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Brocade vADC Device Driver for OpenStack Liberty Neutron LBaaS: Deployment Guide

BROCADE

Brocade Communications Systems, Incorporated

Corporate and Latin American Headquarters
Brocade Communications Systems, Inc.
130 Holger Way
San Jose, CA 95134
Tel: 1-408-333-8000
Fax: 1-408-333-8101
E-mail: info@brocade.com

Asia-Pacific Headquarters
Brocade Communications Systems China HK, Ltd.
No. 1 Guanghua Road
Chao Yang District
Units 2718 and 2818
Beijing 100020, China
Tel: +8610 6588 8888
Fax: +8610 6588 9999
E-mail: china-info@brocade.com

European Headquarters
Brocade Communications Switzerland Sàrl
Centre Swissair
Tour B - 4ème étage
29, Route de l'Aéroport
Case Postale 105
CH-1215 Genève 15
Switzerland
Tel: +41 22 799 5640
Fax: +41 22 799 5641
E-mail: emea-info@brocade.com

Asia-Pacific Headquarters
Brocade Communications Systems Co., Ltd. (Shenzhen WFOE)
Citic Plaza
No. 233 Tian He Road North
Unit 1308 – 13th Floor
Guangzhou, China
Tel: +8620 3891 2000
Fax: +8620 3891 2111
E-mail: china-info@brocade.com

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Preface

Read this preface for an overview of the information provided in this guide. This preface includes the following sections:

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About This Guide

Brocade vADC Device Driver for OpenStack Neutron LBaaS: Deployment Guide describes how to deploy the Brocade vADC device driver for OpenStack Neutron LBaaS. It applies specifically to the OpenStack Liberty release and the Neutron LBaaS API version 2.

Document Conventions

This guide uses the following standard set of typographical conventions

Convention	Meaning
italics	Within text, new terms and emphasized words appear in *italic* typeface.
boldface	Within text, CLI commands, CLI parameters, and REST API properties appear in **bold** typeface.

Courier	Code examples appear in Courier font:
	`amnesiac > enable`
	`amnesiac # configure terminal`

< >	Values that you specify appear in angle brackets: **interface <ip-address>**
[ ]	Optional keywords or variables appear in brackets: **ntp peer <ip-address> [version <number>]**
{ }	Elements that are part of a required choice appear in braces: **{<interface-name>	ascii <string>	hex <string>}**
|	The pipe symbol represents a choice to select one keyword or variable to the left or right of the symbol. The keyword or variable can be either optional or required: **{delete <filename>	upload <filename>}**

Documentation and Release Notes

To obtain the most current version of all Brocade documentation, click through to the desired product page on the Brocade Web site at http://www.brocade.com/en/products-services.html.

If you need more information, see the Brocade Knowledge Base for any known issues, how-to documents, system requirements, and common error messages. You can browse titles or search for keywords and strings. To access the Brocade Knowledge Base, login to the MyBrocade Web site at https://login.brocade.com.

Each software release includes release notes. The release notes identify new features in the software as well as known and fixed problems. To obtain the most current version of the release notes, login to the MyBrocade Web site at https://login.brocade.com.

Examine the release notes before you begin the installation and configuration process.

Traffic Manager and Services Director Documentation

The Brocade Virtual Traffic Manager (Traffic Manager) and Brocade Services Director (Services Director) products includes comprehensive user's guides that describes their respective feature sets in depth.

There are also getting started guides for each variant of each product line, and a series of reference guides to cover additional functionality such as the TrafficScript rules language and product APIs.

You can download documentation for all supported editions from the relevant product pages on the Brocade Web site.

For the Traffic Manager, use:

http://www.brocade.com/content/brocade/en/products-services/application-delivery-controllers/virtual-traffic-manager.html.

For the Services Director, use:

http://www.brocade.com/content/brocade/en/products-services/application-delivery-controllers/services-director.html

Further Information Online

Visit the Brocade Community Web site for further documentation, examples, white papers, and other resources:

http://community.brocade.com

Getting Technical Help or Reporting Errors

Brocade is committed to ensuring that your investment in our products remains cost-effective. If you need assistance or find errors in the documentation, contact Brocade using one of the following options.

Web Access

The Brocade Web site contains the latest version of this guide and all other user guides for the Traffic Manager and Services Director. For more information, see http://www.brocade.com/en/products-services/application-delivery-controllers.html.

To report errors, log in to the MyBrocade Web site at https://login.brocade.com and click **Support Cases** to open a new support case. Make sure you specify the document title in the case description.

E-mail and Telephone Access

Go to http://www.brocade.com/en/support.html for the latest e-mail and telephone contact information.

CHAPTER 1   Prerequisites

Read this chapter for a description of the required prerequisites for this deployment guide.

You must first satisfy the following requirements:

- A configured OpenStack Liberty environment, consisting of at least the Keystone, Neutron, Nova and Glance services. For HTTPS decryption, the Barbican service is also required.

- A working understanding of the above OpenStack services, or the related documentation (available from http://docs.openstack.org) to work from.

- Suitable licenses for the Brocade products you are going to use. These could be:

  – None, if you are using the Developer Edition of the Traffic Manager in the "central cluster" deployment model for testing purposes.

  – One or more perpetual Traffic Manager licenses if you are using the "central cluster" deployment model in production.

  – A Brocade Services Director license of either the Cloud Services Provider type, or the Enterprise type with an associated bandwidth pack.

- The necessary Brocade software packages, downloadable from the Brocade Web site:

  – A Traffic Manager Virtual Appliance image for the hypervisor you are using, or a Virtual Traffic Manager software installation package.
  – Optionally, the Brocade Services Director software installation package for your chosen OS.

- A working understanding of the above Brocade products, or the related documentation (available from the Brocade Web site) to work from.

The Brocade vADC driver supports various deployment models that are described in the second chapter of this guide. The steps for deploying the driver are included in the third chapter. Make sure you have planned your deployment and configured the necessary prerequisite services before creating your Brocade LBaaS configuration file (see Chapter 4, "Installing and Configuring the Device Driver") to ensure you have all the required components and settings in place.

CHAPTER 2 Deployment Models

2.1 Using a Central Cluster of Traffic Managers

This configuration does not require the Services Director and is most suited to organizations that wish to use perpetual Traffic Manager license keys.

A central cluster of Traffic Managers (up to 64) is shared between all OpenStack tenants. A shared network on which all LBaaS "loadbalancer" IP addresses are raised is required, and there is no resource isolation between tenants' services.

Although the load-balanced services use an IP address on a shared network, the back-end servers themselves remain within the tenants' own subnets.

Figure 2-1. A central cluster of Traffic Managers (vTM Cluster) shared between all OpenStack tenants.
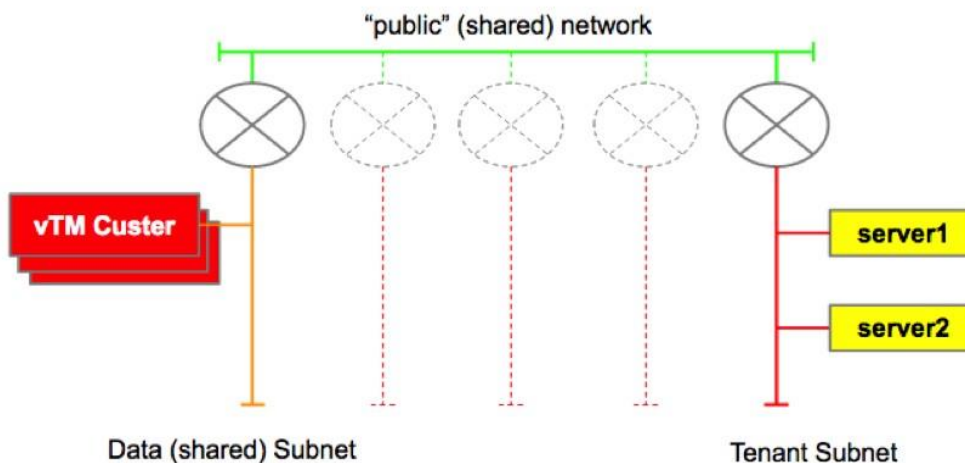
Note: All Traffic Manager configuration objects that are created on the cluster by the LBaaS driver will have the Neutron name of the object and the Keystone ID of the tenant included in the object's "Note" field.

"Loadbalancer" Objects

LBaaS "loadbalancer" objects are implemented as Traffic Manager Traffic IP Groups.

Each group contains the "Loadbalancer" IP address, one primary Traffic Manager on which to host the IP during normal operation, and a configurable number of backup Traffic Managers to use in the event of a failure of the primary. The driver will automatically distribute Traffic IP Groups across the cluster to providing scalability and approximately even load distribution (assuming all "loadbalancers" process roughly the same amount of traffic). To facilitate Traffic IP failover, each Traffic IP address is added to the "allowed_address_pair" field of the Neutron port associated with each Traffic Manager.

"Listener" Objects

LBaaS "listener" objects are implemented as Virtual Servers in the Traffic Manager.

HTTP, HTTPS pass-through, HTTPS off-load, generic TCP (client-first) and UDP protocols are supported.

Certificates for HTTPS off-loading must be managed through the OpenStack Barbican tool.

The LBaaS "listener" "connection_limit" setting is implemented using a Traffic Manager Rate Class and a corresponding TrafficScript request rule to apply it. These are tied to the Virtual Server and will be deleted automatically along with it when the "listener" object is deleted.

"Pool" Objects

LBaaS "pool" objects are implemented as Pools in the Traffic Manager.

The LBaaS "pool" "session_persistence" setting is implemented using a Traffic Manager Session Persistence Class applied to the Pool. This is tied to the Pool and will be deleted automatically along with it when the "pool" object is deleted.

"Member" Objects

LBaaS "member" objects are implemented as nodes in the corresponding Traffic Manager Pool.

"Healthmonitor" Objects

LBaaS "healthmonitor" objects are implemented as Monitors in the Traffic Manager.

While there is a 1:1 relationship between "pools" and "healthmonitors", the Traffic Manager Monitor object is not automatically deleted when the "pool" is deleted, allowing it to be reused by another "pool".

2.2 Private Traffic Manager per-tenant

This configuration _**does**_ require Brocade Services Director and is most suitable for organizations that wish to provide their users with network-isolated LBaaS capability whilst keeping hardware resource use to a minimum.

Because the driver deploys Traffic Manager virtual machines on the tenants' behalves, either the OpenStack "admin" user or a specially created central user with permissions to deploy Nova VMs must be added to each tenant.

A Traffic Manager instance or HA-pair (this is decided globally by the administrator) is automatically created as a Nova virtual machine for each tenant the first time they create an LBaaS "loadbalancer" object. All subsequent LBaaS services the tenant creates are hosted on the same instance/HA-pair. The virtual machine(s) resides within the tenant's environment and is connected directly to their own subnet. This deployment provides network isolation from other tenants, but does not provide resource isolation between LBaaS services.

The vTM instance(s) are locked to prevent accidental deletion and should not be touched by the tenants. To delete the instance(s), simply delete all LBaaS "loadbalancer" objects.

(The diagram below shows the Traffic Manager instance(s) connected to a management network; this is one available option for management traffic, please see section 3.1 for more details.)
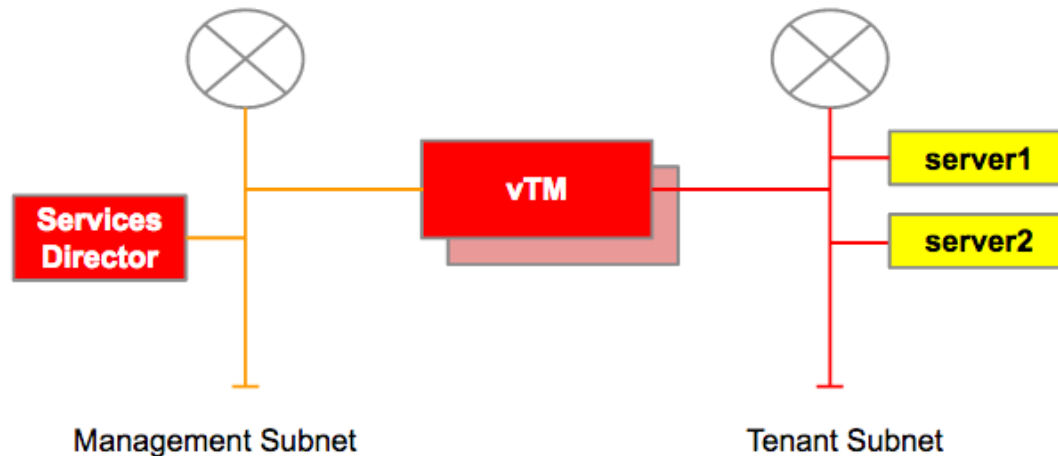
The relationship between LBaaS objects and vTM configuration objects is the same as for the "Central Cluster of Traffic Managers" - see section 2.1.

2.3 Private Traffic Manager per-"loadbalancer"

This configuration _does_ require Brocade Services Director and is most suitable for organizations where resource isolation and performance are a higher priority than hardware resource usage.

Because the driver deploys Traffic Manager virtual machines on the tenants' behalves, either the OpenStack "admin" user or a specially created central user with permissions to deploy Nova VMs must be added to each tenant.

A Traffic Manager instance or HA-pair (this is decided globally by the administrator) is automatically created for each LBaaS "loadbalancer" object the tenant creates. This deployment provides full resource isolation between services but also uses up the most resources (CPU, memory, storage).

The Traffic Manager instance(s) are locked to prevent accidental deletion and should not be touched by the tenants. To delete the instance(s), simply delete the associated LBaaS "loadbalancer" object.

(The diagram below shows the Traffic Manager instance(s) communicating with the Services Director via a Neutron floating IP; this is one available option for management traffic, please see section 3.1 for more details.)

"public" (shared) Subnet   Tenant Subnet
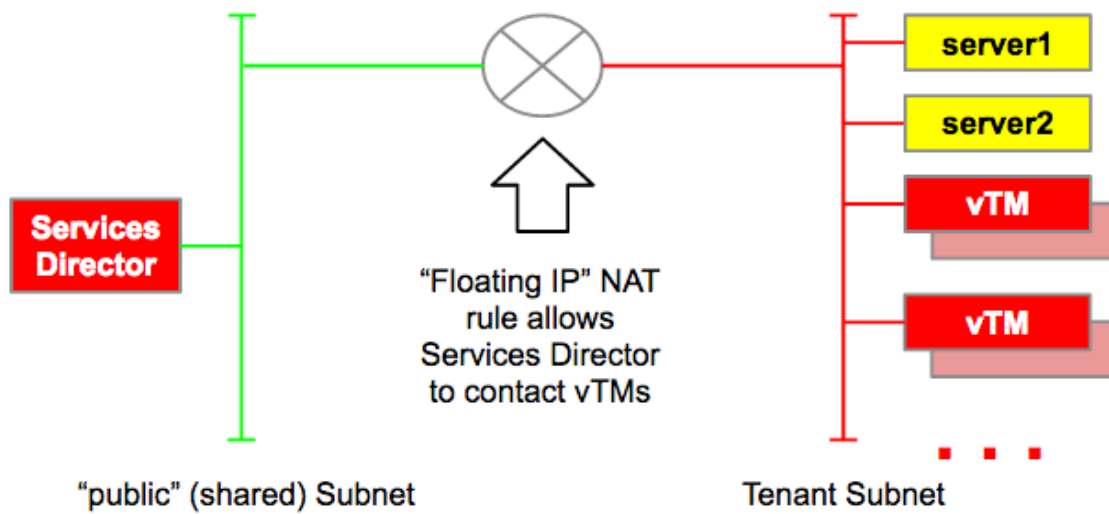
"Loadbalancer" Objects

LBaaS "loadbalancer" objects are implemented as Traffic Manager instances or HA-pairs. If single instances are used, no Traffic IP Groups are required and the instance will use the IP address of the Neutron port associated with the "loadbalancer" object for the data interface.

The relationship between all other LBaaS objects and Traffic Manager configuration objects is the same as for the "Central Cluster of Traffic Managers" - see section 2.1.

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Other Deployment Options

As well as the three deployment models described in section 1, the Brocade vADC device driver supports various options for the following:

3.1 Management Traffic

For the two deployment options that require Brocade Services Director, management communication between the SD and the vTM instances can be configured in one of two ways:

1. Over a dedicated management network (the vTM will have two vNICs – one for management, one for data) - orange in the diagram below

2. Via a Neutron floating IP mapped to the vTM's data vNIC - green in diagram below
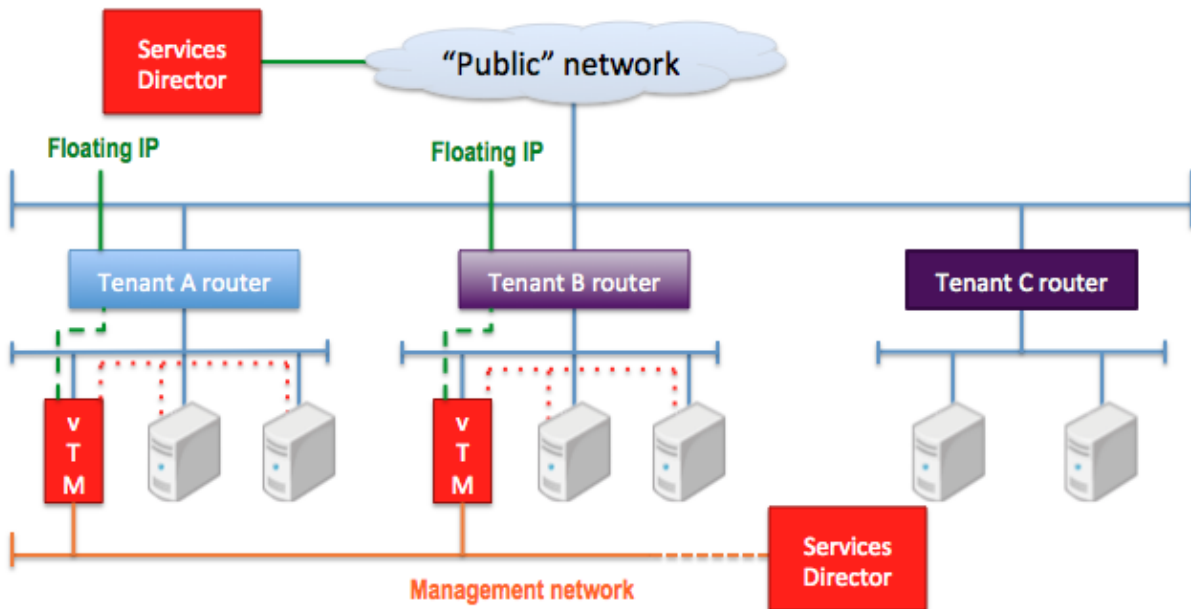
To use a management network, the OpenStack administrator must create a suitable shared network and subnet before running the brocade_lbaas_config_generator tool (see chapter 4), as the network ID will be required.

When a management network is used, Neutron security group rules are automatically created and applied to ensure that management traffic can only come from the Services Directors.

3.2 GUI Access

For the two deployment options that create Traffic Manager instances owned by the tenant, the administrator can optionally (as a global setting) provide the tenant with read-only access to the GUI for monitoring.

If allowed, the GUI can be accessed in a web browser on TCP port 9090 of the IP address assigned to the data interface, from within the tenant's subnet. IP forwarding may be required

The username for read-only access is "`monitor`" and the initial password is "`password`".

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CHAPTER 4 Installing and Configuring the Device Driver

This chapter contains instructions for installing and configuring the Brocade vADC Device Driver for OpenStack Neutron LBaaS.

The following instructions assume you have a fully configured OpenStack Liberty environment, including all of the required Neutron networks.

1. If you haven't already done so:

    If you are using the "central cluster" deployment model:

    o Create and configure the vTM cluster (for more information, see the *Brocade Virtual Traffic Manager: User's Guide* or *Brocade Virtual Traffic Manager: Virtual Appliance Installation and Getting Started Guide*) ensuring each cluster member has a vNIC on the shared data network, and on a management network if applicable. You can use either the applicable vTM Virtual Appliance for your hypervisor platform, or a vTM software installation.

    o Ensure that the REST API is enabled on all cluster members

    If you are using one of the private Traffic Manager deployment models:

    o Create and configure the necessary Services Director instances (see Services Director User Guide). NB. Services Director 2.2 or higher must be used.

    o Create the `feature_pack` resource on the Services Director to be used by the Traffic Manager instances that are dynamically created.

    o Download the appropriate Brocade vTM Virtual Appliance image (must be vTM 10.1 or above) for your environment and copy the image file to the Glance server.

    o As an OpenStack admin user, register the image with Glance:

    ```
    # glance image-create –name Brocade-vTM –is-public True –disk-format
    <FORMAT> --container-format <FORMAT> --file <IMAGE_FILE>
    ```

    o If a built-in machine flavor does not have the required settings, create one:

    ```
    # nova flavor-create <NAME> <ID> <RAM> <DISK> <VCPUS>
    ```

    A minimum of 2GB RAM and 16GB storage should be allocated.

On *all* nodes on which Neutron server is running (typically all "controller" nodes):

2. Type the following command to clone the device driver GitHub repository:

    ```
    $ git clone –b stable/liberty https://github.com/brocade-vadc/neutron-lbaas-device-driver
    ```

3. Type the following commands to install the driver:

    ```
    $ cd neutron-lbaas-device-driver
    $ sudo python setup.py install
    ```

4. Type the following command to create the driver configuration file:

```
$ sudo brocade_lbaas_config_generator /etc/neutron/services/loadbalancer/brocade.conf
```

Answer the questions concerning the deployment settings you wish to use (see appendix I for more information).
NB. The configuration file should be the same across all Neutron server nodes, so once the configuration file has been created it can simply be copied between nodes without having to re-run the generator script.

5. Use the following steps to configure Neutron to use the driver:

   – In `/etc/neutron/neutron.conf`, under the `[DEFAULT]` section, ensure the "`service_plugins =`" line contains "`neutron_lbaas.services.loadbalancer.plugin.LoadBalancerPluginv2`".

   – In `/etc/neutron/neutron_lbaas.conf`, under the `[service_providers]` section, type the following:

```
service_provider= LOADBALANCERV2:brocade:neutron_lbaas.drivers.brocade.driver_v2.BrocadeLoadBalancerDriver:default
```

9. Stop the Neutron server (system and installation-specific).

10. Start the Neutron server with the following additional CLI parameter:

```
--config-file /etc/neutron/services/loadbalancer/brocade.conf
```

At this point, you should be able to create, modify and delete LBaaS services through the Neutron command line tool, the Neutron REST API or the Horizon GUI.
For more information, see http://docs.openstack.org.

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APPENDIX 1 Driver Configuration Information

Table 1

Question	Guidelines for answer
What deployment model are you using?	Select "1" if you are using a central cluster of Traffic Managers (see section 2.1), then proceed to Table 2. Select "2" if you wish Traffic Manager instances to be created by tenants on-demand, then proceed to Table 3.

Table 2

Question	Guidelines for answer
Please provide a comma-seperated list of all vTM management IPs in your cluster	These IP addresses are called from the driver to make configuration changes that represent LBaaS objects. You do not have to specify every cluster member in this list, but only those specified will have management traffic sent to them which could influence high availability.
What is the username for the vTM cluster admin user?	This is the username that will be included in all API calls to the Traffic Manager cluster. Default: "admin".
What is the password for the vTM cluster admin user?	This is the password that will be included in all API calls to the Traffic Manager cluster.
Please provide a comma-seperated list of Neutron port IDs that represent the interfaces for each vTM on which VIPs will listen:	In a "central cluster" deployment, all LBaaS "loadbalancer" objects will raise their VIPs on the same shared network. This setting is a list of the Neutron port IDs for the interface on this network of *every* cluster member. This setting is used to set the `allowed_address_pairs` setting of each port to facilitate high-availability.
How many passive Traffic IP Group members should there be?	A central cluster can have up to 64 members, but, for efficiency, VIPs will be spread across the cluster. A VIP will only be active on one cluster member at a time, but can have the number of passive members defined with this setting. A value of one represents active-passive, whilst a value of two represents active-passive-passive, etc.
Should HTTPS off-load be supported?	Select "1" if you have the Barbican service installed and configured, and wish to allow HTTPS off-load on the Traffic Managers. Otherwise, select "2".
Which TCP port does the vTM REST API listen on?	Port that the driver will use to communicate with the Traffic Manager cluster. Please ensure that this port is not blocked by any firewalls between the Neutron server and the Traffic Manager cluster. Default: 9070
What is the username for the OpenStack admin user?	Username for an OpenStack user that has permission to alter Neutron settings on the central cluster network. Default: "admin".
What is the password for the OpenStack admin user?	Corresponding password for above.
Which Keystone version should be used?	Select "1" if you are using Keystone v2.0. Select "2" if you are using Keystone v3.

Table 3

Question	Guidelines for answer
Which deployment model do you wish to use?	Select "1" if you wish each tenant to have a Traffic Manager instance/pair on which all their LBaaS "loadbalancer" objects are hosted (see section 2.2). Select "2" if you wish each LBaaS "loadbalancer" object to be hosted on its own Traffic Manager instance/pair.
How should vTMs be deployed?	Select "1" if you wish Traffic Manager instances to be created singly (ie. No HA). Select "2" if you wish Traffic Managers to be deployed as HA-pairs.
Please provide a comma-seperated list of Services Director management IPs	These IP addresses are called from the driver to make configuration changes that represent LBaaS objects. You do not have to specify every cluster member in this list, but only those specified will have management traffic sent to them which could influence high availability.
What is the Glance ID of the vTM image to use?	The Glance ID that will be used when creating Traffic Manager instances.
What is the Nova ID of the flavor to use for vTMs?	The Nova ID that will be used as the flavor when creating Traffic Manager instances.
Which management mode should be used?	Select "1" if using a dedicated management network to which all Traffic Manager instances will be attached. Select "2" if management traffic should be sent via a floating IP address to the Traffic Manager instance. See section 3.1 for further details.
What is the Neutron ID of the management network?	If you selected "1" in the previous question, this should be the Neutron ID of the management network to which the Traffic Manager instances should be attached. If you selected "2" in the previous question, this should be the Neutron ID of the public network on which to raise the floating IP address.
What is the username of the Services Director admin user?	This is the username that will be included in all API calls to the Services Director cluster. Default: "admin".
What is the password of the Services Director admin user?	This is the password that will be included in all API calls to the Services Director cluster.
Which port does the Services Director REST API listen on?	Port that the driver will use to communicate with the Services Director cluster. Please ensure that this port is not blocked by any firewalls between the Neutron server and the Services Director cluster. Default: 8100
How much bandwidth (Mbps) should each vTM be allocated?	The amount of bandwidth allocated (by license key limitation) to each Traffic Manager instance that is created.
Which Services Director "feature_pack" resource should each vTM use?	The name of the Services Director feature_pack object that instances will be licensed with. *N.B. functionality is limited by the LBaaS API so the feature pack should not be over-specified.*
Give tenants read-only access to the vTM GUI?	Select "1" if tenants should be allowed read-only access to the Traffic Manager GUI for the purposes of monitoring. Select "2" if no GUI access should be permitted.
What timezone are the vTMs in?	This setting will be applied to each Traffic Manager instance created.
Please provide a comma-seperated list of your nameservers	This setting will be applied to each Traffic Manager instance created.

Should HTTPS off-load be supported?	Select "1" if you have the Barbican service installed and configured, and wish to allow HTTPS off-load on the Traffic Managers. Otherwise, select "2".
Which TCP port does the vTM REST API listen on?	Port that the Services Director cluster will use to communicate with the Traffic Manager instances. Please ensure that this port is not blocked by any firewalls between the Services Director cluster and the Traffic Manager instances. Default: 9070
What is the username for the OpenStack admin user?	Username of a centralized user that is a member of all tenants and has the permissions to create Nova instances.
What is the password for the OpenStack admin user?	Password corresponding to above user.
Which Keystone version should be used?	Select "1" if you are using Keystone v2.0. Select "2" if you are using Keystone v3.

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APPENDIX 2   Sample Configuration File

The following is a sample configuration file as produced by the configuration generation script:

```
[lbaas_settings]
admin_servers=10.100.0.1,10.100.0.2
deploy_ha_pairs=False
deployment_model=PER_TENANT
flavor_id= 574fb517-fbf1-44ed-adce-3323e72822ec
https_offload=True
image_id=c9f2ff3c-7eeb-470e-ae4d-8e5fc291d29f
keystone_version=3
management_mode=MGMT_NET
management_network= a2ed32de-8496-45fc-88dc-c4ff49430edb
openstack password=p@55w0rd
openstack_username=admin

[vtm_settings]
gui_access=True
nameservers=8.8.8.8,8.8.4.4
rest_port=9070
timezone=Europe/London

[services_director_settings]
bandwidth=10
feature_pack=my_feature_pack
password=p@55w0rd
rest_port=8100
username=admin
```