Neutron/LBaaSv1/F5BigIP - Plugin Version 1.0.10 Release

Supported Neutron Releases

The f5 LBaaSv1 plugin driver, as well as the f5 LBaaSv1 agent with iControl driver, support the OpenStack Neutron Icehouse, Juno and Killo releases.

There are no alternations made to the community LBaaSv1 database schema, nor any additional database tables generated. The stock community LoadBalancerPlugin class is used as the service plugin. Any discovered issues with the community LoadBalancerPlugin class and the associated LBaaSv1 database model will need to be monitored and resolved through the OpenStack Neutron community.

For deployment modes which include tenant tunnels, Neutron **MUST** be using the ML2 core plugin, with the associated Neutron ML2 types and data model classes. Your neutron server configuration should look like:

```
core_plugin = neutron.plugins.ml2.plugin.Ml2Plugin
```

Using the ML2 plugin assures that non-proprietary network types are being used for your cloud networking, and that tenant network attributes can be discovered from within Neutron's data model.

Using the standard community ML2 plugin and type drivers will meet the f5 LBaaSv1 plugin requirements.

When Neutron networks are discovered by the plugin that fall into the classification of a Pool, Vip, or Member object, they must include the Neutron providernet extension data. The providernet extension adds attributes to Neutron networks allowing other services, such as the LBaaSv1 service, to discern appropriate L2 network settings, allowing Neutron to connect appropriately. The f5 LBaaSv1 plugin uses these attributes to provision L2 connectivity on TMOS devices matching the L2 connectivity for the appropriate Neutron networks. If the providernet extension data is not present on Neutron networks, proper L2 isolation and tenancy can not be provisioned on the TMOS devices.

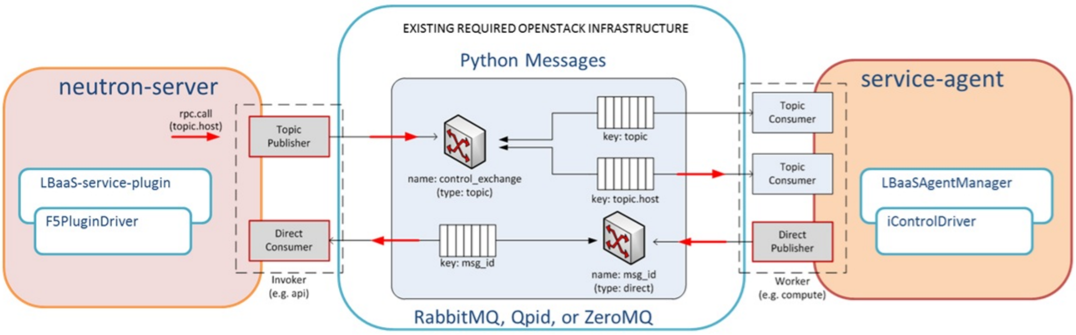
You can determine if your Neutron networks support this extension by showing the details for a Neutron network and checking for the following attributes, such as:

```
# neutron net-show Provider-VLAN-62
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | True                                 |
| id                        | 07f92400-4bb6-4ebc-9b5e-eb8ffcd5b34c |
| name                      | Provider-VLAN-62                     |
| provider:network_type     | vlan                                 |
| provider:physical_network | ph-eth3                              |
| provider:segmentation_id  | 62                                   |
| router:external           | False                                |
| shared                    | True                                 |
| status                    | ACTIVE                               |
| subnets                   | a89aa39e-3a8e-4f2f-9b57-45aa052b87bf |
| tenant_id                 | 3aef8f59a43943359932300f634513b3     |
+---------------------------+--------------------------------------+
```

Typically only older style, monolithic Neutron core drivers will be a concern. ML2 core drivers should typically support providernet extensions without any additional configuration.

Scheduling LBaaSv1 Deployments

The f5 LBaaSv1 plugin driver schedules LBaaSv1 requests across one or multiple f5 LBaaSv1 agent processes. OpenStack RPC queues are used to spread requests out to one or multiple f5 LBaaSv1 agent processes. The f5 agents register and use RPC queues to call back into the f5 LBaaSv1 plugin driver to update LBaaSv1 object status and allocate Neutron ports and IP addresses as necessary.

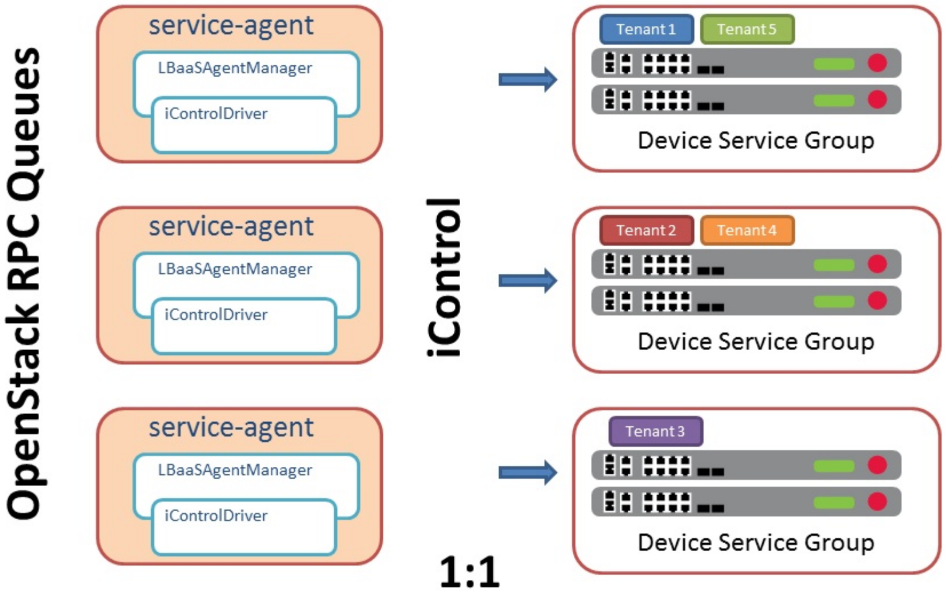


F5 LBaaSv1 agents can be run on any host which has the appropriate Neutron python libraries installed. This includes the controller or network nodes. Alternatively, a host can be dedicated to service agents. Multiple f5 LBaaSv1 agent processes can run on the same host simultaneously.

The f5 LBaaSv1 agent will load configuration parameters from the `/etc/neutron/neutron.conf` file as well as the `f5-oslbaasv1-agent.ini` file. The former should contain the necessary neutron settings for RPC communications. The later includes settings specific to the f5 LBaaSv1 agent.

F5 LBaaSv1 agent processes are mapped directly to TMOS Device Service Groups. As a result there will always be one active f5 LBaaSv1 agent per TMOS Device Service Group.

By default the f5 LBaaSv1 plugin uses an agent scheduler which will keep all LBaaSv1 Pools associated with the same tenant on the same TMOS Device Service Group. This aids in scaling by keeping all network objects associated with an OpenStack tenant on the same TMOS Device Service Group instead of requiring them to be provisioned on all possible TMOS Device Service Groups in your cloud deployment.



Other scheduling from Pool to agent is possible with the use of a custom scheduler class. Please reference *the plugin* configuration setting for `f5_loadbalancer_pool_scheduler_driver` in the `neutron.conf` configuration file in following section. Only the tenant affinity scheduler, described above, is included with the f5 LBaaSv1 plugin.

F5 LBaaSv1 agent processes use standard Neutron agent registration and state reporting. The health and details of registered f5 LBaaSv1 agents can be queried using typical Neutron agent commands.

```
# neutron agent-list
+--------------------------------------+--------------------+-------------------------------------------------------+-------+----------------+
| id                                   | agent_type         | host                                                  | alive | admin_state_up |
+--------------------------------------+--------------------+-------------------------------------------------------+-------+----------------+
| 034bddd0-0ac3-457a-9e2c-ed456dc2ad53 | Open vSwitch agent | sea-osp-cmp-001                                       | :-)   | True           |
| 17e447de-6589-4419-ac83-36ffb7e8b328 | Open vSwitch agent | sea-osp-cmp-002                                       | :-)   | True           |
| 301f6e21-a8f2-4f58-a4a3-38eabc0c2987 | Open vSwitch agent | sea-osp-net-001                                       | :-)   | True           |
| 5ecd96ab-d01e-4a64-92e8-9cd7caa8f25e | L3 agent           | sea-osp-net-001                                       | :-)   | True           |
| b50b8b21-0d0b-4776-a6ec-eeab61590f10 | DHCP agent         | sea-osp-net-001                                       | :-)   | True           |
| fb7bff08-3e45-475a-a02a-8020a2e0763a | Loadbalancer agent | sea-osp-ctl-001:b1cbd354-c78f-572d-8492-f6be4f7ef0bd | :-)   | True           |
+--------------------------------------+--------------------+-------------------------------------------------------+-------+----------------+
```

F5 LBaaSv1 agent processes support the configuration of static name value parameters which will get passed to the plugin every time it updates its status. The values can be queried from within neutron or via the `neutron agent show` command. These custom values can be used to inventory the f5 LBaaSv1 agents for operational purposes, or as input to custom agent schedulers. Please see the reference to the `static_agent_configuration_data` entry in the *agent* `f5-oslbaasv1-agent.ini` configuration in the following section.

High availability for the f5 LBaaSv1 agent process follows the same pattern as any OpenStack agent. Please see the OpenStack high availability guides for instructions on how to run active and standby agents in a high availability mode.

OpenStack Active-Stanby Agent Guide

Restarting a failed agent process will force the agent to resychronize BIG-IPs for LBaaSv1 object associated with the agent.

Please see the section below for the high availability modes supported for the TMOS devices themselves.

Installation of the Plugin Side Type Driver

The Neutron server plugin driver is distributed as a Debian or Red Hat installation package. To install the Neutron server plugin driver, download the appropriate package for your neutron server host and install it. Changes to the neutron server configuration file, as detailed below, will then need to be made to enable LBaasSv1 services and reference the f5 LBaaSv1 provider driver. The neutron server will then need to be restarted.

Neutron Server Plugin Settings

There are two settings which must be set to enable Neutron LBaaSv1 with the F5 LBaaSv1 type driver. The services entry for Neutron must include a reference to the default community LoadBalancerPlugin. The `services` configuration entry in the default `neutron.conf` file contains a comma separated list of python classes which implement extension plugin services. The following example would load the default community LoadBalancerPlugin.

In the `neutron.conf` file:

```
service_plugins = neutron.services.loadbalancer.plugin.LoadBalancerPlugin
```

Once the default community LoadBalancerPlugin plugin is loaded, service provider type drivers entries will be examined. Providing the following service provider type driver entry for the `LOADBALANCER` plugin service will load the f5 LBaaSv1 type driver:

```
service_provider=LOADBALANCER:F5:f5.oslbaasv1driver.drivers.plugin_driver.F5PluginDriver:default
```

You must have at least one `default` entry for each plugin service. If the F5 plugin type driver is not the default, simply remove the `default` field from the above entry.

In the default section of your `neutron.conf` file, the optional `f5_loadbalancer_pool_scheduler_driver` variable can be set to the full python class path for an alternative agent scheduler. The default value for this setting, `f5.oslbaasv1driver.drivers.agent_scheduler.TenantScheduler`, will cause the plugin to assign pools to agents with tenant affinity as described above.

Installing and Running an LBaaSv1 Agent Processes

The f5 LBaaSv1 agent is distributed as a Debian or Redhat installation package. To install a single LBaaSv1 agent, first download the appropriate package to the host which will run your agent process. Once downloaded, once downloaded, install the package.

The installation process will start the agent. You will need to stop the agent service, configure the `/etc/neturon` and `/etc/neutron/f5-oslbaasv1-agent.init` files appropriately, and then restart the agent process.

The default configuration file for the f5 LBaaSv1 agent is located at `/etc/neutron/f5-oslbaasv1-agent.ini`. Below is a consideration of each setting in that configuration file. The configuration file installed with the agent package contains documention comments as well.

Setting	Allowed Values	Default Value	Description
debug	True or False	False	Should the agent create verbose debug logging in /var/log/neutron/f5-oslbaasv1-agent.log. You should remember to check the /etc/neutron/neutron.conf settings for debug and verbose as well.
periodic_interval	integer number of seconds	10	How often the statistics are updated for LBaaSv1 objects assoicated with this agent.
service_resync_interval	integer number of seconds	500	How often the agent pulls known configurations from Neutron and syncrhonizes and cleans up orphaned configurations on the BIG-IPs.
use_namespace	True or False	True	Should all Neutron non-shared subnet addresses be assigned to route domains
max_namespaces	integer number of namespaces	1	If a tenant attempts to create overlapping subnets within their own networks, this number must be increased to the max number of overlapping subnets that will be supported. By default only one route domain will be created per tenant. If this is increased, it can adversely effect the tenant scaling of the BIG-IPs as maintaining separate routing tables cost control plan memory.
static_agent_configuration_data	single or comma separated list	None	This list of name:value attribues will be sent as part of the agent configuration data to the plugin.
environment_prefix	String prefix	'' (blank string)	This is the prefix this agent will use for all BIG-IP objects. Default is a blank string which will result in BIG-IP objects prefixed with uuid_.
f5_device_type	external	external	This determines the type of automatica device onboarding. Only external is acceptable with this releaes.
f5_ha_type	standalone, pair, or scalen	pair	This determines the way LBaaSv1 will be deployed for HA.
f5_sync_mode	auto_sync or replication	replication	This determines the way LBaaSv1 will be provisioned. For auto_sync, only a single TMOS device will be provisioned and DSG syncing used to replicate the configuration objects. For replication, each device will be provisioned independantly. Only replication mode is supported at this time.
f5_external_physical_mappings	comma separated list	default:1.1:True	Determines how Neutron VLAN networks are created. The format for each mapp entry is [provider:physical_network]:[TMOS interface or trunk name]:[Boolean to tag the VLAN]. One entry with 'default' as it initial entry should be present to allow for cases where the provider:physical_network does not match any other specified mapping.
vlan_binding_driver	vlan binding driver path	f5.oslbaasv1agent.drivers.bigip.vlan_binding.NullBinding	Some systems require the need to bind and prune VLANs ids allowed to specific ports, often for security.

interface_port_static_mappings	JSON dictionary	'' (blank string)	The interface_port_static_mappings allows for a JSON encoded dictionary mapping BigIP devices and interfaces to corresponding ports.
f5_vtep_folder	TMOS folder name	Common	For tenant tunneling, this determines the TMOS folder to discover the VTEP interface.
f5_vtep_selfip_name	TMOS Self IP name	vtep	For tennant tunneling, this determines the pre-provisioned VTEP Self IP name.
advertised_tunnel_types	gre vxlan gre,vxlan	gre,vxlan	Specifies the tunnel types the agent advertises via RPC to other VTEPs. This should match your ML2 allowed network_typs. Default is to advertise both gre and vxlan.
f5_populate_static_arp	True or False	False	Specifies that if a Pool Member IP address is associated with a GRE or VxLAN tunnel network, in addition to a tunnel fdb record being added, that a static arp entry will be created to avoid the need to learn the Member's MAC address via flooding.
l2_population	True or False	True	The agent will register for Neutron L2 population updates and will populate tunnel fdb entries accordingly. Without L2 population, pool member migration will not function properly.
f5_global_routed_mode	True or False	False	If set, only L4+ objects will be provisioned. All necessary L2 and L3 routes will be assumed pre-provisioned. SNAT will be truned to AutoMAP on all VIPs, and all L2 and L3 tenancy isolation will not be provisioned.
f5_snat_mode	True or False	True	For L3 forwarding, should SNAT be used. If set to False, the LBaaSv1 device will attempt to become the default gateway for the Neutron subnets associated with Member objects.
f5_snat_addresses_per_subnet	integer number of SNAT addresses	1	If set to 0(zero), AutoMAP SNAT will be used. If set to a positive integer, this number of SNAT addresses will be created per Neutron subnet associated with Pool Members, per active TMOS device in an HA mode.
f5_route_domain_strictness	True or False	False	If set to True, tenant route domain isolation will be set to strict and VIPs and Members must be placed in the same route domain. This would mean that all Neutron networks with the shared attribute can not be used for VIPs or Members.
f5_common_external_networks	True or False	False	If set to True, any VIP address or Member address associated with a Neutron network with router:external set to True will be created in the Common parition and in the default route domain.
common_network_ids	comma separated list	None	List in [vlan]:[neutron network UUID] format. All defined network UUIDs defined will exempt services from creating new VLANs, but will use the /Common/[vlan] specified instead.
l3_binding_driver	l3 binding driver path	f5.oslbaasv1agent.drivers.bigip.l3_binding.AllowedAddressPairs	Some system require notification when L3 addresses are bound to ports to open security features or provide forwarding information.
l3_binding_static_mappings	JSON dictionary	'' (blank string)	Much like common network ids, if there are known subnets which are bound to BIG-IP neutron ports which need L3 binding, these can be specified statically.
f5_bigip_LBaaSv1_device_driver	python class name of the	neutron.services.loadbalancer.drivers.f5.bigip.icontrol_driver.iControlDriver	Only the neutron.services.loadbalancer.drivers.

	device driver to use		f5.bigip.icontrol_driver.iControlDriver is supplied.
icontrol_hostname	either a single entry or a comma separated list iControl endpoint IP address or FQDNs	192.168.1.245	The iControl endpoint to connect to for this agent. If a comma separated list is given, you must include each device in your DSG. If only one address is given, the other device's management address will be learned from the DSG and must be reachable from the LBaaSv1 agent.
icontrol_username	valid username for the TMOS device	admin	The iControl endpoint username for this agent
icontrol_password	valid password for the TMOS device	admin	The iControl endpoint password for this agent
icontrol_connection_retry_interval	integer number of seconds	10	How often to attempt to reconnect if iControl connection fails
icontrol_vcmp_hostname	iControl endpoint IP address or FQDN	192.168.1.245	VCMP host which must have use the same credentials as the BIG-IP guests.
icontrol_config_mode	objects or iapp	objects	Determines if iControl objects or the LBaaSv1 iApp are used to provision services. iApp support is experimental in this release.
bigiq_hostname	BIG-IQ API endpoint IP or FQDN	bigiqhostname	Single tenant LBaaSv1 support via BIG-IQ. This is experimental in this release.
bigiq_admin_password	valid password for a BIG-IQ device	admin	Single tenant LBaaSv1 support via BIG-IQ. This is experimental in this release.
bigip_management_username	valid username for a BIG-IP device	admin	The username used by BIG-IQ to manage BIG-IPs for Single tenant LBaaSv1 support via BIG-IQ. This is experimental in this release.
bigip_management_password	valid password for a BIG-IP device	admin	The password used by BIG-IQ to manage BIG-IPs for Single tenant LBaaSv1 support via BIG-IQ. This is experimental in this release.
openstack_keystone_url	URL	http://keystonserver:5000/v2.0	OpenStack keystone instance. This is experimental in this release.
openstack_admin_username	Keystone admin username	valid Keystone username	Admin OpenStack login to determine if a tenant has BIG-IPs which can be used for Single Tenant LBaaSv1. This is experimental in this release.
openstack_admin_password	Keystone admin password	valid Keystone password	Admin OpenStack login to determine if a tenant has BIG-IPs which can be used for Single Tenant LBaaSv1. This is experimental in this release.

Starting Multiple Agents on the Same Host

In order to start more than one agent on the same host, several alterations need to be made for each additional agent instance:

1. Create a unique configuration file for each agent, using `/etc/neutron/f5-oslbaasv1-agent.ini` as a template.
2. Create additional upstart, init.d, or systemd service definitions for the agent using the default service definitions as a guide.
3. Start each agent using the name of its unique upstart conf file.

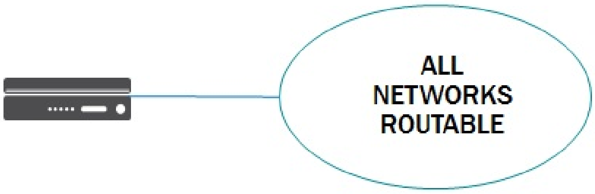
iControl Driver Supported TMOS Versions

The agent processes themselves include orchestration methods which are available on TMOS 11.5 and greater. The agents will check for this version of TMOS on all connected devices. If an older version of TMOS is detected, the agents will not register with Neutron.

Supported Neutron Network Topologies

The F5 iControl agent driver supports the following network topologies with either hardware appliances or TMOS virtual editions:

- Global routed mode where all VIPs are assumed routable from clients and all Members are assumed routable from the TMOS devices themselves. All L2 and L3 objects, including routes, must be pre-provisioned on the TMOS Device Service Group prior to LBaaSv1 provisioning.

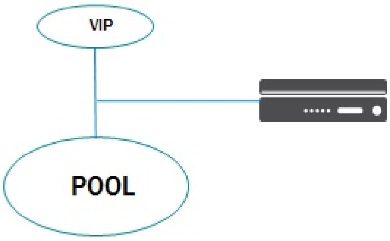
Topology	f5-oslbaasv1-agent.ini settings
 	`f5_global_routed_mode = True`

Global routed mode uses TMOS AutoMap SNAT for all VIPs. Because no explicit SNAT pools are being defined, sufficient Self IP addresses should be created to handle connection loads.

Warning: In global routed mode, because all access to and from the TMOS devices is assumed globally routed, there is no segregation between tenant services on the TMOS devices themselves. Overlapping IP address spaces for tenant objects is likewise not available.

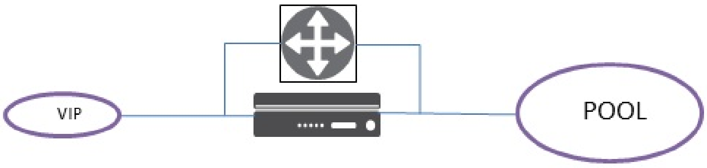
- One-Arm mode where VIP and Members can be provisioned from the same Neutron subnet.

Topology	f5-oslbaasv1-agent.ini settings


 	
	`f5_global_routed_mode = False`
	`f5_snat_mode = True`
	optional settings:
	`f5_snat_addresses_per_subnet = n`
	where if n is 0, the virtual server will use AutoMap SNAT. If n is > 0, n number of SNAT addresses will be allocated from the Member subnet per active traffic group.

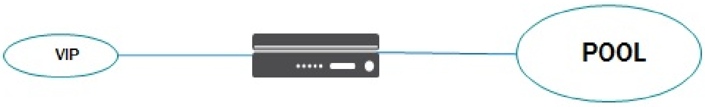
- Multiple-Arm mode where VIP and Members are provisioned from different Neutron subnets.

Topology	f5-oslbaasv1-agent.ini settings


 	
	`f5_global_routed_mode = False`
	`f5_snat_mode = True`
	optional settings:
	`f5_snat_addresses_per_subnet = n`
	where if n is 0, the virtual server will use AutoMap SNAT. If n is > 0, n number of SNAT addresses will be allocated from the Member subnet per active traffic group.

- Gateway routed mode where attemps will be made to create a default gateway forwarding service on the TMOS Device Service Group for Member Neutron subnets

Topology	f5-oslbaasv1-agent.ini settings


 	
	`f5_global_routed_mode = False`
	`f5_snat_mode = False`

For the Neutron network topologies requiring dynamic L2 and L3 provisioning of the TMOS devices, which includes all network topologies except global routed mode, the f5 LBaaSv1 iControl driver supports:

- Provider VLANs - VLANs defined by the admin tenant and shared
- Tenant VLANs - VLANs defined by the admin tenant for other tenants or by the tenant themselves
- Tenant GRE Tunnels - GRE networks defined by the tenant
- Tenant VxLAN Tunnels - VxLAN networks defined by the tenant

VLANs

For VLAN connectivity, the f5 TMOS devices use a mapping between the Neutron network `provider:physical_network` attribute and TMM interface names. This is analogous to the Open vSwitch agents mapping between the Neutron network `provider:physical_network` and their interface bridge name. The mapping is created in the `f5-oslbaasv1-agent.ini` configuration file using in the `f5_external_physical_mappings` setting. The name of the `provider:physical_network` entries can be added to a comma separated list with mappings to the TMM interface or LAG trunk name, and a boolean attribute to specify if 802.1q tagging will be applied. An example which would map the `provider:physical_network` containing 'ph-eth3' to TMM interface 1.1 with 802.1q tagging would look like this:

```
f5_external_physical_mappings = ph-eth3:1.1:True
```

A default mapping should be included for cases where the `provider:physical_network` does not match any configuration settings. A default mapping simply uses the word `default` instead of a known `provider:physical_network` attribute.

An example that would include the previously illustrated mapping, a default mapping, and LAG trunk mapping, might look like this:

```
f5_external_physical_mappings = default:1.1:True, ph-eth3:1.1:True, ph-eth4:lag-trunk-1:True
```

Tunnels

For GRE and VxLAN tunnels, the f5 TMOS devices expect to communicate with Open vSwitch VTEPs. The VTEP addresses for Open vSwitch VTEPs are learned from their registered Neutron agent configurations `tunneling_ip` attribute. I.E.:

```
# neutron agent-show 034bddd0-0ac3-457a-9e2c-ed456dc2ad53
+---------------------+--------------------------------------+
| Field               | Value                                |
+---------------------+--------------------------------------+
| admin_state_up      | True                                 |
| agent_type          | Open vSwitch agent                   |
| alive               | True                                 |
| binary              | neutron-openvswitch-agent            |
| configurations      | {                                    |
|                     |      "tunnel_types": [               |
|                     |           "gre"                      |
|                     |      ],                              |
|                     |      "tunneling_ip": "10.1.0.35",    |
|                     |      "bridge_mappings": {            |
|                     |           "ph-eth3": "br-eth3"       |
|                     |      },                              |
|                     |      "l2_population": true,          |
|                     |      "devices": 4                    |
|                     | }                                    |
| created_at          | 2013-11-15 05:00:23                  |
| description         |                                      |
| heartbeat_timestamp | 2014-04-22 16:58:21                  |
| host                | sea-osp-cmp-001                      |
| id                  | 034bddd0-0ac3-457a-9e2c-ed456dc2ad53 |
| started_at          | 2014-04-17 22:39:30                  |
| topic               | N/A                                  |
+---------------------+--------------------------------------+
```

The ML2 L2 Population service is supported by the f5 LBaaSv1 iControl driver, such that only Open vSwitch agents hosting Members will have overlay tunnels built to them for Member IP access. When the ML2 L2 Population service is used, static ARP entries will optionally be created on the TMOS devices to remove the need for them to send ARP broadcast (flooding) across the tunnels to learn the location of Members. In order to support this, the ML2 port binding extensions and segmentation models must be present. The port binding extensions and segmentation model are defined by default with the community ML2 core plugin and Open vSwitch agents on the compute nodes.

When VIPs are placed on tenant overlay networks, the f5 LBaaSv1 agent will send tunnel update RPC messages to the Open vSwitch agents informing them of TMOS device VTEPs. This enables tenant guest virtual machines or network node services to interact with the TMOS provisioned VIPs across overlay networks. An f5 LBaaSv1 agent's connected TMOS VTEP addresses are placed in the agent's configurations and reported to Neutron. The VTEP addresses are listed as `tunneling_ips`.

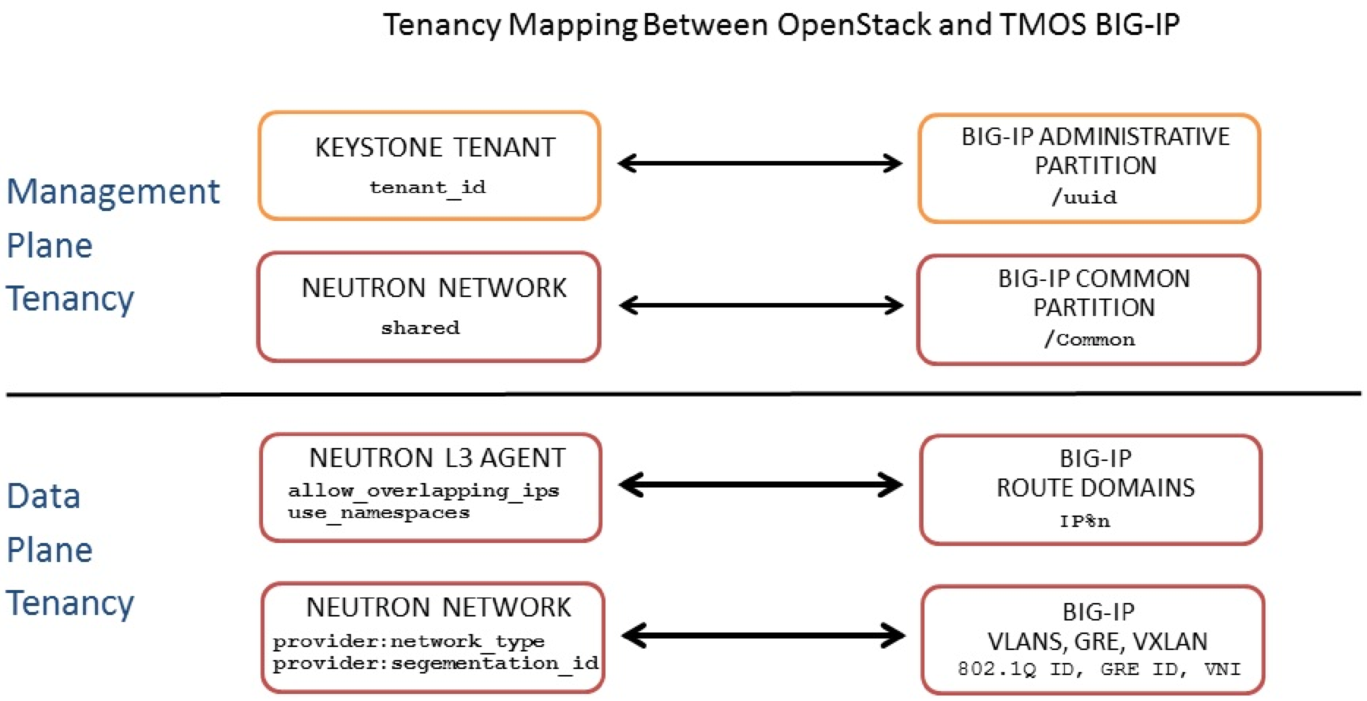
```
# neutron agent-show 0b7bff08-3e45-475a-a02a-8020a2e0763a
+---------------------+------------------------------------------------------+
| Field               | Value                                                |
+---------------------+------------------------------------------------------+
| admin_state_up      | True                                                 |
| agent_type          | Loadbalancer agent                                   |
| alive               | True                                                 |
| binary              | f5-bigip-LBaaSv1-agent                                 |
| configurations      | {                                                    |
|                     |      "icontrol_endpoints": {                         |
|                     |           "10.0.40.122": {                           |
|                     |                "device_name": "bigip-122.f5se.com",  |
|                     |                "platform": "3900",                   |
|                     |                "version": "BIG-IP_v11.5.0",          |
|                     |                "serial_number": "f5-htfx-njih"       |
|                     |           },                                         |
|                     |           "10.0.40.121": {                           |
|                     |                "device_name": "bigip-121.f5se.com",  |
|                     |                "platform": "3900",                   |
|                     |                "version": "BIG-IP_v11.5.0",          |
|                     |                "serial_number": "f5-qprg-nkdl"       |
|                     |           }                                          |
|                     |      },                                              |
|                     |      "agent_env": "dev",                             |
|                     |      "vpc_zone": "east",                             |
|                     |      "tunneling_ips": [                              |
|                     |           "10.1.0.122",                              |
|                     |           "10.1.0.121"                               |
|                     |      ],                                              |
|                     |      "services": 23,                                 |
|                     |      "tunnel_types": [                               |
|                     |           "vxlan",                                   |
|                     |           "gre"                                      |
|                     |      ],                                              |
|                     |      "bridge_mappings": {                            |
|                     |           "default": "1.1",                          |
|                     |           "ph-eth3": "1.1"                           |
|                     |      },                                              |
|                     |      "global_routed_mode": false                     |
|                     | }                                                    |
| created_at          | 2014-04-02 02:03:37                                  |
| description         |                                                      |
| heartbeat_timestamp | 2014-04-22 17:16:25                                  |
| host                | sea-osp-ctl-001:b1cbd354-c78f-572d-8492-f6be4f7ef0bd |
| id                  | 0b7bff08-3e45-475a-a02a-8020a2e0763a                 |
| started_at          | 2014-04-22 16:25:00                                  |
| topic               | f5_LBaaSv1_process_on_agent                            |
+---------------------+------------------------------------------------------+
```

OpenStack and TMOS Multinenancy

By default, all TMOS objects are created in administrative partitions associated with the OpenStack `tenant_id` for the Pool.

If the `f5-oslbaasv1-agent.ini` configuration file setting for `use_namespaces` is set to `True`, and it is not configured for global routed mode, each tenant will also have a TMOS route domain created, providing segmentation for IP address spaces between tenants.

If an associated Neutron network for a VIP or Member is marked as `shared=True`, and the f5 LBaaSv1 agent is not in global routed mode, all associated L2 and L3 objects will be created in the `/Common` administrative partition and associated with route domain 0 (zero) on all TMOS devices.



Supported TMOS High Availability Modes

The F5 iControl agent driver supports:

- Standalone mode - Single TMOS device providing no High Availability
- Pair mode - Active / Standby TMOS devices
- ScaleN mode - Multiple Active TMOS devices, up to 4 (four) devices

Every TMOS device, hardware or virtual edition, must be on-boarded, or pre-provisioned, before taking LBaaSv1 requests. If VLANs are used with the TMOS device, these devices are expected to support tagged VLAN frames on the TMOS interfaces if provisioned to do so.

Note: TMOS vCMP guests are currently not supported by the f5 LBaaSv1 Plugin.

Preparing Your TMOS Device for LBaaSv1

TMOS devices must be on-boarded to support their appropriate high availability mode. All of the following on-boarding steps can be automated using iControl. Below is a listing of all the manual CLI commands needed to complete the TMOS device on-boarding.

Standalone High Availability Mode

The TMOS device must be licensed to support Local Traffic (LTM). The TMOS device should have Local Traffic (LTM) provisioned as Nominal.

To license a TMOS device via the CLI, run:

```
SOAPClientClient --interactive <license_basekey>
```

To provision the Local Traffic (LTM) to nominal via the CLI, run:

```
tmsh modify sys provision ltm level nominal
tmsh modify sys db provision.extramb value 500
```

For Standalone Mode, SNAT addresses will get created on, and VIPs will get scheduled to, the default traffic-group-local-only non-floating traffic group.

Pair High Availability Mode

Both TMOS devices must be licensed to support Local Traffic (LTM). The TMOS devices should have Local Traffic (LTM) provisioned as Nominal.

To license a TMOS device via the CLI, run:

```
SOAPClientClient --interactive <license_basekey>
```

To provision the Local Traffic (LTM) to nominal via the CLI, run:

```
tmsh modify sys provision ltm level nominal
tmsh modify sys db provision.extramb value 500
```

Both TMOS devices must have their Network Time Protocol servers set to the same NTP server. Both TMOS devices should also have their timezone set to the same timezone.

To set a TMOS device NTP server via the CLI, run:

```
tmsh modify sys ntp servers replace-all-with { <ip_address_ntp_1> <ip_address_ntp_2> }
```

To set a TMOS device timezone via the CLI, run:

```
tmsh modify sys ntp timezone UTC
```

Both TMOS devices must share a common VLAN for HA management communication. Both devices will require a local IP address to communicate cluster heartbeat and synchronization information.

To provision a TMOS device HA VLAN via the CLI, run:

```
tmsh create net vlan HA interfaces add { <TMOS_interface_name> } description HA
```

To provision a TMOS device IP address on the HA VLAN via the CLI, run:

```
tmsh create net self HA <ip_address/cidr> allow-service default vlan HA
```

Both TMOS devices must have their configuration sync interfaces, connection mirroring, and failover addresses defined.

To define a TMOS device configuration sync address via the CLI, run:

```
tmsh modify cm device <device_name> configsync-ip <ha_ip_address>
```

To define a TMOS device connection mirroring address via the CLI, run:

```
tmsh modify cm device <device_name> mirror-ip <ha_ip_address>
```

To define a TMOS device failover address via the CLI, run:

```
tmsh modify cm device <device_name> unicast-address { { ip <ha_ip_address> port 1026 } { ip
<device_mgmt_ip_address> port 1026 } }
```

Both TMOS devices must have distinct device names before they can be placed in a Device Service Group. Once they have distinct device names, a trust must be built between the devices.

To reset TMOS device name via the CLI, run:

```
tmsh mv cm device <original_name> <new_name>
```

To add a trusted peer *from your primary TMOS device* via the CLI, run:

```
tmsh modify cm trust-domain /Common/Root ca-devices add { <peer_mgmt_ip_address> } name
<remove_device_name> username <remote_device_admin_username> password
<remote_device_admin_password>
```

Both TMOS devices must be placed into a sync failover Device Service Group to allow active/standby failover. An initial sync must be run on the new sync failover Device Service Group.

To create the sync failover Device Service Group *from your primary TMOS device* via the CLI, run:

```
tmsh create cm device-groupÂ <device_group_name> devices add
{Â <primary_device_name>Â <remote_device_name> } type sync-failover auto-sync enabled
network-failover enabled
```

To force an initial sync for the sync failover Device Service Group *from your primary TMOS device* via the CLI, run:

```
tmsh run cm config-sync to-group <device_group_name>
```

For Pair High Availability Mode, SNAT addresses will get created on, and VIPs will get scheduled to, the default traffic-group-1 floating traffic group.

ScaleN High Availability Mode

All TMOS devices in your ScaleN group must be licensed to support Local Traffic (LTM). The TMOS device should have Local Traffic (LTM) provisioned as Nominal.

To license a TMOS device via the CLI, run:

```
SOAPClientClient --interactive <license_basekey>
```

To provision the Local Traffic (LTM) to nominal via the CLI, run:

```
tmsh modify sys provision ltm level nominal
tmsh modify sys db provision.extramb value 500
```

All TMOS devices must have their Network Time Protocol servers set to the same NTP server. Both TMOS devices should also have their timezone set to the same timezone.

To set a TMOS device NTP server via the CLI, run:

```
tmsh modify sys ntp servers replace-all-with { <ip_address_ntp_1> <ip_address_ntp_2> }
```

To set a TMOS device timezone via the CLI, run:

```
tmsh modify sys ntp timezone UTC
```

All TMOS devices must share a common VLAN for HA management communication. All devices will require a local IP address to communicate cluster heartbeat and synchronization information.

To provision a TMOS device HA VLAN via the CLI, run:

```
tmsh create net vlan HA interfaces add { <TMOS_interface_name> } description HA
```

To provision a TMOS device IP address on the HA VLAN via the CLI, run:

```
tmsh create net self HA <ip_address/cidr> allow-service default vlan HA
```

All TMOS devices must have their configuration sync interfaces, connection mirroring, and failover addresses defined.

To define a TMOS device configuration sync address via the CLI, run:

```
tmsh modify cm device <device_name> configsync-ip <ha_ip_address>
```

To define a TMOS device connection mirroring address via the CLI, run:

```
tmsh modify cm device <device_name> mirror-ip <ha_ip_address>
```

To define a TMOS device failover address via the CLI, run:

```
tmsh modify cm device <device_name> unicast-address { { ip <ha_ip_address> port 1026 } { ip
<device_mgmt_ip_address> port 1026 } }
```

All TMOS devices must have distinct device names before they can be placed in a Device Service Group. Once they have distinct device names, a trust must be built between the devices.

To reset TMOS device name via the CLI, run:

```
tmsh mv cm device <original_name> <new_name>
```

To add a trusted peer *from your primary TMOS device* for each peer device via the CLI, run:

```
tmsh modify cm trust-domain /Common/Root ca-devices add { <peer_mgmt_ip_address> } name
<remove_device_name> username <remote_device_admin_username> password
<remote_device_admin_password>
```

All TMOS devices must be placed into a sync failover Device Service Group to allow active/standby failover. An initial sync must be run on the new sync failover Device Service Group.

To create the sync failover Device Service Group *from your primary TMOS device* via the CLI, run:

```
tmsh create cm device-groupÂ <device_group_name> devices add
{Â <primary_device_name>Â <remote_device_name> .. <additional_remote_device_name> } type
sync-failover auto-sync enabled network-failover enabled
```

To force an initial sync for the sync failover Device Service Group *from your primary TMOS device* via the CLI, run:

```
tmsh run cm config-sync to-group <device_group_name>
```

To enable failover between the active devices you must create traffic groups. The scheme you choose to create traffic groups will depend on your failover group design. The iControl driver in ScaleN failover mode will schedule VIPs and SNAT addresses on traffic groups which are not named traffic-group-1 or traffic-group-local-only. It is required that you create unique named traffic groups for you failover pattern which are associated with an appropriate HA failover order. The iControl driver will schedule the VIP traffic group placement based on which unique named traffic group has least number of VIPs associated with it.

To create one of multiple traffic groups with explicit HA order *from your primary TMOS device* via the CLI, run:

```
tmsh create cm traffic-group <traffic_group_name> default-device <device_name> auto-
failback-enabled true ha-order { <secondary_device_name> .. <additional_device_name> }
```

Tenant Tunnel VTEP Self IPs

In order to terminate GRE or VxLAN tenant tunnels each TMOS device must have VTEP non-floating Self IP addresses configured. The folder and name of the VTEP interface must correspond to the `f5_vtep_folder` and `f5_vtep_selfip_name` settings for the agent. The VTEP Self IPs must be able to route IP packets to the rest of the Open vSwitch VTEP addresses.

To create a VTEP Self IP via the CLI,

```
tmsh create net self [vtep selfip name] <ip_address/cidr> allow-service default vlan [vtep VLAN name]
```

A connectivity test should be made from each TMOS device to Open vSwitch VTEP address to ensure L3 routing is functioning properly.

Troubleshooting Issues

To troubleshoot problems with the F5 LBaaSv1 Type driver or an agent process, set the global Neutron setting and agent process `debug` setting to `True`. Extensive logging will then appear in the `neutron-server` and `f5-bigip-LBaaSv1-agent` log files on their respective hosts.

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