IP SLA v2 UDP Jitter Probe

The IP SLA V2 UDP feature performs link monitoring by actively injecting traffic, and measuring metrics such as traffic packet loss and delay. The software crafts probe packets and injects them to the data plane. The responses are punted back to the CPU for statistics. The IP SLA packets carry sender or responder sequence numbers to infer the packet loss statistics per direction (sender to responder or vice versa), and the timestamps required for delay measurements.

The IP SLA v2 UDP Jitter Probe feature provides link monitoring with UDP packets carrying timestamp information, called probe. The RX / TX timestamp information provides monitoring of better UDP statistics and accuracy.

The IP SLA UDP jitter probe configuration has 3 packet formats, referred to as versions v1/v2/v3.

  • v2—Precision microsecond

  • v3—Optimize timestamp

Note   RSP3 module does not support IP SLA v3.

Note   IP SLA v1 is the default configuration.

Benefits of Using IP SLA UDP Probe

  • Monitors network performance and health of the system.

  • Ability to test and troubleshoot network problems.

  • Ability to measure network metrics such as:

      • Network delay

      • Packet loss

      • Network delay variation (jitter)

      • Connectivity

The example explains the Jitter operation where, A is the IP SLA source, and B is the Responder. The IP Core
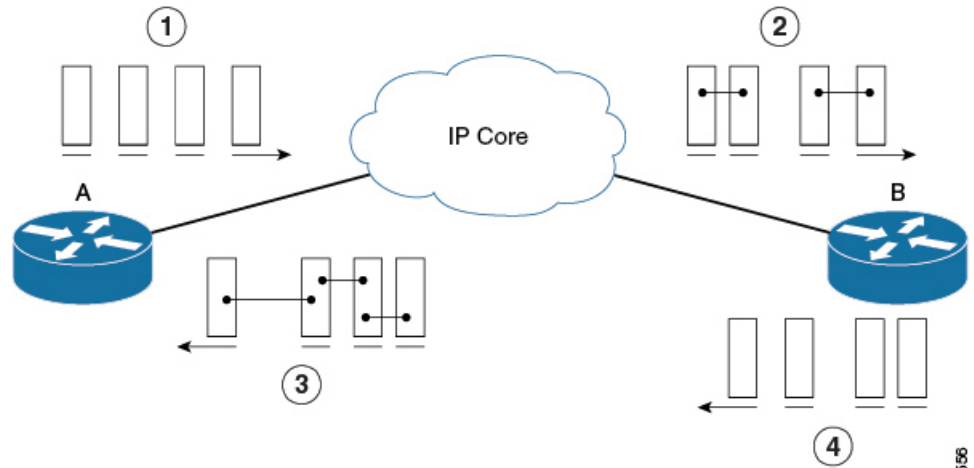
connects A and B.

1	Displays the train of packets that are sent at a constant interval.	3	Displays the train of packets that are received at an interval that is impacted by network.
2	Indicates the per-direction (SD or DS) inter-packet delay (Jitter) Indicates the per-direction (SD or DS) packet loss.	4	Indicates the timestamp. Increments Rx count delta time.

Calculating the UDP-Based Probe Round Trip Time

The router uses the Patented Control Protocol for UDP operation. It requires a responder for accurate results. The source and the destination routers subtract the processed delays.
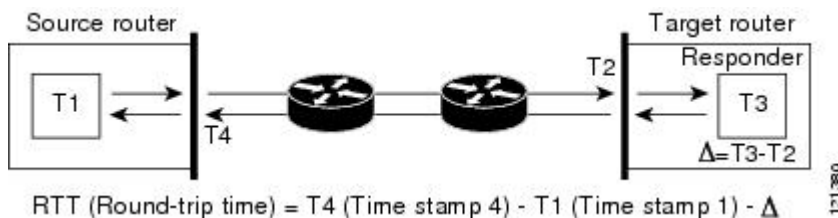
One-way latency is T2-T1.

The Round Trip Time (RTT) is [T4-T1]-[T3-T2].

Restrictions for IP SLA V2

- RSP3 module only supports IP SLA v2.

- IP SLA v2 does not support hardware time stamping.

- IP SLA v2 supports MD5 authentication.

- One-way latency values are not displayed in the **show ip sla statistics** command.

Configuring IP SLA V2

```
Router(config)# ip sla 15
Router(config-ip-sla)#udp-jitter 190.168.1.2 2080 num-packets 1200 interval 50
Router(config-ip-sla-jitter)#precision microseconds
Router(config-ip-sla-jitter)#frequency 250
Router(config-ip-sla-jitter)#verify-data
Router(config-ip-sla-jitter)#tos 48
DUT2(config)#ip sla responder
Router(config)#ip sla schedule 15 start-time now
```

Configuring IP SLA V2 on the NTP Server

NTP configuration is mandatory to get accurate results [T1, T2, T3, T4].

Note Ensure that NTP configuration is in sync state on all the devices.

```
Router(config)# ntp logging
Router(config)#ntp source Loopback0
Router(config)# ntp server 192.168.2.1
```

Verifying IP SLA V2

The **show ip sla statistics** command displays the jitter operation statistics

```
Router# show ip sla statistics
IPSLAs Latest Operation Statistics
IPSLA operation id: 10
Type of operation: udp-jitter
Latest RTT: 582 microseconds
 Latest operation start time: 10:18:51 IST Sat Feb 9 2019
Latest operation return code: OK
Latest operation NTP sync state: SYNC
RTT Values:
Number Of RTT: 10 RTT Min/Avg/Max: 494/582/718 microseconds
 Latency one-way time:
Number of Latency one-way Samples: 0
Source to Destination Latency one way Min/Avg/Max: 0/0/0 microseconds Destination to Source
 Latency one way Min/Avg/Max: 0/0/0 microseconds
Jitter Time:
Number of SD Jitter Samples: 9
 Number of DS Jitter Samples: 9
```

```
 Source to Destination Jitter Min/Avg/Max: 2/69/110 microseconds
 Destination to Source Jitter Min/Avg/Max: 5/32/78 microseconds
 Over Threshold: Number Of RTT Over Threshold: 0 (0%)
 Packet Loss Values: Loss Source to Destination: 0
Source to Destination Loss Periods Number: 0
Source to Destination Loss Period Length Min/Max: 0/0
 Source to Destination Inter Loss Period Length Min/Max: 0/0
 Loss Destination to Source: 0
Destination to Source Loss Periods Number: 0
Destination to Source Loss Period Length Min/Max: 0/0
Destination to Source Inter Loss Period Length Min/Max: 0/0 Out Of Sequence: 0
Tail Drop: 0 Packet Late Arrival: 0 Packet Skipped: 0 Voice Score Values: Calculated Planning
 Impairment Factor (ICPIF): 0 Mean Opinion Score (MOS): 0
Number of successes: 3
Number of failures: 0
 Operation time to live: Forever
```

The **show ip sla configuration** command displays IP SLA configuration.

```
Router# show ip sla configuration
IP SLAs Infrastructure Engine-III
Entry number: 10
Owner:
Tag:
Operation timeout (milliseconds): 5000
Type of operation to perform: udp-jitter
Target address/Source address: 10.0.0.2/0.0.0.0
Target port/Source port: 3028/0
Type Of Service parameter: 0xC
Request size (ARR data portion): 64
Packet Interval (milliseconds)/Number of packets: 40/200
Verify data: Yes
Operation Stats Precision : microseconds
Timestamp Location Optimization: disabled
Operation Packet Priority : normal
Vrf Name:
Control Packets: enabled
Schedule:
   Operation frequency (seconds): 15  (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
Threshold (milliseconds): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 1
   Statistic distribution interval (microseconds): 20000
Enhanced History:
Percentile:
```