Configure IP SLA Tracking and Path Control Topology

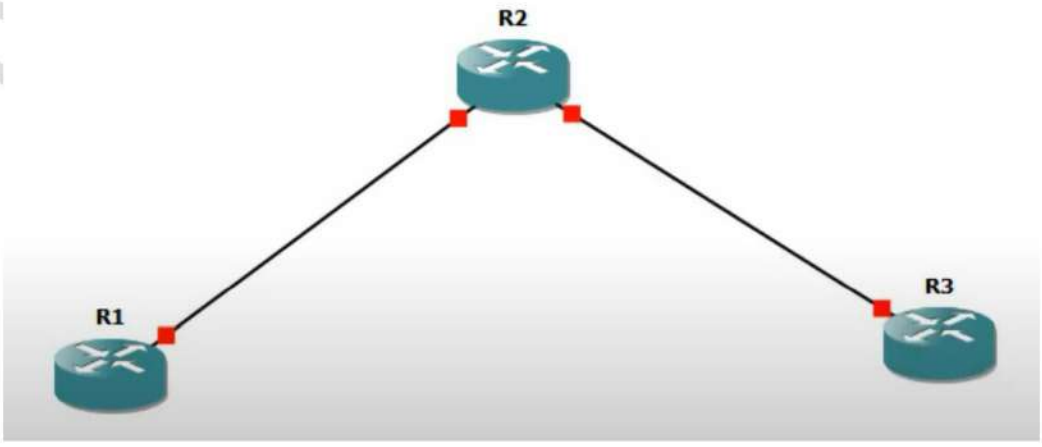
Aim: To configure and verify IP SLA (Service Level Agreement) tracking and path control on Cisco routers, enabling dynamic failover between multiple ISPs based on real-time network performance metrics.

Theory: IP SLA is a Cisco IOS feature that allows active monitoring of network performance by generating traffic and measuring parameters like delay, jitter, and packet loss. This proactive monitoring helps in assessing the quality of network paths.

Path Control involves directing traffic over specific network paths based on performance metrics. By integrating IP SLA with tracking objects, routers can make intelligent routing decisions, ensuring optimal path selection and network resilience.

Tracking Objects are used to monitor the status of IP SLA operations. If an IP SLA operation fails (e.g., due to high latency or packet loss), the tracking object reflects this state, allowing the router to adjust its routing decisions accordingly.

Topology:



Commands:

Configure IP SLA Operations
R1(config)# ip sla 1
R1(config-ip-sla)# icmp-echo 209.165.200.254 source-interface Serial0/0/0
R1(config-ip-sla-echo)# timeout 5000
R1(config-ip-sla-echo)# frequency 10
R1(config)# ip sla schedule 1 life forever start-time now
Explanation: This configuration sets up an ICMP echo operation (ping) to the IP address 209.165.200.254, using Serial0/0/0 as the source interface. The operation has a timeout of 5000 ms and a frequency of 10 seconds.

Configure Tracking Objects
R1(config)# track 1 ip sla 1 reachability
R1(config-track)# delay down 10 up 1
R1(config-track)# exit
Explanation: This command creates a tracking object (ID 1) that monitors the reachability of IP SLA operation 1. The delay parameters ensure that transient failures don't cause unnecessary route changes.

Configure Static Routes with Tracking
R1(config)# ip route 0.0.0.0 0.0.0.0 209.165.201.1 5 track 1
R1(config)# ip route 0.0.0.0 0.0.0.0 209.165.202.129 10 track 2
Explanation: These commands set up two default routes with different administrative distances. The first route uses 209.165.201.1 with a distance of 5 and is tracked by object 1. The second route uses 209.165.202.129 with a distance of 10 and is tracked by object 2.

Configure IP SLA Responder on Remote Router
R2(config)# ip sla responder
Explanation: This command enables the IP SLA responder on the remote router (R2), allowing it to respond to the ICMP echo requests sent by R1.

Verification:
To verify the IP SLA operation:
R1# show ip sla statistics

To check the status of tracking objects:
R1# show track

To view the routing table and confirm active routes:
R1# show ip route

Conclusion:
By configuring IP SLA tracking and path control, the network can dynamically adjust to changing conditions, ensuring optimal path selection and improved network resilience. This setup is particularly beneficial in scenarios where multiple ISPs are used, allowing for automatic failover in case of link degradation or failure.

For video demonstration of the above practical scan the following QR-code or type the link address

https://youtu.be/mIj40NPOH9I?si=0XWBVaZ27wcaacYt