Configure IP SLA Feature with L3out to Track Static Route

Contents

Introduction Prerequisites Requirements Components Used Background Information Configure Network Diagram Configurations Verify Troubleshoot Related Information

Introduction

This document describes how to configure the Internet Protocol Service Level Agreement (IPSLA) in Cisco Application Centric Infrastructure (ACI) to track static route learn from one L3out and advertise to another L3out only if the subnet is reachable from the first L3out.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- ACI software version 4.1 and later
- L3out toward External device or Server
- EX and -FX chassis
- Track the route to use Internet Control Message Protocol (ICMP) and TCP probes (in this example ICMP probe is used)

Note: ACI image IP SLA is supported in all Cisco Nexus second-generation switches, which includes -EX and -FX chassis. Please read <u>Guidelines and Limitations for IP SLA</u>.

Components Used

The information in this document is based on these software and hardware versions:

- ACI version 5.2(2f)
- N9K-C93180YC-FX

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

Some servers have multiple interfaces (like a loopback) which is reachable from ACI via the physical IP address of the server. In such a case you can have a requirement to add a static route and advertise externally but only if the physical IP of the server is reachable. Hence IP SLA track feature is an unavoidable configuration that can only achieve through L3out configuration toward those servers. At this moment IP SLA track features are not supported for the <u>static route on a</u> <u>Bridge Domain</u>. In this document, we will look for server examples and transit route configurations that use IP SLA.

Configure

- L3out toward Server and toward N3K devices.
- Configure IP SLA track for the physical IP address of the server.
- Configure static route under L3out toward server which use IP SLA track and advertise from another L3out toward N3K.

Network Diagram



ACI Lab Topology

Configurations

Summary Steps:

ACI fabric policies:

- Create Contract (for this example, a common default filter that allows all traffic to be used, but you can use a specific filter locally created in the same Tenant to allow specific traffic. in such a case please ensure you allow protocol that we are used for IP SLA track).
- Create new L3out toward server 10.100.0.100/24 (ACI side SVI 550 with IP address 10.100.0.254)
- Create IP SLA Track Policies (IP SLA monitor policy, Track Members policy, Track List policy)
- Add static route under L3out toward server with IP SLA tracklist.
- Create a new L3out toward the N3K device which use BGP. (EBGP) ACI AS 65535 and N3K AS 65536
- Export static route from L3out toward N3K.
- Verify configuration and reachability.
- 1. Create Contract (for this example, use a common default filter that allows all traffic, however, you can use a specific filter locally created in the same tenant to allow specific traffic but in

such case please ensure you allow protocol which we are used for IP SLA track).

| TN_D | 000 | Contract - Contract_L | 3out_BGP | | | | | | | | | 0.0 | 0 |
|----------------------|-----|-----------------------|------------------------------|----------------------------|----------------|----------|----------|--------|----------------|------------------------------------------------|--------|-----------|----------|
| ~ Щ т⊾d | | | | | | Summany | Topology | Dolicy | Deer Entities | Contract Exception | Foults | History | <i>•</i> |
| Application Profiles | | | | | | owninary | inhound) | roity | r ster charace | e en la en | 1 ouno | rinditory | |
| > 🖃 Networking | | | | | | | | | | | Ċ | 土 秋, | |
| Contracts | | Properties | | | | | | | | | | | |
| V 🖼 Standard | | Name: | Contract_L3out_BGP | | | | | | | | | | |
| Contract_L3out_8GP | | Alas: | | | | | | | | | | | |
| Taboos | | Global Alias: | | | | | | | | | | | |
| > 🧮 Imported | | Scope: | VRF | | | | | | | | | | |
| > 🚍 Fitters | | QoS Class: | Unspecified | | | | | | | | | | |
|) 🔤 Policies | | Target DSCP: | Unspecified | | | | | | | | | | |
| > 🔤 Services | | Decedering | Target 05CP Marking works or | ny if the QoS Class is set | | | | | | | | | |
| 🚍 Security (Beta) | | Description. | | | | | | | | | | | |
| | | Annotations | Click to add a new a | enolation | | | | | | | | | |
| | | Subjects | | | | | | | | | | = + | |
| | | | = Name | Akas | Filters | | | | Description | | | | |
| | | | Allow_Any | | common/default | | | | | | | | |
| | | | | | | | | | | | | | ١. |

Create Contract

2. Create a new L3out toward server 10.100.0.100/24 (ACI side SVI 550 with IP address 10.100.0.254).

| TN_D (C) | L3 Outside - L3out_Static_server |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| ~ ⊞ т№_D | |
| > 🗖 Application Profiles | |
| 🗸 📛 Networking | |
| > 🚞 Bridge Domains | |
| > 🚞 VRFs | |
| > 🚞 L2Outs | Properties |
| └─ 🖬 L3Outs | Name: L3out_Static_server |
| > 1 L3out_N3K_BGP | |
| ✓ | Description. Optional |
| > 🚞 Logical Node Profiles | |
| > 🚞 External EPGs | Annotations: Click to add a new annotation |
| > The second | Global Alias: |
| > 🔤 SR-MPLS VRF L3Outs | Provider Label: |
| > 📩 Dot1Q Tunnels | Consumer Label: select an option |
| V 🖿 Contracts | Target DSCP: Unspecified |
| V 📩 Standard | PIM: |
| > 🔁 Contract_L3out_BGP | PIMv6: |
| > 🚞 Taboos | Route Control Enforcement: Import |
| > 🚞 Imported | VRF: VRF_S |
| Filters | Resolved VRF: TN_D/VRF_S |
| > 🖬 Policies | L3 Domain: TN_D_L3Dom 🗸 🗗 |
| > 🚍 Services | Route Profile for Interleak: select a value |
| E Security (Beta) | Route Profile for Redistribution: |
| | ▲ Source |
| | |
| | |
| | Enable Dom/EligRP/USPF: BGP OSPF EIGRP |
| | Address Family Tuns |
| | Address Family Type |
| | |
| | |

Create L3out



Attaching node to L3out

| TN_D | 00 | Logical Interface Profile - | L3out_Static_server_inter | faceProfile | | | | | | | 0.0 |
|--------------------------------------|----|-----------------------------|---------------------------|-------------|-------------------------|-----------------|-------------------|---------------|-------------------|----------|------------|
| ~ ∰ TN_D | | | | | | | | | Della | Earths | U U |
| > 🚔 Application Profiles | | | | | | | | | Policy | Paults | history |
| Wetworking | | | | | | | General Routed S | ub-Interfaces | Routed Interfaces | SVI Fic | oating SVI |
| > 🚞 Bridge Domains | | 0.0.0 | | | | | | | | | |
| > 🖿 VRFs | | | | | | | | | | | 0 ± |
| > 🖿 L20uts | | | | | | | | | | | 11 + |
| L3Outs | | Path | Side A IP | Side B IP | Secondary IP Address | IP Address | MAC Address | MTU (bytes) | Encap | Encap Sc | cope |
| > 🚯 L3out_N3K_BGP | | Ded. 101ede. 1011eb1/0 | | | Plaareaa | 10 100 0 054/04 | 00.00.00.00.10.00 | in the second | .den 507 | 1 mml | |
| L3out_Static_server | | Pod-1/Wode-101/edi1/3 | | | | 10.100.0.254/24 | 00.22.80.76.19.77 | EIDEIL | vian-507 | LOCAL | |
| Logical Node Profiles | | | | | | | | | | | |
| El L3out_Static_server_nodeProfile | | | | | | | | | | | |
| > E Configured Nodes | | | | | | | | | | | |
| Logical Interface Profiles | _ | | | | | | | | | | |
| L3out_Static_server_interfaceProfile | | | | | | | | | | | |
| V 🔛 External EPGs | | | | | | | | | | | |
| | | | | | | | | | | | |

Attaching interface to L3out

| TN_D (D.9)0 | External EDG - EV | T statis EDG | | | | | 0.0 |
|-----------------------------------------------|---------------------------------------|--------------------------------|------------------------|-----------|------------|------------------------------|----------------------------|
| ✓ III TN.D | External EPG - EX | 1_30000_010 | | | | | 00 |
| > Application Profiles | | | | | | Policy Operational | Health Faults History |
| 🗸 🚞 Networking | | | | | General Co | ontracts Inherited Contracts | Subject Labels EPG Labels |
| > 🚞 Bridge Domains | 0.0.0 | | | | | | |
| > 🧰 VRFs | | | | | | | 0 ± %. |
| > 🚍 L2Outs | Properties | EVT envire EDG | | | | | |
| V 🚞 L3Outs | Alias | ENT_DUDUC_EPG | | | | | ^ |
| > 📤 L3out_N3K_BGP | Annotations | Click to add a new annota | tion | | | | |
| | Global Alias | | | | | | |
| Logical Node Profiles | Description | | | | | | |
| B L3out_Static_server_nodeProfile | | | | | | | |
| > Configured Nodes | | | | | | | |
| Logical Interface Profiles | Contract Exception Tag | 32771 | | | | | |
| L3out_Static_server_interfaceProfile | Configured VRE Name | VEES | | | | | |
| V 🔤 External EPGs | Resolved VRF: | uni/tn-TN_D/ctx-VRF_S | | | | | |
| EXT_static_EPG | QoS Class | Unspecified v | | | | | |
| Route map for import and export route control | Target DSCP: | Unspecified | | | | | |
| > 📰 SR-MPLS VRF L3Outs | Configuration Status | applied | | | | | |
| > 🚞 Dot1Q Tunnels | Configuration Issues | | | | | | |
| > 🚍 Contracts | Preferred Group Member: | Exclude Include | | | | | |
| > 🚍 Policies | Intra Ext-EDG Isolation | Entraned Linestrument | | | | | |
| > 🚍 Services | Published States | Chinadea Chinadea | | | | | |
| 🚞 Security (Beta) | Subnets. | | | | | | |
| O Quick Start | | IP Address | Scope | Name | Aggregate | Route Control Profile | Route Summarization Policy |
| | | 0.0.0/0 | External Subnets for t | he Extern | | | ~ |
| | | | | | | | |
| | | | | | | Show U | sage Reset Submit |

Configure External EPG

| TN_D ∨ Щ TN_D > ⊒ Application Profiles | 090 | External EPG - I | EXT_static_EPG | | | | | Po | Derational | Health Faults History | 9 |
|----------------------------------------------|-----|-------------------------|----------------------------|--------------|---------------|------------------------|-------------|-----------|---------------------|---------------------------|---|
| V 🚍 Networking | | | | | | | General | Contracts | Inherited Contracts | Subject Labels EPG Labels | |
| > 📾 Bridge Domains > 📾 VRFs | | 🗢 Healthy 🙁 💟 (| | | | | | | | 0 ± %. | |
| > 🚞 L2Outs | | Name | Tenant | Tenant Alias | Contract Type | Provided / Consumed | QoS Class | State | Label | Subject Label | |
| ✓ | | Gontract Type: Contract | t | | | | | | _ | | |
| A L3out_N3K_BGP A L3out_Static server | | Contract_L3out_BGP | TN_D | | Contract | Provided | Unspecified | formed | | | |
| Logical Node Profiles | | | | | | | | | - | | |
| V P L3out_Static_server_nodeProfile | | | | | | | | | | | |
| > 🚞 Configured Nodes | | | | | | | | | | | |
| Lout_Static_server_interfaceProfile | | | | | | | | | | | |
| V 🔛 External EPGs | | | | | | | | | | | |
| EXT_state_EPG | | | | | | | | | | | |

Attaching Contract to L3out

3. Create IP SLA Track Policies (IP SLA monitor policy, Track Members policy, Track List policy).

IP SLA Monitor Policy:

| TN_D | ©∍⊘ | IP SLA Monitoring Policy - IC | MP_Moni | tor | | | |
|--------------------------------|-----|-----------------------------------|------------|-----|------------|------|---|
| ₩ TN_D | ^ | | | | | | |
| > 🧮 Application Profiles | | | | | | | |
| > 🛅 Networking | | 8 👽 🛆 🕕 | | | | | |
| > 🚞 Contracts | | Properties | | | | | |
| V 🖬 Policies | | Name: | ICMP_Monit | or | | | |
| Protocol | | Description: | optional | | | | |
| > 💳 BFD | | | | | | | |
| > 🧮 BFD Multihop | | SLA Type: | ICMP | TCP | L2Ping | HTTP |) |
| > 🚞 ND RA Prefix | | SLA Frequency (sec): | 5 | | ^ | | |
| > 🗖 BGP | | Detect Multiplier: | 3 | | | | |
| > 🚞 Custom QoS | | Request Data Size (bytes): | 28 | | | | |
| > 🚞 Data Plane Policing | | Tune of Service: | 0 | | ~ | | |
| | | Operation Timeout (millicoconde): | 000 | | | | |
| > 🗖 EIGRP | 4 | Threshold (milliseconds): | 900 | | | | |
| > 🧮 End Point Retention | | Threshold (miniseconds). | 900 | | | | |
| > 🧮 First Hop Security | | Trame Class Value: | 0 | | \bigcirc | | |
| > 🗖 HSRP | | | | | | | |
| > 🧮 IGMP Interface | | | | | | | |
| > 🔄 IGMP Snoop | | | | | | | |
| V 🖿 IP SLA | | | | | | | |
| V 🖬 IP SLA Monitoring Policies | | | | | | | |
| F ICMP_Monitor | | | | | | | |
| > 🧮 Track Lists | | | | | | | |
| > 🚞 Track Members | | | | | | | |

Configure IP SLA monitor policy

IP SLA Track Members:

| TN_D | 000 | Track Member - S | Server_Phys | ical_IP | | | | | | | 0.0 |
|--------------------------------|-----|--------------------|----------------|------------------------|------------------|----------------------|-----------------------------|--------|-------|--------|---------|
| > Ⅲ TN_D | ~ | | | | | | | | | F | |
| > 🚞 Application Profiles | _ | | | | | | | Policy | Stats | Faults | History |
| > 🖿 Networking | _ | | | | | | | | | Ó | ÷ %- |
| > 🚞 Contracts | _ | Properties | | | | | | | | | |
| V 🖿 Policies | _ | | Name: | Server_Physical_IP | | | | | | | |
| V 🖿 Protocol | _ | | Description: | | | | | | | | |
| > 🚍 BFD | _ | | | | | | | | | | |
| > 🚍 BFD Multihop | _ | Track ID Of Object | To Be Tracked: | 2000 | | | | | | | |
| > 🚞 ND RA Prefix | _ | Destination IP | To Be Tracked: | 10.100.0.100 | | | | | | | |
| > 🚞 BGP | _ | Scope of | Track Member: | L3Out - L3out_Static_s | erva 🗸 🔁 | | | | | | |
| > 🚍 Custom QoS | _ | | IPSLA Policy: | ICMP_Monitor | V 🚱 | Statu | us of destination track IP | | | | |
| > 🚍 Data Plane Policing | _ | | Deployments: | Node ID | Operation Number | Operation Status | Latest Operation Error Mess | 301 | | | |
| > 🚍 DHCP | _ | | | Port-1/Norde-101 | 2000 | Reachable | OK | | | | |
| > 🚍 EIGRP | | | | | | 10000-0010 | | | | | |
| > 🚞 End Point Retention | _ | | | | | | | | | | |
| > 🚍 First Hop Security | _ | | | | | | | | | | |
| > 🚍 HSRP | | | | | | | | | | | |
| > 🚞 IGMP Interface | | | | | | | | | | | |
| > 🚞 IGMP Snoop | | | | | | | | | | | |
| V 🖿 IP SLA | | | | | | | | | | | |
| V 🚞 IP SLA Monitoring Policies | | | | | | | | | | | |
| ICMP_Monitor | | | | | | | | | | | |
| > 🚍 Track Lists | | | | | | | | | | | |
| Track Members | | | | | | | | | | | |
| E Server_Physical_IP | | | | | | | | | | | |

Adding IP to monitor policy

Track List Policy:

| TN_D | Track List - Tracking_Server_Physical_IP | | | | 0.0 |
|-----------------------------|--------------------------------------------------------------------------|--------|-------|--------|---------|
| ✓ III TN_D | | | | F | |
| > 🚞 Application Profiles | | Policy | Stats | Faults | History |
| > 🚍 Networking | | | | 0 | ± %- |
| Contracts | Properties | | | | |
| V Tolicies | Name: Tracking_Server_Physical_IP | | | | |
| V III Protocol | Description: Optional | | | | |
| > 🚍 BFD | | | | | |
| > 🚞 BFD Multihop | Type of Track List: Threshold percentage | | | | |
| > 🥅 ND RA Prefix | Percentage Up (percentage): 1 | | | | |
| > 🚞 BGP | Hereinsge tip stockt de greater han Heleinsge Down | | | | |
| > 🚍 Custom QoS | Per Unitinge scherin geervergegeb. V V V V V V V V V V V V V V V V V V V | | | | |
| > 🚞 Data Plane Policing | Track list to track member | | | | ± + |
| > 🚍 DHOP | Track Member | | | | |
| > 🚞 Eigrp | * TN_D/Server_Physical_IP | | | | |
| > 🧮 End Point Retention | | | | | |
| First Hop Security | | | | | |
| > 🧮 HSRP | | | | | |
| > 🧮 IGMP Interface | | | | | |
| > 🧮 IGMP Snoop | | | | | |
| V 🚞 IP SLA | | | | | |
| P SLA Monitoring Policies | | | | | |
| E ICMP_Monitor | | | | | |
| V 🖿 Track Lists | | | | | |
| Tracking_Server_Physical_IP | | | | | |
| V 🚍 Track Members | | | | | |
| Server_Physical_IP | | | | | |

Configure Track List

4. Configure static route under L3out toward server with newly created IP SLA tracklist policy.

| cisco | APIC | | | | | | | | | | | | | | | admin | 00 | 0 | • |
|-------------|-------------------|-----------------|-------------|---------------|--------------------------|------------------|---------------------|--------------|------------------------------|----------------------------|-----------------------------|-----------------------|----------------------------------------------------|----------------------|----|-------------|----------|----------|-------|
| System | Tenants | Fabric | Virtua | al Networking | Admin | Operat | ions Apps | Inte | grations | | | | | | | | | | |
| ALL TENANT | IS Add Te | mant Te | nant Search | name or descr | | common | TN_D da | onwang2 | SERVERS edi | 90 | | | | | | | | | |
| TN_D | | | | Ē | 00 | Node As | ssociation | | | | | | | | | | | | ~ ~ |
| - 🖽 TN_D | | | | | ~~ | | | | | | | | | | | | | | 00 |
| > 🖿 Appl | lication Profiles | | | | | | | | | | | | | | | Polic | y Faults | Hi | story |
| 💎 🚞 Neta | vorking | | | | | | | | | | | | | | | | Ċ | <u>+</u> | **- |
| > 🚞 🖲 | kridge Domains | | | | | Propert | ties | | | | | | | | | | | | |
| > 🖬 V | /RFs | | | | | | | Node ID: | topology/pod-1/node | -101 | | | | | | | | | ^ |
| | 2Outs | | | | | Line De | uter ID on Loopha | Nouter ID. | 101.101.101.101 | | | | | | | | | | |
| | 30uts | | | | | Use K | outer ito as coopoa | ck Address. | This setting will be ignored | i if loopback addresses an | defined in the table below. | | | | | | | | |
| | 1 Jourt Static | second | | | | | Loopback | Addresses: | | | | | | | | | | | + |
| | Logical N | ode Profiles | | | | | | | ▲ IP | | | | | | | | | | -1 |
| | ~ 1 L3out | Static_serve | r_nodeProfi | 4e | | | | | | | | No i Select A | tens have been found. ctions to create a new it | em. | | | | | |
| | - 🖿 Co | nfigured Node | 85 | | | | | | | | | | | | | | | | |
| | > = | topology/pod | i-1/node-1 | 01 | | | | | | | | | | | | | | | |
| | 🔿 🚍 Log | pical Interface | Profiles | | • | | Intersite Loopback | Addresses: | | | | | | | | | | 11 | + |
| > | 🚞 External E | PGs | | | | | | | ▲ IP | | | | | | | | | | |
| > | Route ma | p for import a | nd export n | oute control | | | | | | | | No | tems have been found. | | | | | | |
| > 🖿 s | R-MPLS VRF L | 3Outs | | | | | | | | | | Select A | ctions to create a new it | em. | | | | | |
| | ot1Q Tunnels | | | Lei | of 101 | | | | | | | | | | | | | | |
| > 🖬 Con | eracts | | | N9K-C9 | 3180YC-FX | | | alla Davidaa | - | | | | | | | | | | |
| | 2805 4000 | | | 15 | Eth1/3 | | 51 | atic Houtes | | | | | | | | | | | + |
| Sec. | urity (Beta) | | | | L3out_Stat Encap vlan | ic_server 507 | | | A IP Address | | Description | | THE O (THE | Y | | WAT HOD IP | | | - 11 |
| > O Quick S | tart | | | L3Out | 10.100.0.2 VRF-TN_D | 54/24 WRF 5 | | | 200.0.0.1/32 | | Static route adde | d with IP SLA Track v | which tracking ph | ysical IP of server. | | 0.100.0.100 | | | |
| | | | | | 1 | | | | | | | | | - | | | | | |
| | | | | | 1 | _ | | | | | 1 | | | | | | | | ~ |
| | | | | Ecopback 50 | 7: 200.0.0.1/ | 32 | | | | | | | | | | | | | |
| | | | | - | | | | | | | | | | | SH | now Usage | | | |

Configure Static route under L3out

5. Create a new L3out toward the N3K device which uses Border Gateway Protocol (BGP). (EBGP) ACI AS 65535 and N3K AS 65536.

| TN_D (| 000 | L3 Outside - L3out_N3K_BGP |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------|
| ע_אד Щ | | |
| > Application Profiles | | |
| V III Networking | | |
| > 🧮 Bridge Domains | | |
| > 🖿 VRFs | | |
| > 🚍 L2Outs | | Properties |
| V 🖬 L3Outs | | Name: L3out_N3K_BGP |
| ✓ | | |
| Logical Node Profiles | | Description. Optional |
| E L3out_BGP_nodeProfile E | | |
| > 🚞 Configured Nodes | | Annotations: |
| 🗸 🚞 Logical Interface Profiles | | Global Alias: |
| V \Xi L3out_N3K_BGP_interfaceProfile | | Provider Label: |
| BGP Peer 100.0.0.2- Node-102/1/3 | | Consumer Label: select an option |
| External EPGs Exte | | Target DSCP: Unspecified |
| EXT_N3K_BGP_EPG | | |
| > The second | | PIMv6: |
| > 📤 L3out_Static_server | | Route Control Enforcement: Import |
| > 🔤 SR-MPLS VRF L3Outs | | VRE: VRE S |
| > 🖿 Dot1Q Tunnels | | Resolved VRF: TN D/VRF. S |
| > 💳 Contracts | • | L3 Domain: TN D L3Dom |
| > 💳 Policies | | Route Profile for Interleak: select a value |
| > 💳 Services | | Route Profile for Redistribution: |
| 🚞 Security (Beta) | | ▲ Source |
| > 🕞 Quick Start | | |
| | | |
| | | |
| | | |
| | | Enable BGP/EIGRP/OSPF BGP OSPF EIGRP |
| | | Route Control for Dampening: |
| | | Address Family Type |
| | | |

Configure BGP protocol

| TND | | | | |
|---------------------------------------------------|--------------------------------------|----------------------------|-----------------|-----------------------|
| IN_U (CO)O | Logical Node Profile - L3out_BC | iP_nodeProfile | | |
| → III 10,0 | | | | |
| > 🚔 Application Profiles | | | | |
| Networking | | | | |
| > 🚞 Bridge Domains | Properties | | | |
| > 🧮 VRFs | Name | : L3out_BGP_nodeProfile | | |
| > 🖿 120m | Description | | | |
| V 🗎 Liðun | | | | |
| V 🚯 LSout_NSK_BOP | Alar | | | |
| 🗸 🚍 Logical Node Profiles | Target DSCF | Unspecified | | |
| V B L3out_B0P_nodeProfile | Noder | | | |
| Configured Nodes | | Node D | Restor D | Loorback Address |
| Logical Interface Profiles | r | Income Incols 100 | 102 103 102 103 | 102 102 102 102 |
| Llout_N3K_B3P_interfaceProfile | | indexed block inter- unit | 104.104.104 | THE PAC THE FIRE |
| # BOP Peer 100.0.0.2- Node-102/1/3 | | | | |
| v 🔛 External (PCs | | | | |
| EXT_N3K_BOP_EPG | | | | |
| > 🚍 Route map for import and export route control | | | | |
| > 🗗 L3out_Static_server | 8GP Peer Connectivity | | | |
| > 🛅 SR-MPLS VRF LSOuts | | Peer IP Address | Peer Controls | interface |
| > 🚞 Dot1Q Turnets | | 100.0.0.2 | | Pad-1/Node-102/wtb1/3 |
| > 🚍 Contracts | | | | |
| > 🚍 Policius | | | | |
| > 🚍 Services | | | | |
| E Security (Beta) | | | | |
| > O Quick Start | | | | |
| | Create BGP Protocol Profile | | | |
| | Create BFD Multihop Protocol Profile | | | |

BGP Peer Profile



Configure BGP peer policy



Configure Logical interface profile under L3out

| diale APIC | | admin 🕲 🕲 🕲 🕲 |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| System Tenants Fabric Virtual Networking Admin | n Operations Apps Integrations | |
| ALL TENANTS Add Tenant Tenant Search: name or direct | i common i 1%0 i doneandi i 50%435 i edge | |
| TN_D | | 0.0 |
| ~ 🗒 10,0 | | |
| > 🚔 Application Profiles | | Policy Operational Health Paulis History |
| Networking | | General Contracts Inherited Contracts Subject Labels EPG Labels |
| > 🔤 Bridge Comains | 0000 | 0 1 2. |
| > 🖬 VWs | | |
| | Name: DdT_AGK_B0P_EPG | <u>*</u> |
| V A Dave NOT DOD | Alas | |
| V El Lacical Node Parties | Annotations 🚯 Click to add a new annotation | |
| V P L3out, 85P, rode/rote | Clobel Asia: | |
| > E Configured Nodes | Description: Optional | |
| Logical Interface Profiles | | |
| B Llout_NIX_BOP_interboeProfile | perbas 10385 | |
| BGP Peer 100.0.0.2- Node-102/1/3 | Contract Exception star | |
| El Deensi DRGs | Resolved VMF surgers And Sector VMF _ S | |
| P DT_NBK_BGP_DPG | 0x8 Ctass: Unspected 🗸 | |
| Boute map for import and export route control | Target DSCP: Utspecified 🗸 | |
| > 44 Land state server | Configuration Status: applied | |
|) Drito terreta | Contguration bases | |
|) Detracts | Professional Conception Profes | |
| > Protes | Inter De-EPG Isolates: Enforced University | |
| > 🖬 Services | Salavita | 2.4 |
| E Security (Beta) | - PAdres Scroe Name Aggregate | Route Control Profile Route Summarization Policy |
| > Q+ Quick Start | 0.0.0.00 External Subnets for the External EPG | |
| | 200.8 0 1/02 Expert Rode Control Subret | |
| | | |
| | | |
| | | |

External EPG export subnet in transit L3out

| TN_D | 090 | External EPG - EXT_N3 | K_BGP_EPG | | | | | | |
|-----------------------------------|-----|---------------------------|----------------------------|--------------|---------------|---------------------|-------------|---------|-------------------------------|
| > m_0 | | | | | | | | | Desire Constantional |
| > 🔤 Application Profiles | | | | | | | | | Polcy Operational |
| V 🔤 Networking | | | | | | | | General | Contracts Inherited Contracts |
| > 🚞 Bridge Domains | | | | | | | | | |
| > 🚍 VRFs | | Greatily O O O O | | | | | | | |
| > 🚞 L20/IS | | Name | Tenant | Tenant Alias | Contract Type | Provided / Consumed | QoS Class | State | Label |
| V 🖿 LIOUS | | G Contract Type: Contract | | | | | | | |
| V 🙆 LBORT,NOK_BOP | | Contract_L3out_BGP | TN_D | | Contract | Consumed | Unspecified | formed | |
| V E Logical Node Profiles | | | | | | | | | |
| 2 43out_80P_nodeProfile | | | | | | | | | |
| > 🧮 Configured Nodes | | | | | | | | | |
| Logical Interface Profiles | | | | | | | | | |
| E3out_N3K_80P_interfaceProfile | | | | | | | | | |
| BCP Peer 100.0.0.2 • Node=102/1/3 | | | | | | | | | |
| V El Esternal FB/m | | | | | | | | | |
| EXT_MOK_BOP_EPO | | | | | | | | | |

Attaching Contract to External EPG

6. Export static route from L3out toward N3K.

```
switchname N3K
feature bgp
feature interface-vlan
interface Vlan550
 no shutdown
 vrf member BGP_L3out
 ip address 100.0.2/30
interface loopback200
 vrf member BGP_L3out
 ip address 30.30.30.1/32
interface Ethernet1/1
 switchport mode trunk
router bgp 65536
 address-family ipv4 unicast
 neighbor 100.0.0.1
 vrf BGP_L3out
   router-id 3.3.3.3
   address-family ipv4 unicast
     network 30.30.30.1/32
   neighbor 100.0.0.1
     remote-as 65535
     update-source Vlan550
     address-family ipv4 unicast
```

Verify

Use this section in order to confirm that your configuration works properly.

Nexus3K.



Transit route advertisement explained by topology

N3K# routing vrf BGP_L3out

N3K%BGP_L3out# show ip route IP Route Table for VRF "BGP_L3out" '*' denotes best ucast next-hop '**' denotes best mcast next-hop '[x/y]' denotes [preference/metric] '%' in via output denotes VRF 30.30.30.1/32, ubest/mbest: 2/0, attached *via 30.30.30.1, Lo200, [0/0], 02:35:27, local *via 30.30.30.1, Lo200, [0/0], 02:35:27, direct 100.0.0/30, ubest/mbest: 1/0, attached *via 100.0.0.2, Vlan550, [0/0], 05:52:18, direct 100.0.0.2/32, ubest/mbest: 1/0, attached *via 100.0.0.2, Vlan550, [0/0], 05:52:18, local 200.0.0.1/32, ubest/mbest: 1/0 *via 100.0.0.1, [20/0], 02:32:36, bgp-65536, external, tag 65535

Server Loopback is reachable with source as N3K loopback address.

N3K

interface loopback200
vrf member BGP_L3out
ip address 30.30.30.1/32

N3K# ping 200.0.0.1 vrf BGP_L3out source 30.30.30.1

PING 200.0.0.1 (200.0.0.1): 56 data bytes 64 bytes from 200.0.0.1: icmp_seq=0 ttl=252 time=0.94 ms 64 bytes from 200.0.0.1: icmp_seq=1 ttl=252 time=0.729 ms 64 bytes from 200.0.0.1: icmp_seq=2 ttl=252 time=0.658 ms 64 bytes from 200.0.0.1: icmp_seq=3 ttl=252 time=0.706 ms 64 bytes from 200.0.0.1: icmp_seq=4 ttl=252 time=0.655 ms --- 200.0.0.1 ping statistics ---5 packets transmitted, 5 packets received, 0.00% packet loss round-trip min/avg/max = 0.655/0.737/0.94 ms

ACI Leaf 102 route table (which has L3out toward Nexus 3K).

Leaf102# show ip route vrf TN_D:VRF_S IP Route Table for VRF "TN_D:VRF_S" '*' denotes best ucast next-hop '[x/y]' denotes [preference/metric] '%' in via output denotes VRF 10.100.0.0/24, ubest/mbest: 1/0 *via 10.0.96.64%overlay-1, [200/0], 02:56:36, bgp-65535, internal, tag 65535 30.30.30.1/32, ubest/mbest: 1/0 of N3K.

<<address

```
*via 100.0.0.2%TN_D:VRF_S, [20/0], 02:44:34, bgp-65535, external, tag 65536
100.0.0.0/30, ubest/mbest: 1/0, attached, direct
 *via 100.0.0.1, vlan19, [0/0], 05:09:37, direct
100.0.0.1/32, ubest/mbest: 1/0, attached
 *via 100.0.0.1, vlan19, [0/0], 05:09:37, local, local
101.101.101.101/32, ubest/mbest: 1/0
 *via 10.0.96.64%overlay-1, [1/0], 02:56:36, bgp-65535, internal, tag 65535
102.102.102.102/32, ubest/mbest: 2/0, attached, direct
 *via 102.102.102.102, lo5, [0/0], 16:49:13, local, local
 *via 102.102.102.102, lo5, [0/0], 16:49:13, direct
200.0.0.1/32, ubest/mbest: 1/0
 *via 10.0.96.64%overlay-1, [1/0], 02:42:15, bgp-65535, internal, tag 65535
```

Leaf 101 IP SLA configuration verification from CLI.

Attached to:

Route prefix 200.0.0.1/32

```
Leaf101# show ip sla configuration
IP SLAs Infrastructure Engine-III
Entry number: 2000
Owner: owner-icmp-echo-dme
Tag:
Operation timeout (milliseconds): 900
Type of operation to perform: icmp-echo
Target address/Source address: 10.100.0.100/0.0.0.0
Traffic-Class parameter: 0x0
Type Of Service parameter: 0x0
Request size (ARR data portion): 28
Verify data: No
Vrf Name: TN_D:VRF_S
Schedule:
   Operation frequency (seconds): 5 (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): 3600
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (milliseconds): 900
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 1
   Statistic distribution interval (milliseconds): 20
History Statistics:
  Number of history Lives kept: 0
   Number of history Buckets kept: 15
   History Filter Type: None
Leaf101# show track brief
 TrackId Type Instance
                                 Parameter
                                                      State
                                                               Last Change
        IP SLA 2000
                                reachability
 4
                                                                 2021-09-16T18:08:42.364+00:00
                                                      up
                 ____
 3
         List
                                percentage
                                                      up
                                                                 2021-09-16T18:08:42.365+00:00
Leaf101# show track
Track 1
    List Threshold percentage
    Threshold percentage is up
    6 changes, last change 2021-09-16T00:01:50.339+00:00
    Threshold percentage up 1% down 0%
    Tracked List Members:
        Object 2 (100)% up
```

```
Track 2
    IP SLA 2000
    reachability is up
    6 changes, last change 2021-09-16T00:01:50.338+00:00
    Tracked by:
        Track List 1
```

Verification with Managed Object Query (Moquery) command:

apic1# moquery -c fvIPSLAMonitoringPol -f 'fv.IPSLAMonitoringPol.name=="ICMP_Monitor"'
Total Objects shown: 1

| <pre># fv.IPSLAMonitoringE</pre> | 0 | L |
|----------------------------------|---|---------------------------------------------|
| name | : | ICMP_Monitor |
| annotation | : | |
| childAction | : | |
| descr | : | |
| dn | : | uni/tn-TN_D/ipslaMonitoringPol-ICMP_Monitor |
| extMngdBy | : | |
| httpMethod | : | get |
| httpUri | : | / |
| httpVersion | : | HTTP10 |
| ipv4Tos | : | 0 |
| ipv6TrfClass | : | 0 |
| lcOwn | : | local |
| modTs | : | 2021-09-15T21:18:48.195+00:00 |
| monPolDn | : | uni/tn-common/monepg-default |
| nameAlias | : | |
| ownerKey | : | |
| ownerTag | : | |
| reqDataSize | : | 28 |
| rn | : | ipslaMonitoringPol-ICMP_Monitor |
| slaDetectMultiplier | : | 3 |
| slaFrequency | : | 5 |
| slaPort | : | 0 |
| slaType | : | icmp |
| status | : | |
| threshold | : | 900 |
| timeout | : | 900 |
| uid | : | 15374 |
| userdom | : | :all: |

apic1# moquery -c fvTrackMember -f 'fv.TrackMember.name=="Server_Physical_IP"'
Total Objects shown: 1

```
# fv.TrackMember
name : Server_Physical_IP
annotation :
childAction :
descr
            :
dn
            : uni/tn-TN_D/trackmember-Server_Physical_IP
dstIpAddr : 10.100.0.100
extMngdBy :
id : 2000
lcOwn : local
modTs : 2021-09-15T21:16:22.992+00:00
monPolDn : uni/tn-common/monepg-default
nameAlias
            :
ownerKey
             :
             :
ownerTag
rn
            : trackmember-Server_Physical_IP
```

| scopeDn | : | uni/tn-TN_D/out-L3out_Static_server |
|---------|---|-------------------------------------|
| status | : | |
| uid | : | 15374 |
| userdom | : | :all: |

apic1# moquery -c fvTrackList -f 'fv.TrackList.name=="Tracking_Server_Physical_IP"'
Total Objects shown: 1

| <pre># fv.TrackList</pre> | | |
|---------------------------|---|---------------------------------------------------|
| name | : | Tracking_Server_Physical_IP |
| annotation | : | |
| childAction | : | |
| descr | : | |
| dn | : | uni/tn-TN_D/tracklist-Tracking_Server_Physical_IP |
| extMngdBy | : | |
| lcOwn | : | local |
| modTs | : | 2021-09-15T07:41:15.958+00:00 |
| monPolDn | : | uni/tn-common/monepg-default |
| nameAlias | : | |
| ownerKey | : | |
| ownerTag | : | |
| percentageDown | : | 0 |
| percentageUp | : | 1 |
| rn | : | tracklist-Tracking_Server_Physical_IP |
| status | : | |
| type | : | percentage |
| uid | : | 15374 |
| userdom | : | :all: |
| weightDown | : | 0 |
| weightUp | : | 1 |

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

In event of link disconnection or physical IP address is unreachable, ACI IP SLA shows destination IP 'timeout' after configured threshold reaches.



L3out interface down

| TN_D | 00 | Track Member - Server_Physi | ical_IP | | | |
|-----------------------------------------|----|-----------------------------------|-------------------------|--------------------|------------------|--------------------------------|
| TN_D TN_D TApplication Profiles | | | | | | Polic |
| > 🧮 Networking | | 8 7 4 0 | | | | |
| > 🚞 Contracts | | Properties | | | | |
| 🗸 🚞 Policies | | Name: | Server_Physical_IP | | | |
| V 🚍 Protocol | | Description: | | | | |
| > 🚍 BFD | | | | | | |
| > 🚞 BFD Multihop | | Track ID Of Object To Be Tracked: | 2000 | | | |
| > 🚞 ND RA Prefix | | Destination IP To Be Tracked: | 10.100.0.100 | | | |
| > 🚍 BGP | | Scope of Track Member: | L3Out - L3out_Static_se | rw 🗸 🚱 | | |
| > 🚞 Custom QoS | | IPSLA Policy: | ICMP_Monitor | ~ @ | | |
| > 🚞 Data Plane Policing | | Deployments: | Node ID | Operation Number | Operation Status | Latest Operation Error Message |
| > 🚍 DHCP | | | Pod-1/Node-101 | 2000 ms (2seconds) | Unreachable | Timeout |
| > 🚞 EIGRP | | | | | | |
| > 🧮 End Point Retention | | | | | | |
| First Hop Security | | | | | | |
| > 🖬 HSRP | | | | | | |
| IGMP Interface | | | | | | |
| > C IGMP Snoop | | | | | | |
| | | | | | | |
| IP SLA Monitoring Policies | | | | | | |
| > Track Lists | | | | | | |
| Track Members | | | | | | |
| Server_Physical_IP | | | | | | |

IP SLA monitor link status after link down

Leaf 101 CLI verification (You can see timeout for "Last Operation return code").

```
Leaf101# show ip sla statistics

IPSLAs Latest Operation Statistics

IPSLA operation id: 2000

Latest RTT: NoConnection/Busy/Timeout

Latest operation start time: 23:54:30 UTC Wed Sep 15 2021

Latest operation return code: Timeout

Number of successes: 658

Number of failures: 61

Operation time to live: forever
```

As soon as the server is reachable, it shows status OK.

| TN_D | \bigcirc | Track Member - Server_Phys | ical_IP | | | | | |
|--------------------------------|------------|-----------------------------------|---------------------------|------------------|------------------|--------------------------------|--------|-------|
| ~ ∰ TN_D | ^ | | | | | | Deline | Ctote |
| > 🚍 Application Profiles | | | | | | | Policy | Stats |
| > 🚞 Networking | | | | | | | | |
| > 🚞 Contracts | | Properties | | | | | | |
| V Policies | | Name: | Server_Physical_IP | | | | | |
| V 🚍 Protocol | | Description: | | | | | | |
| > 🚞 8FD | | | | | | | | |
| > 🚞 BFD Multihop | | Track ID Of Object To Be Tracked: | 2000 | | | | | |
| > 🚞 ND RA Prefix | | Destination IP To Be Tracked: | 10.100.0.100 | | | | | |
| > 🚞 8GP | | Scope of Track Member: | L3Out - L3out_Static_serv | - @ | | | | |
| > 🚞 Custom QoS | | IPSLA Policy: | ICMP_Monitor | V 🚱 | | | | |
| > 🧮 Data Plane Policing | | Deployments: | Node ID | Operation Number | Operation Status | Latest Operation Error Message | | |
| > 🚞 DHCP | | | Pod-1/Node-101 | 2000 | Reachable | OK | | |
| > 🚞 EIGRP | | | | | | | | |
| > 🧮 End Point Retention | | | | | | | | |
| > 🚞 First Hop Security | | | | | | | | |
| > 🧮 HSRP | | | | | | | | |
| > 🧮 IGMP Interface | | | | | | | | |
| > 🧮 IGMP Snoop | | | | | | | | |
| 🗸 🚞 IP SLA | | | | | | | | |
| > 🚞 IP SLA Monitoring Policies | | | | | | | | |
| > 🚞 Track Lists | | | | | | | | |
| V 🚍 Track Members | | | | | | | | |
| Server_Physical_IP | | | | | | | | |

IP SLA monitor status after link brought up

Leaf101# show ip sla statistics IPSLAs Latest Operation Statistics IPSLA operation id: 2000 Latest RTT: 1 milliseconds Latest operation start time: 00:03:15 UTC Thu Sep 16 2021 Latest operation return code: OK

Number of successes: 18 Number of failures: 86 Operation time to live: forever

Related Information

- <u>Cisco APIC Layer 3 Networking Configuration Guide, Release 5.2(x)</u>
- <u>Technical Support & Documentation Cisco Systems</u>