



Configuring IP SLA - Service Performance Testing

This module describes how to configure the ITU-T Y.1564 Ethernet service performance test methodology to measure the ability of a network device to carry traffic at the configured data rate.

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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 for IP SLA - Service Performance Testing

Ensure that the direction configured for the **measurement-type direction {internal | external}** and the **profile traffic direction {internal | external}** commands is the same.

Restrictions for IP SLA - Service Performance Operation

- Traffic generation mode is not supported in Cisco IOS Release 15.3(2)S.
- One-way statistics collection is not supported in Cisco IOS Release 15.3(2)S.

Information About IP SLA - Service Performance Testing

ITU Y.1564

Y.1564 is an Ethernet service activation and performance test methodology for turning up, installing and troubleshooting Ethernet-based services. This test methodology allows for complete validation of Ethernet service level agreements (SLAs) in a single test.

The three key objectives for Y.1564 are as follows:

- To serve as a network SLAs validation tool, ensuring that a service meets its guaranteed performance settings in a controlled test time.
- To ensure that all services carried by the network meet their SLAs objectives at the maximum committed rate, proving that network devices and paths can support all the traffic as designed under maximum load.
- To perform medium- and long-term service testing, confirming that a network element can properly carry all services while under stress during a soaking period.

The following Key Performance Indicators (KPI) metrics are collected to ensure that the configured SLAs is met for the service/stream. These are service acceptance criteria metrics.

- Information Rate (IR) or throughput—Measures the maximum rate at which none of the offered frames are dropped by the device under test (DUT). This measurement translates into the available bandwidth of the Ethernet virtual connection (EVC).
- Frame Transfer Delay (FTD) or latency—Measures the round-trip time (RTT) taken by a test frame to travel through a network device or across the network and back to the test port .
- Frame Loss Ratio (FLR)—Measures the number of packets lost over the total number of packets sent. Frame loss can be due to a number of issues such as network congestion or errors during transmissions.
- Frame Delay Variation (FDV) or jitter—Measures the variations in the time delay between packet deliveries.

Service Performance Operations

Forwarding devices (switches and routers) and network interface units are the basis of any network as they interconnect segments. If a service is not correctly configured on any one of these devices within the end-to-end path, network performance can be greatly affected, leading to potential service outages and network-wide issues such as congestion and link failures. Service performance testing is designed to measure the ability of device under test (DUT) or network under test to properly forward in different states. The Cisco implementation of ITU-T Y.1564 includes the following service performance tests:

- Minimum data rate to CIR—Bandwidth is generated from the minimum data rate to the committed information rate (CIR) for the test stream. KPI for Y.1564 are then measured to ensure that the configured service acceptance criteria (SAC) are met.
- CIR to EIR—Bandwidth is ramped up from the CIR to the excess information rate (EIR) for the test stream. Because EIR is not guaranteed, only the transfer rate is measured to ensure that CIR is the minimum bandwidth up to the maximum EIR. Other KPI are not measured.

Service performance supports four operational modes: two-way statistics collection, one-way statistics collection, passive measurement mode, and traffic generator mode. Statistics are calculated, collected, and reported to the IP SLAs module. The statistics database keeps historical statistics for the operations that have been executed.

For two-way statistics collection, all measurements are collected by the sender. In order for two-way statistics to work, the remote target must be in loopback mode. Loopback mode enables traffic sent from the sender to go to the target and be returned to the sender.

One-way statistics are collected by the responder. Control messages are sent from the sender to a responder to enable and retrieve the remote statistics.

Passive measurement mode is enabled by excluding a configured traffic profile. A passive measurement operation does not generate live traffic. The operation only collects statistics for the target configured for the operation.

The traffic generator mode sends traffic only. No statistics are collected.

How to Configure IP SLA - Service Performance Testing

Configuring a Service Performance Operation

Perform the following steps to define the parameters for a single service performance test stream.

Before you begin

- The service instance for the Ethernet Flow Point (EFP) must be configured. For configuration information, see your hardware configuration guide.
- For two-way statistics calculations, the destination interface must be in loopback mode. For information, see the *Interface and Hardware Component Configuration Guide*.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla** operation-number
4. **service-performance type** *type* **dest-mac-addr** *mac-address* **interface** *interface* **service instance** *id*
5. **aggregation interval buckets** *buckets*
6. **description** *description*
7. **duration time** *seconds*
8. **frequency** {**interaction** *interaction-number* **delay** *seconds*}
9. **frequency time** *seconds*}
10. **measurement-type direction** {**external** | **internal**}
11. **signature** *sequence*
12. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	ip sla operation-number Example: Device(config)# ip sla 10	Configures an IP SLAs operation and enters IP SLA configuration mode.
Step 4	service-performance type type dest-mac-addr mac-address interface interface service instance id Example: Device(config-ip-sla)# service-performance type ethernet dest-mac-addr 0001.0001.0001 interface gigabitethernet0/4 service instance 100	Configures a service performance operation and enters service performance configuration mode.
Step 5	aggregation interval buckets buckets Example: Device(config-ip-sla-service-performance)# aggregation interval buckets 5	(Optional)Configures number of interval buckets to be kept.
Step 6	description description Example: Device (config-ip-sla-service-performance) # description With all operations	(Optional)
Step 7	duration time seconds Example: Device (config-ip-sla-service-performance) # duration time 20	(Optional)
Step 8	frequency {interation interation-number delay seconds Example: Device (config-ip-sla-service-performance) # frequency interation 1 delay 5	(Optional) Specifies how often and for how long the operation runs.
Step 9	frequency time seconds} Example: Device (config-ip-sla-service-performance) # frequency time 30	(Optional) Specifies how often and for how long the operation runs.

	Command or Action	Purpose
Step 10	measurement-type direction {external internal} Example: Device(config-ip-sla-service-performance)# measurement-type direction external	(Optional) Configures measurement metrics type.
Step 11	signature <i>sequence</i> Example: Device(config-ip-sla-service-performance)# signature 05060708	(Optional) Configures payload contents.
Step 12	end Example: Device(config-ip-sla-service-performance)# end	returns to privileged EXEC mode.

Configuring Service Performance Profiles on the Sender

Perform these steps to configure profiles for generating live traffic.



Note Do not configure a traffic profile if you are configuring an operation for passive measurement mode.

Before you begin

The service performance operation to which the profile is to be applied must be configured. For configuration information, see the “Configuring a Service Performance Operation” section.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla** *operation-number*
4. **profile traffic direction** {external | internal}
5. **rate-step** *kbps [kbps ... kbps]*
6. **exit**
7. **profile packet**
8. **inner-cos** *cos-number*
9. **outer-cos** *cos-number*
10. **inner-vlan** *vlan-id*
11. **outer-vlan** *vlan-id*
12. **packet-size** *size*
13. **src-mac-addr** *mac-address*
14. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	ip sla operation-number Example: Device(config)# ip sla 10	Configures an IP SLA operation.
Step 4	profile traffic direction {external internal} Example: Device(config-ip-sla-service-performance)# profile traffic direction internal	Configures a traffic profile for generating live traffic.
Step 5	rate-step kbps [kbps ... kbps] Example: Device(config-ip-sla-service-performance-traffic)#rate-step 1000 2000	Configures a list of rate steps for live traffic.
Step 6	exit Example: Device(config-ip-sla-service-performance-traffic)# exit	
Step 7	profile packet Example: Device(config-ip-sla-service-performance)# profile packet	Configures a packet profile for live traffic.
Step 8	inner-cos cos-number Example: Device(config-ip-sla-service-performance-packet)# inner-cos 6	Sets inner-loop CoS in the packet profile.
Step 9	outer-cos cos-number Example: Device(config-ip-sla-service-performance-packet)# outer-cos 6	Sets outer-loop CoS in the packet profile.
Step 10	inner-vlan vlan-id Example:	Specifies the inner-loop VLAN in the packet profile.

	Command or Action	Purpose
	Device(config-ip-sla-service-performance-packet)# inner-vlan 100	
Step 11	outer-vlan <i>vlan-id</i> Example: Device(config-ip-sla-service-performance-packet)# outer-vlan 100	Specifies the outer-loop VLAN in the packet profile.
Step 12	packet-size <i>size</i> Example: Device(config-ip-sla-service-performance-packet)# packet-size 512	(Optional) Specifies packet size in the packet profile.
Step 13	src-mac-addr <i>mac-address</i> Example: Device(config-ip-sla-service-performance-packet)# src-mac-addr 4055.398d.8d4c	Specifies source device in packet profile.
Step 14	end Example: Device(config-ip-sla-service-performance)# end	Returns 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: <pre>Device> enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: <pre>Device# configure terminal</pre>	Enters global configuration mode.
Step 3	Enter one of the following commands: <ul style="list-style-type: none"> • ip sla schedule <i>operation-number</i> [life {forever <i>seconds</i>}] [start-time {[<i>hh:mm:ss</i>] [<i>month day</i> <i>day month</i>] pending now after <i>hh:mm:ss</i>}] [ageout <i>seconds</i>] [recurring] • ip sla group schedule <i>group-operation-number</i> <i>operation-id-numbers</i> {schedule-period <i>schedule-period-range</i> schedule-together} [ageout <i>seconds</i>] frequency <i>group-operation-frequency</i> [life {forever <i>seconds</i>}] [start-time {<i>hh:mm</i> [:<i>ss</i>] [<i>month day</i> <i>day month</i>] pending now after <i>hh:mm</i> [:<i>ss</i>]}}] Example: <pre>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</pre>	<ul style="list-style-type: none"> • 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: <pre>Device(config)# end</pre>	Exits global configuration mode and returns to privileged EXEC mode.
Step 5	show ip sla group schedule Example: <pre>Device# show ip sla group schedule</pre>	(Optional) Displays IP SLAs group schedule details.

	Command or Action	Purpose
Step 6	show ip sla configuration Example: Device# show ip sla configuration	(Optional) Displays IP SLAs configuration details.

Configuration Examples for IP SLA - Service Performance Testing

Example: Service Performance Operation

```

Device# show ip sla configuration 1
IP SLAs Infrastructure Engine-III
Entry number: 1
Service Performance Operation
Type: ethernet
Destination
MAC Address: 4055.398d.8bd2
VLAN:
Interface: GigabitEthernet0/4
Service Instance: 10
EVC Name:
Duration Time: 20
Interval Buckets: 5

Signature:
05060708

Description: this is with all operation modes

Measurement Type:
throughput, loss
Direction: internal

Profile Traffic:
Direction: internal
CIR: 0
EIR: 0
CBS: 0
EBS: 0
Burst Size: 3
Burst Interval: 20
Rate Step (kbps): 1000 2000

Profile Packet:
Inner COS: 6
Outer COS: 6
Inner VLAN: 100
Outer VLAN: 100
Source MAC Address: 4055.398d.8d4c
Packet Size: 512
Schedule:
  Operation frequency (seconds): 64 (not considered if randomly scheduled)
  Next Scheduled Start Time: Start Time already passed

```

```

Group Scheduled : FALSE
Randomly Scheduled : FALSE
Life (seconds): Forever
Entry Ageout (seconds): never
Recurring (Starting Everyday): FALSE
Status of entry (SNMP RowStatus): Active

```

Example: Passive Measurement Mode

The following sample output displays the default configuration for a passive-measurement service performance operation. No live traffic will be generated for this operation because the traffic profile is not configured.

```
sla-asr901-1# show ip sla configuration 10
```

```

IP SLAs Infrastructure Engine-III
Entry number: 10
Service Performance Operation
Type: ethernet
Destination
MAC Address: 4055.398d.8bd2
VLAN:
Interface: GigabitEthernet0/0
Service Instance: 10
EVC Name:
Duration Time: 30
Interval Buckets: 1

Signature:

Description:

Measurement Type:
  none
Direction: internal

Profile Traffic:
Direction: internal
CIR: 0
EIR: 0
CBS: 0
EBS: 0
Burst Size: 0
Burst Duration: 0
Inter Burst Interval: 0
Rate Step (kbps):

Profile Packet:
Inner COS: Not Set
Outer COS: Not Set
Inner VLAN: Not Set
Outer VLAN: Not Set
Source MAC Address: 0000.0000.0000
EtherType: default
Packet Size: 64

```

Additional References for IP SLA - Service Performance Testing

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Command List, All Releases
Cisco IOS IP SLAs commands	Cisco IOS IP SLAs Command Reference

Standards and RFCs

Standard/RFC	Title
ITU-T Y.1564	<i>Ethernet service activation test methodology</i>
No specific RFCs are supported by the features in this document.	--

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 IP SLA - Service performance Testing

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 IP SLA - Service performance Testing

Feature Name	Releases	Feature Information
IP SLA - Service Performance Testing	15.3(2)S 15.4(1)S	<p>The IP SLA - Service Performance Testing feature utilizes the ITU-T Y.1564 Ethernet service activation/performance test methodology for turning up, installing and troubleshooting Ethernet-based services. This test methodology allows for complete validation of Ethernet IP Service Level Agreements (SLAs) in a single test.</p> <p>The following commands were introduced or modified: aggregation interval, description (IP SLA), duration time, frequency (IP SLA service performance), inner-cos, inner-vlan, measurement-type, outer-cos, outer-vlan, packet size, profile packet, profile traffic, service-performance, show ip sla configuration, show ip sla group schedule signature (IP SLA).</p> <p>In Cisco IOS Release 15.4(1)S, support was added for the Cisco ASR 901S Router.</p>