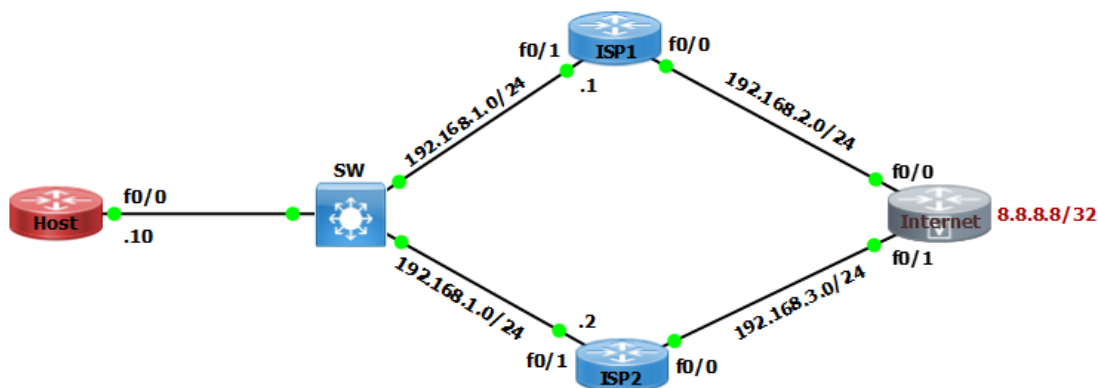


IP SLA (Service Level Agreement):

- o Internet Protocol SLA is a term which stands for **Service Level Agreement**.
- o Service Level Agreement is a formal or informal contract between two parties.
- o IP SLA uses active traffic monitoring to monitor continuous traffic on the network.
- o With IP SLAs, the Cisco routers and Cisco switches perform periodic measurements.
- o IP Service Level Agreement is a feature of Cisco IOS that allows collecting information.
- o IP SLA is a feature to collect info about the performance of network in the real time.
- o IP SLA is a Cisco IOS feature, which can be used to measure network performance.
- o IP Service-Level Agreements (SLA) measure the current performance of the network.
- o IP SLA continuously collects data about latency, packet loss, jitter & response time.
- o IP SLA responder is the IOS software, which responds to the SLA request packet.
- o IP Service Level Agreement consists of two components: source and target router.
- o IP Service Level Agreement (SLA) source is where the IP SLA operation is defined.
- o Operation is the type of packet that will be sent from the source to the destination.
- o IP Service Level Agreement: each measurement that we do is called an operation.
- o In IP SLA, the routers will collect the data and can be used for tracking.
- o For example, you can use SLA to view the status of static routes or for PBR.
- o The destination router is referred to as IP Service Level Agreement Responder.
- o Types of traffic IP SLA can use: ICMP, RTP, TCP, UDP, DNS, DHCP, and HTTP & FTP.
- o IP SLAs use ICMP Echo operation to monitor end-to-end response time between devices.
- o ICMP Echo is useful for troubleshooting network connectivity issues.
- o ICMP Echo operation measures end-to-end response time between devices.
- o Object tracking allows tracking specific objects on the device.
- o Object such as interface line protocol state, IP routing, & route reachability.
- o Object tracking then takes action when the tracked object's state changes.
- o Object feature allows increasing the availability of the network.
- o Object feature allows recovery time if an object state goes down.



ISP1 Configuration
ISP1(config)#interface f0/1 ISP1(config-if)#ip add 192.168.1.1 255.255.255.0 ISP1(config-if)#no shutdown
ISP1(config)#interface f0/0 ISP1(config-if)#ip add 192.168.2.1 255.255.255.0 ISP1(config-if)#no shutdown
ISP1(config)#router eigrp 1 ISP1(config-router)#network 192.168.2.0 ISP1(config-router)#network 192.168.1.0 ISP1(config-router)#no auto-summary
ISP2 Configuration
ISP2(config)#interface f0/1 ISP2(config-if)#ip add 192.168.1.2 255.255.255.0 ISP2(config-if)#no shutdown
ISP2(config)#interface f0/0 ISP2(config-if)#ip add 192.168.3.2 255.255.255.0 ISP2(config-if)#no shutdown
ISP2(config)#router eigrp 1 ISP2(config-router)#network 192.168.3.0 ISP2(config-router)#network 192.168.1.0 ISP2(config-router)#no auto-summary
Internet Configuration
Internet(config)#interface f0/1 Internet(config-if)#ip add 192.168.3.3 255.255.255.0 Internet(config-if)#no shutdown
Internet(config)#interface f0/0 Internet(config-if)#ip add 192.168.2.3 255.255.255.0 Internet(config-if)#no shutdown
Internet(config)#interface loopback 8 Internet(config-if)#ip address 8.8.8.8 255.255.255.255
Internet(config)#router eigrp 1 Internet(config-router)#network 0.0.0.0 Internet(config-router)#no auto-summary
Host IP Configuration
Host(config)#interface f0/0 Host(config-if)#ip address 192.168.1.10 255.255.255.0 Host(config-if)#no shutdown

IP SLA Configuration in Host Router

```
Host(config)#ip sla 1
Host(config-ip-sla)#icmp-echo 192.168.1.1
Host(config-ip-sla-echo)#frequency 10
Host(config-ip-sla-echo)#timeout 5000
Host(config-ip-sla-echo)#exit
Host(config)#ip sla schedule 1 start-time now life forever
```

Track Configuration to bind to IP SLA

```
Host(config)#track 10 ip sla 1 reachability
Host(config)#ip route 0.0.0.0 0.0.0.0 192.168.1.1 track 10
Host(config)#ip route 0.0.0.0 0.0.0.0 192.168.1.2 20
Host# show track
Host# show ip sla statistics
Host# show ip route
```

Show ip route display best route is 192.168.1.1 for all traffic.

```
Host#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, + - replicated route

Gateway of last resort is 192.168.1.1 to network 0.0.0.0
S* 0.0.0.0/0 [1/0] via 192.168.1.1
   192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.1.0/24 is directly connected, FastEthernet0/0
L   192.168.1.10/32 is directly connected, FastEthernet0/0
```

IP SLA operation is ok and working.

```
Host#show ip sla statistics
IPSLAs Latest Operation Statistics

IPSLA operation id: 1
Type of operation: icmp-echo
Latest RTT: 47 milliseconds
Latest operation start time: *09:45:37.811 UTC Mon Apr 8 2019
Latest operation return code: OK
Number of successes: 36
Number of failures: 0
Operation time to live: Forever
```

Show track is monitoring IP SLA reachability its working and return code is OK.

```

Host# show track
Track 10
IP SLA 1 reachability
Reachability is Up
  1 change, last change 00:05:34
Latest operation return code: OK
Latest RTT (milliseconds) 61
Tracked by:
  STATIC-IP-ROUTING 0

```

Traceroute show best route is 192.168.1.1 which is ISP1.

```

Host# traceroute 8.8.8.8 numeric

Type escape sequence to abort.
Tracing the route to 8.8.8.8

  1 192.168.1.1 56 msec 56 msec 60 msec
  2 192.168.2.3 80 msec 56 msec 60 msec

```

After shutdown ISP1 interface F0/1 track IP SLA messages is generated.

```

Host#
*Apr _8 09:50:24.063: %TRACKING-5-STATE: 10 ip sla 1 reachability Up->Down

```

Now second backup route with AD 20 has been installed automatically.

```

Host# show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, + - replicated route

Gateway of last resort is 192.168.1.2 to network 0.0.0.0

S* 0.0.0.0/0 [20/0] via 192.168.1.2
   192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.1.0/24 is directly connected, FastEthernet0/0
L    192.168.1.10/32 is directly connected, FastEthernet0/0

```

Now traceroute again second backup route 192.168.1.2 ISP2.

```

Host# traceroute 8.8.8.8 numeric

Type escape sequence to abort.
Tracing the route to 8.8.8.8

  1 192.168.1.2 56 msec 52 msec 56 msec
  2 192.168.3.3 76 msec 72 msec 84 msec

```

