips

- If the IP Service Level Agreements (SLAs) operation is not running and not generating statistics, add the **verify-data** command to the configuration (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 Service Level Agreements (SLAs) operation, see the "Configuring Proactive Threshold Monitoring" section.

# Configuration Examples for IP SLAs DNS Operations

## Example Configuring a DNS Operation

The following example shows how to configure a DNS operation from Device B to the DNS server (IP address 172.20.2.132) as shown in the "DNS Operation" figure in the "DNS Operation" section. The operation is scheduled to start immediately. In this example, the target address is a hostname and the DNS operation will query the DNS server for the IP address associated with the hostname host1. No configuration is required at the DNS server.

### Device B Configuration

```
ip sla 11
 dns host1 name-server 172.20.2.132
 frequency 50
 timeout 8000
 tag DNS-Test
ip sla schedule 11 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, All Releases |
| Cisco IOS IP SLAs: general information | "Cisco IOS IP SLAs Overview" module of the *Cisco IOS IP SLAs Configuration Guide*. |
| Multioperation scheduling for IP SLAs | "Configuring Multioperation Scheduling of IP SLAs Operations" module of the *Cisco IOS P SLAs Configuration Guide* |
| Proactive threshold monitoring for IP SLAs | "Configuring Proactive Threshold Monitoring of IP SLAs Operations" module of the *Cisco IOS IP SLAs Configuration Guide* |

### 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:<br>http://www.cisco.com/go/mibs |

### 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 Configuring IP SLAs DNS Operation

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 the IP SLAs - DNS Operation***

| Feature Name | Releases | Feature Information |
|---|---|---|
| IP SLAs - DNS Operation | 12.2(31)SB2<br>12.2(33)SRB1<br>12.2(33)SXH<br>12.3(14)T<br>Cisco IOS XE Release 2.1<br>15.0(1)S<br>Cisco IOS XE 3.1.0SG | The IP SLAs Domain Name System (DNS) Operation feature allows you to measure the difference between the time taken to send a DNS request and receive a reply. |
| IPSLA 4.0 - IP v6 phase2 | 15.2(3)T<br>Cisco IOS XE Release 3.7S<br>15.1(2)SG<br>Cisco IOS XE Release 3.4SG | Support was added for operability in IPv6 networks. The following commands are introduced or modified: **dns (IP SLA)**, **show ip sla configuration**, **show ip sla summary**. |
| IP SLAs VRF Aware 2.0 | 12.4(2)T<br>15.1(1)S<br>15.1(1)SY<br>Cisco IOS XE Release 3.8S | Support was added for IP SLAs VRF-aware capabilities for TCP connect, FTP, HTTP and DNS client operation types. |