Creating a Floating L3Out

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Follow the steps in this procedure to create a Layer 3 outside network connection (L3Out) with the floating L3Out feature. When configuring the Floating L3Out for a VMM domain, the configuration creates a port-group on the VMware VDS with the name of **<Tenant> | <L3Out name> | < VLAN Number >**. The administrator managing the virtual router would then attach the virtual router vNIC to this port-group.

Before you begin

You must have performed the following tasks before creating the L3Out.

- Configured the interface access policies, accessible attachable entity profile (AEP), and Layer 3 domain.

- Created the VMM domain or physical domain.

Configuration Steps with Physical Domain:

Step 1 Log in to the Cisco Application Policy Infrastructure Controller (APIC).

Step 2 Go to **Tenants** > *your tenant*.

Step 3 In the tenant navigation pane, expand the **Networking** folder, right-click the **L3Outs** folder and choose **Create L3Out**.

Step 4 In the **Create L3Out** dialog box, **1. Identity** dialog box, complete the following steps.

a) In the **Name** field, enter a name for the L3Out.

b) From the **VRF** drop-down list, choose or create a virtual routing and forwarding (VRF) instance.

c) From the **L3 Domain** drop-down list, choose the Layer 3 domain that you created earlier.

d) On the right side of the dialog box, click one or more routing protocols, and accept the defaults or configure routing as appropriate for your setup.

   You can choose **BGP** or **OSPF**.

e) Click **Next**.

Step 5 In the **Create L3Out** dialog box, **2. Nodes and Interfaces** dialog box, complete the following steps:

    a) For the **Use Defaults** check box, leave it checked to accept the default interface and node policy names, or uncheck it to create custom names.

       User can choose defaults or create custom names for the interface and node policies.

    b) In the **Interface Types** field, choose **Floating SVI**.

    c) From the **Domain Type** options, choose **Physical**.

    d) From the **Domain** drop-down list, choose a domain.

    e) In the **Floating Address** field, enter the floating IP address.

       The floating IP address is the common IP address for non-anchor leaf nodes. It is used to locate the router if it is connected to any non-anchor top-of-rack switch through the data path.

    f) In the **Encap** area, in the **Integer Value** field, enter the desired VLAN from the static VLAN range.

    g) In the **MTU** field, enter the maximum transmission unit (MTU) of the external network.

       The range is 1500 to 9216. The value inherit can be used. This will inherit the value configured for the Fabric L2 MTU policy. The default value is 9000. To inherit the value, enter "inherit" in the **MTU** field.

    h) In the **Nodes** area, from the **Node ID** drop-down list, choose a node for the anchor leaf switch.

    i) In the **Router ID** field, add the address for the router to be used for OSPF or BGP.

    j) In the **Loopback Address** field, accept the default—which is the same as the router ID—or add a different loopback address.

    k) In the **IP Address Primary** field, enter the primary IP address for the anchor leaf switch.

       Note   If the external router is connected behind virtual port channel (vPC) leaf anchor nodes, make sure to add a vPC peer leaf as the second anchor node.

    l) (Optional) Click the + (plus sign) next to the **Loopback Address** field to add additional anchor leaf nodes.

Step 6 In the **Create L3Out** dialog box, **3. Protocols** dialog box, complete the following steps.

    a) In the **Protocol Associations** area, configure items if necessary.

       For example, if you chose the OSPF protocol, choose an OSPF policy:

       If you chose the BGP protocol, the following configurations are available:

- **Peer Address**: Enter the peer IP address

- **EBGP Multihop TTL**: Enter the connection time to live (TTL). The range is from 1 to 255 hops; if zero, no TTL is specified. The default is 1.

- **Remote ASN**: Enter a number that uniquely identifies the neighbor autonomous system. The Autonomous System Number can be in 4-byte as plain format from 1 to 4294967295.

         Please refer Layer 3 Configuration guide for detail.

    b) Click **Next**.

Step 7 In the **Create L3Out** dialog box, **4. External EPG** dialog box, complete the following steps.

    a) In the **Name** field, enter a name for the external EPG.

    b) From the Provided Contract drop-down list, choose or create a contract.

    c) From the **Consumed Contract** drop-down list, choose or create a contract.

    d) For the **Default EPG for all external networks** check box, leave it checked or uncheck it and add specific subnets.

e) Click **Finish**.

What to do next

Verify that the floating L3Out exists in Cisco APIC and that the port group exists on the VMware VDS. See the procedure Verifying the L3Out Configuration.

Configuration Steps With VMM Domain

Step 1 Log in to the Cisco APIC.

Step 2 Go to **Tenants** > *your tenant*.

Step 3 In the tenant navigation pane, expand the **Networking** folder, right-click the **L3Outs** folder and choose **Create L3Out or use an existing L3Out**.

Step 4 Select the folder **Logical Interface Profiles**, right click and select **Create Interface Profile**.

a) Assign it a name.

b) Select **Floating L3Out SVI** and then select +.

c) In the **Select Floating L3Out** dialog box, select the Anchor node(s) and assign the Primary IP Address. In the **IP Address Primary** field, enter the primary IP address for the anchor leaf switch.

   Note: If the external router is connected behind virtual port channel (vPC) leaf anchor nodes, make sure to add a vPC peer leaf as the anchor node. In the case of the floating L3Out each vPC peer leaf must be entered individually as a separate anchor node.

d) Enter the **Path Attributes**, this is the configuration where you associate the Floating L3Out with the VMM domain.

e) Select the **Domain Type** as **Physical**.

f) Select the VMM domain.

g) Select the **Enhanced LAG Policy** for the port-group. This is the ELACP teaming configuration for the port-group on the virtualized host: if the virtualized host Vmnics are configured with ELACP and the **Path Attributes** configuration doesn't select the correct ELACP, traffic forwarding between the vRouter and the ACI leaf nodes won't work.

h) Enter the encap VLAN from the VLAN range (only a VLAN defined in the static range of the VMM domain VLAN pool is allowed).

i) In the **Floating Address** field, enter the floating IP address. The floating IP address is the common IP address for non-anchor leaf nodes. It is used to locate the router if it is connected to any non-anchor top-of-rack switch through the data path.

Step 5 In the **Create L3Out** dialog box, **4. External EPG** dialog box, complete the following steps:

a) In the **Name** field, enter a name for the external EPG.

b) From the **Provided Contract** drop-down list, choose or create a contract.

c) From the **Consumed Contract** drop-down list, choose or create a contract.

d) For the **Default EPG for all external networks** check box, leave it checked or uncheck it and add specific subnets.

e) Click **Finish**.

What to do next

Verify that the floating L3Out exists in Cisco APIC and that the port group exists on the VMware VDS. See the procedure Verifying the L3Out Configuration.

Configuring a Secondary IP

This section explains how to create an optional secondary IP by creating a logical interface profile for floating SVI.

Step 1   From the navigation pane, go to **Tenants** > **tenant_name** > **Networking** > **L3Outs** > **L3Out_name** > **Logical Node Profiles** > **logical_node_profile_name** > **Logical Interface Profiles** > **logical_interface_profile_name**.

The logical interface profile screen appears in the work pane.

Step 2   From the work pane, click the **Floating SVI** tab.

Step 3   Double-click on an anchor leaf node.

The **Floating SVI** dialog appears.

Step 4   Locate the **IPv4 Secondary / IPv6 Additional Addresses** field and click the + to enable the **Address** and **IPv6 DAD** fields and enter the appropriate values.

Note   • Starting in Cisco Application Policy Infrastructure Controller (APIC) Release 5.0(1), **IPv6 DAD** and **ND RA Prefix** are disabled by default.

• Click the **?** icon to open the help file and view a description of each field.

Step 5   When finished, click **OK**.

Configuration Example: Different L3Outs for OSPF and BGP Using GUI

Use this procedure to configure OSPF and BGP for a floating Layer 3 outside network connection (L3Out) if you have already created the Layer 3 domain that you want to use. If both OSPF and BGP need to redistribute routes into the Cisco Application Centric Infrastructure (ACI) fabric, then you would have to configure OSPF and BGP under two different L3Outs, in this fashion:

Note   Note that this scenario could apply to a standard L3Out as well as a floating L3Out.

Before you begin

You must have created a Layer 3 domain. See the procedure Create a Layer 3 Domain Using the GUI.

Create the first L3Out with only the BGP protocol enabled (**l3out-bgp**), with the following settings:

Example

1. Under **l3out-bgp**, navigate to the **Select SVI** or **Select Floating SVI** page:

   Tenants > *tenant_name* > **Networking** > **L3Outs** > **l3out-bgp** > **Logical Node Profiles** > *log_node_prof_name* > **Logical Interface Profiles** > *log_int_prof_name*, then + in the **SVI** or **Floating SVI** tab and configure the following:

     • In the **Encap** field, configure the VLAN settings

     • In the **Encap Scope** field, select **VRF** if the L3Out for BGP and the L3Out for OSPF use the same VLAN encapsulation ID for the floating SVI.

2. Configure the loopback under **l3out-bgp** (**Tenants** > *tenant_name* > **Networking** > **L3Outs** > **l3out-bgp** > **Logical Node Profiles** > *log_node_prof_name* > **Configured Nodes**).

3. Create a BGP peer between the **l3out-bgp** anchor leaf nodes and the external router. This example uses BGP peering between the loopback IP addresses. If loopback IP address is used for BGP peering, ensure the route to the loopback IP addresses are available on the anchor leaf nodes and external routers by using OSPF or static routes.

4. Configure the *import* route control profile at the BGP peer connectivity profile area:

   Tenants > *tenant_name* > **Networking** > **L3Outs** > *BGP_L3Out* > **Logical Node Profiles** > *logical_node_profile_name* > **Logical Interface Profiles** > *logical_interface_profile_name* > *bgp_peer_connectivity_profile_name*

   Ensure that the external router's loopback IP addresses are not imported using this route map.

5. Configure the *export* route control profile at the BGP peer connectivity profile area:

   Tenants > *tenant_name* > **Networking** > **L3Outs** > *BGP_L3Out* > **Logical Node Profiles** > *logical_node_profile_name* > **Logical Interface Profiles** > *logical_interface_profile_name* > *bgp_peer_connectivity_profile_name*

   This external route control profile should include all of the required routes to be exported out of the fabric, but should not export the **l3out-bgp**'s loopback IP address in this route map (either the **l3out-bgp**'s loopback IP address should not be part of the match rule, or there should be an explicit deny entry in the route map to deny the **l3out-bgp**'s loopback IP address).

6. Create the second L3Out with only the OSPF protocol enabled (**l3out-ospf**), with the following settings:

   a. Under **l3out-ospf**, navigate to the **Select SVI** or **Select Floating SVI** page:

      Tenants > *tenant_name* > **Networking** > **L3Outs** > **l3out-ospf** > **Logical Node Profiles** > *log_node_prof_name* > **Logical Interface Profiles** > *log_int_prof_name*, then + in the **SVI** or **Floating SVI** tab

      and configure the following:

        • In the **Encap** field, configure the VLAN settings

- In the **Encap Scope** field, select **VRF** if the L3Out for BGP and the L3Out for OSPF use the same VLAN encapsulation ID for the floating SVI.

b. Create an export route map to export all of the required direct routes, including the loopback of **l3out-bgp** out of **l3out-ospf**:

Tenants > *tenant_name* > **Networking** > **L3Outs** > **l3out-ospf**, then right-click and choose **Create Route Map For Import and Export Route Control**, then select **default-export**

The match condition for this **default-export** should be all of the required routes and the **l3out-bgp**'s loopback IP addresses.

c. Unless the **Import Route Control Enforcement** is explicitly configured under the L3Out, the external node's loopback IP addresses are learned on the ACI fabric. If **Import Route Control Enforcement** is configured under the L3Out, the match condition for this default-import should have all the required routes and the external node's loopback IP addresses:

Tenants > *tenant_name* > **Networking** > **L3Outs** > **l3out-ospf** > **Route map for import and export route control** > **default-import** > **Contexts** > *context_name* > **Associated Matched Rules**