Distributed Virtual Routing with VRRP

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Open vSwitch: High availability using DVR (deploy-ovs-ha-dvr.html#deploy-ovs-ha-dvr) supports augmentation using Virtual Router Redundancy Protocol (VRRP). Using this configuration, virtual routers support both the **--distributed** and **--ha** options.

Similar to legacy HA routers, DVR/SNAT HA routers provide a quick fail over of the SNAT service to a backup DVR/SNAT router on an l3-agent running on a different node.

SNAT high availability is implemented in a manner similar to the Linux bridge: High availability using VRRP (deploy-lb-ha-vrrp.html#deploy-lb-ha-vrrp) and Open vSwitch: High availability using VRRP (deploy-ovs-ha-vrrp.html#deploy-ovs-ha-vrrp) examples where **keepalived** uses VRRP to provide quick failover of SNAT services.

During normal operation, the master router periodically transmits *heartbeat* packets over a hidden project network that connects all HA routers for a particular project.

If the DVR/SNAT backup router stops receiving these packets, it assumes failure of the master DVR/SNAT router and promotes itself to master router by configuring IP addresses on the interfaces in the **snat** namespace. In environments with more than one backup router, the rules of VRRP are followed to select a new master router.

> ⚠ **Warning**
>
> There is a known bug with **keepalived** v1.2.15 and earlier which can cause packet loss when **max_l3_agents_per_router** is set to 3 or more. Therefore, we recommend that you upgrade to **keepalived** v1.2.16 or greater when using this feature.

> ⊘ **Note**
>
> Experimental feature or incomplete documentation.

Configuration example¶

The basic deployment model consists of one controller node, two or more network nodes, and multiple computes nodes.

Controller node configuration¶

1. Add the following to **/etc/neutron/neutron.conf**:

```
[DEFAULT]
core_plugin = ml2
service_plugins = router
allow_overlapping_ips = True
router_distributed = True
l3_ha = True
l3_ha_net_cidr = 169.254.192.0/18
max_l3_agents_per_router = 3
```

When the **router_distributed = True** flag is configured, routers created by all users are distributed. Without it, only privileged users can create distributed routers by using **--distributed True**.

Similarly, when the **l3_ha = True** flag is configured, routers created by all users default to HA.

It follows that with these two flags set to **True** in the configuration file, routers created by all users will default to distributed HA routers (DVR HA).

The same can explicitly be accomplished by a user with administrative credentials setting the flags in the **neutron router-create** command:

```
$ neutron router-create name-of-router --distributed=True --ha=True
```

> ⊘ **Note**
>
> The *max_l3_agents_per_router* determine the number of backup DVR/SNAT routers which will be instantiated.

2. Add the following to **/etc/neutron/plugins/ml2/ml2_conf.ini**:

```
[ml2]
type_drivers = flat,vxlan
tenant_network_types = vxlan
mechanism_drivers = openvswitch,l2population
extension_drivers = port_security

[ml2_type_flat]
flat_networks = external

[ml2_type_vxlan]
vni_ranges = MIN_VXLAN_ID:MAX_VXLAN_ID
```

Replace **MIN_VXLAN_ID** and **MAX_VXLAN_ID** with VXLAN ID minimum and maximum values suitable for your environment.

> **✔ Note**
>
> The first value in the **tenant_network_types** option becomes the default project network type when a regular user creates a network.

Network nodes¶

1. Configure the Open vSwitch agent. Add the following to **/etc/neutron/plugins/ml2/openvswitch_agent.ini**:

```
[ovs]
local_ip = TUNNEL_INTERFACE_IP_ADDRESS
bridge_mappings = external:br-ex

[agent]
enable_distributed_routing = True
tunnel_types = vxlan
l2_population = True
```

Replace **TUNNEL_INTERFACE_IP_ADDRESS** with the IP address of the interface that handles VXLAN project networks.

2. Configure the L3 agent. Add the following to **/etc/neutron/l3_agent.ini**:

```
[DEFAULT]
ha_vrrp_auth_password = password
interface_driver = openvswitch
external_network_bridge =
agent_mode = dvr_snat
```

> **✔ Note**
>
> The **external_network_bridge** option intentionally contains no value.

Compute nodes¶

1. Configure the Open vSwitch agent. Add the following to **/etc/neutron/plugins/ml2/openvswitch_agent.ini**:

```
[ovs]
local_ip = TUNNEL_INTERFACE_IP_ADDRESS
bridge_mappings = external:br-ex

[agent]
enable_distributed_routing = True
tunnel_types = vxlan
l2_population = True

[securitygroup]
firewall_driver = neutron.agent.linux.iptables_firewall.OVSHybridIptablesFirewallDriver
```

2. Configure the L3 agent. Add the following to **/etc/neutron/l3_agent.ini**:

```
[DEFAULT]
interface_driver = openvswitch
external_network_bridge =
agent_mode = dvr
```

Replace **TUNNEL_INTERFACE_IP_ADDRESS** with the IP address of the interface that handles VXLAN project networks.

Keepalived VRRP health check¶

The health of your **keepalived** instances can be automatically monitored via a bash script that verifies connectivity to all available and configured gateway addresses. In the event that connectivity is lost, the master router is rescheduled to another node.

If all routers lose connectivity simultaneously, the process of selecting a new master router will be repeated in a round-robin fashion until one or more routers have their connectivity restored.

To enable this feature, edit the `l3_agent.ini` file:

```
ha_vrrp_health_check_interval = 30
```

Where `ha_vrrp_health_check_interval` indicates how often in seconds the health check should run. The default value is `0`, which indicates that the check should not run at all.

Known limitations¶

- Migrating a router from distributed only, HA only, or legacy to distributed HA is not supported at this time. The router must be created as distributed HA. The reverse direction is also not supported. You cannot reconfigure a distributed HA router to be only distributed, only HA, or legacy.
- There are certain scenarios where l2pop and distributed HA routers do not interact in an expected manner. These situations are the same that affect HA only routers and l2pop.

« (config-dns-res.html) » (config-ipam.html) 🐞 (https://bugs.launchpad.net/neutron/+filebug?field.title=Distributed%20Virtual%20Routing%20with%20VRRP%20in%20Neutron&field.comment=%0A%0A%0AThis bug tracker is for errors with the documentation, use the following as a template and remove or add fields as you see fit. Convert [ ] into [x] to check boxes:%0A%0A- [ ] This doc is inaccurate in this way: _____%0A- [ ] This is a doc addition request.%0A- [ ] I have a fix to the document that I can paste below including example: input and output. %0A%0AIf you have a troubleshooting or support issue, use the following resources:%0A%0A - Ask OpenStack: http://ask.openstack.org%0A - The mailing list: http://lists.openstack.org%0A - IRC: 'openstack' channel on Freenode%0A%0A---------------------------------%0ARelease:%2012.0.1.dev11%20on%202018-03-07%2021:05%0ASHA:%2043df2709acbdce86686a40b75fd34e96880427d0%0ASource:%20https://git.openstack.org/cgit/openstack/neutron/tree/doc/source/admin/config-dvr-ha-snat.rst%0AURL: https://docs.openstack.org/neutron/queens/admin/config-dvr-ha-snat.html&field.tags=doc)

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Neutron 12.0.1

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