Service subnets

« (config-subnet-pools.html) » (config-trunking.html) (https://bugs.launchpad.net/neutron/+filebug?field.title=Service%20subnets%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-service-subnets.rst%0AURL: https://docs.openstack.org/neutron/queens/admin/config-service-subnets.html&field.tags=doc)

UPDATED: 2018-03-07 21:05

Service subnets enable operators to define valid port types for each subnet on a network without limiting networks to one subnet or manually creating ports with a specific subnet ID. Using this feature, operators can ensure that ports for instances and router interfaces, for example, always use different subnets.

Operation¶

Define one or more service types for one or more subnets on a particular network. Each service type must correspond to a valid device owner within the port model in order for it to be used.

During IP allocation, the IPAM (config-ipam.html#config-ipam) driver returns an address from a subnet with a service type matching the port device owner. If no subnets match, or all matching subnets lack available IP addresses, the IPAM driver attempts to use a subnet without any service types to preserve compatibility. If all subnets on a network have a service type, the IPAM driver cannot preserve compatibility. However, this feature enables strict IP allocation from subnets with a matching device owner. If multiple subnets contain the same service type, or a subnet without a service type exists, the IPAM driver selects the first subnet with a matching service type. For example, a floating IP agent gateway port uses the following selection process:

- **`network:floatingip_agent_gateway`**
- **`None`**

> **Note**
>
> Ports with the device owner **`network:dhcp`** are exempt from the above IPAM logic for subnets with **`dhcp_enabled`** set to **`True`**. This preserves the existing automatic DHCP port creation behaviour for DHCP-enabled subnets.

Creating or updating a port with a specific subnet skips this selection process and explicitly uses the given subnet.

Usage¶

> **Note**
>
> Creating a subnet with a service type requires administrative privileges.

Example 1 - Proof-of-concept¶

This following example is not typical of an actual deployment. It is shown to allow users to experiment with configuring service subnets.

1. Create a network.

```
$ openstack network create demo-net1
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | UP                                   |
| availability_zone_hints   |                                      |
| availability_zones        |                                      |
| description               |                                      |
| headers                   |                                      |
| id                        | b5b729d8-31cc-4d2c-8284-72b3291fec02 |
| ipv4_address_scope        | None                                 |
| ipv6_address_scope        | None                                 |
| mtu                       | 1450                                 |
| name                      | demo-net1                            |
| port_security_enabled     | True                                 |
| project_id                | a3db43cd0f224242a847ab84d091217d     |
| provider:network_type     | vxlan                                |
| provider:physical_network | None                                 |
| provider:segmentation_id  | 110                                  |
| revision_number           | 1                                    |
| router:external           | Internal                             |
| shared                    | False                                |
| status                    | ACTIVE                               |
| subnets                   |                                      |
| tags                      | []                                   |
+---------------------------+--------------------------------------+
```

2. Create a subnet on the network with one or more service types. For example, the **compute:nova** service type enables instances to use this subnet.

```
$ openstack subnet create demo-subnet1 --subnet-range 192.0.2.0/24 \
  --service-type 'compute:nova' --network demo-net1
+-------------------+--------------------------------------+
| Field             | Value                                |
+-------------------+--------------------------------------+
| id                | 6e38b23f-0b27-4e3c-8e69-fd23a3df1935 |
| ip_version        | 4                                    |
| cidr              | 192.0.2.0/24                         |
| name              | demo-subnet1                         |
| network_id        | b5b729d8-31cc-4d2c-8284-72b3291fec02 |
| revision_number   | 1                                    |
| service_types     | ['compute:nova']                     |
| tags              | []                                   |
| tenant_id         | a8b3054cc1214f18b1186b291525650f     |
+-------------------+--------------------------------------+
```

3. Optionally, create another subnet on the network with a different service type. For example, the **compute:foo** arbitrary service type.

```
$ openstack subnet create demo-subnet2 --subnet-range 198.51.100.0/24 \
  --service-type 'compute:foo' --network demo-net1
+-------------------+--------------------------------------+
| Field             | Value                                |
+-------------------+--------------------------------------+
| id                | ea139dcd-17a3-4f0a-8cca-dff8b4e03f8a |
| ip_version        | 4                                    |
| cidr              | 198.51.100.0/24                      |
| name              | demo-subnet2                         |
| network_id        | b5b729d8-31cc-4d2c-8284-72b3291fec02 |
| revision_number   | 1                                    |
| service_types     | ['compute:foo']                      |
| tags              | []                                   |
| tenant_id         | a8b3054cc1214f18b1186b291525650f     |
+-------------------+--------------------------------------+
```

4. Launch an instance using the network. For example, using the **cirros** image and **m1.tiny** flavor.

```
$ openstack server create demo-instance1 --flavor m1.tiny \
  --image cirros --nic net-id=b5b729d8-31cc-4d2c-8284-72b3291fec02
+--------------------------------------+------------------------------------------------+
| Field                                | Value                                          |
+--------------------------------------+------------------------------------------------+
| OS-DCF:diskConfig                    | MANUAL                                         |
| OS-EXT-AZ:availability_zone          |                                                |
| OS-EXT-SRV-ATTR:host                 | None                                           |
| OS-EXT-SRV-ATTR:hypervisor_hostname  | None                                           |
| OS-EXT-SRV-ATTR:instance_name        | instance-00000009                              |
| OS-EXT-STS:power_state               | 0                                              |
| OS-EXT-STS:task_state                | scheduling                                     |
| OS-EXT-STS:vm_state                  | building                                       |
| OS-SRV-USG:launched_at               | None                                           |
| OS-SRV-USG:terminated_at             | None                                           |
| accessIPv4                           |                                                |
| accessIPv6                           |                                                |
| addresses                            |                                                |
| adminPass                            | Fn85skabdxBL                                   |
| config_drive                         |                                                |
| created                              | 2016-09-19T15:07:42Z                           |
| flavor                               | m1.tiny (1)                                    |
| hostId                               |                                                |
| id                                   | 04222b73-1a6e-4c2a-9af4-ef3d17d521ff           |
| image                                | cirros (4aaec87d-c655-4856-8618-b2dada3a2b11)  |
| key_name                             | None                                           |
| name                                 | demo-instance1                                 |
| os-extended-volumes:volumes_attached | []                                             |
| progress                             | 0                                              |
| project_id                           | d44c19e056674381b86430575184b167               |
| properties                           |                                                |
| security_groups                      | [{u'name': u'default'}]                        |
| status                               | BUILD                                          |
| updated                              | 2016-09-19T15:07:42Z                           |
| user_id                              | 331afbeb322d4c559a181e19051ae362               |
+--------------------------------------+------------------------------------------------+
```

5. Check the instance status. The **Networks** field contains an IP address from the subnet having the **compute:nova** service type.

```
$ openstack server list
+--------------------------------------+-----------------+---------+---------------------+
| ID                                   | Name            | Status  | Networks            |
+--------------------------------------+-----------------+---------+---------------------+
| 20181f46-5cd2-4af8-9af0-f4cf5c983008 | demo-instance1  | ACTIVE  | demo-net1=192.0.2.3 |
+--------------------------------------+-----------------+---------+---------------------+
```

Example 2 - DVR configuration¶

The following example outlines how you can configure service subnets in a DVR-enabled deployment, with the goal of minimizing public IP address consumption. This example uses three subnets on the same external network:

- 192.0.2.0/24 for instance floating IP addresses
- 198.51.100.0/24 for floating IP agent gateway IPs configured on compute nodes
- 203.0.113.0/25 for all other IP allocations on the external network

This example uses again the private network, **demo-net1** (b5b729d8-31cc-4d2c-8284-72b3291fec02) which was created in Example 1 - Proof-of-concept.

1. Create an external network:

```
$ openstack network create --external demo-ext-net
```

2. Create a subnet on the external network for the instance floating IP addresses. This uses the **network:floatingip** service type.

```
$ openstack subnet create demo-floating-ip-subnet \
  --subnet-range 192.0.2.0/24 --no-dhcp \
  --service-type 'network:floatingip' --network demo-ext-net
```

3. Create a subnet on the external network for the floating IP agent gateway IP addresses, which are configured by DVR on compute nodes. This will use the **network:floatingip_agent_gateway** service type.

```
$ openstack subnet create demo-floating-ip-agent-gateway-subnet \
  --subnet-range 198.51.100.0/24 --no-dhcp \
  --service-type 'network:floatingip_agent_gateway' \
  --network demo-ext-net
```

4. Create a subnet on the external network for all other IP addresses allocated on the external network. This will not use any service type. It acts as a fall back for allocations that do not match either of the above two service subnets.

```
$ openstack subnet create demo-other-subnet \
  --subnet-range 203.0.113.0/25 --no-dhcp \
  --network demo-ext-net
```

5. Create a router:

```
$ openstack router create demo-router
```

6. Add an interface to the router on demo-subnet1:

```
$ openstack router add subnet demo-router demo-subnet1
```

7. Set the external gateway for the router, which will create an interface and allocate an IP address on demo-ext-net:

```
$ neutron router-gateway-set demo-router demo-ext-net
```

8. Launch an instance on a private network and retrieve the neutron port ID that was allocated. As above, use the **cirros** image and **m1.tiny** flavor:

```
$ openstack server create demo-instance1 --flavor m1.tiny \
  --image cirros --nic net-id=b5b729d8-31cc-4d2c-8284-72b3291fec02
$ openstack port list --server demo-instance1
+--------------------------------------+------+-------------------+-----------------------------------------------------+--------+
| ID                                   | Name | MAC Address       | Fixed IP Addresses                                  | Status |
+--------------------------------------+------+-------------------+-----------------------------------------------------+--------+
| a752bb24-9bf2-4d37-b9d6-07da69c86f19 |      | fa:16:3e:99:54:32 | ip_address='203.0.113.130',                         | ACTIVE |
|                                      |      |                   | subnet_id='6e38b23f-0b27-4e3c-8e69-fd23a3df1935' |        |
+--------------------------------------+------+-------------------+-----------------------------------------------------+--------+
```

9. Associate a floating IP with the instance port and verify it was allocated an IP address from the correct subnet:

```
$ openstack floating ip create --port \
  a752bb24-9bf2-4d37-b9d6-07da69c86f19 demo-ext-net
+---------------------+--------------------------------------+
| Field               | Value                                |
+---------------------+--------------------------------------+
| fixed_ip_address    | 203.0.113.130                        |
| floating_ip_address | 192.0.2.12                           |
| floating_network_id | 02d236d5-dad9-4082-bb6b-5245f9f84d13 |
| id                  | f15cae7f-5e05-4b19-bd25-4bb71edcf3de |
| port_id             | a752bb24-9bf2-4d37-b9d6-07da69c86f19 |
| project_id          | d44c19e056674381b86430575184b167     |
| revision_number     | 1                                    |
| router_id           | 5a8ca19f-3703-4f81-bc29-db6bc2f528d6 |
| status              | ACTIVE                               |
| tags                | []                                   |
+---------------------+--------------------------------------+
```

10. As the *admin* user, verify the neutron routers are allocated IP addresses from their correct subnets. Use **openstack port list** to find ports associated with the routers.

    First, the router gateway external port:

```
$ neutron port-show f148ffeb-3c26-4067-bc5f-5c3dfddae2f5
+-----------------------+-------------------------------------------------------------------------------+
| Field                 | Value                                                                         |
+-----------------------+-------------------------------------------------------------------------------+
| admin_state_up        | UP                                                                            |
| device_id             | 5a8ca19f-3703-4f81-bc29-db6bc2f528d6                                          |
| device_owner          | network:router_gateway                                                        |
| extra_dhcp_opts       |                                                                               |
| fixed_ips             | ip_address='203.0.113.11',                                                    |
|                       | subnet_id='67c251d9-2b7a-4200-99f6-e13785b0334d'                              |
| id                    | f148ffeb-3c26-4067-bc5f-5c3dfddae2f5                                          |
| mac_address           | fa:16:3e:2c:0f:69                                                             |
| network_id            | 02d236d5-dad9-4082-bb6b-5245f9f84d13                                          |
| revision_number       | 1                                                                             |
| project_id            |                                                                               |
| status                | ACTIVE                                                                        |
| tags                  | []                                                                            |
+-----------------------+-------------------------------------------------------------------------------+
```

    Second, the router floating IP agent gateway external port:

```
$ neutron port-show a2d1e756-8ae1-4f96-9aa1-e7ea16a6a68a
+-----------------------+--------------------------------------------------------------------------------+
| Field                 | Value                                                                          |
+-----------------------+--------------------------------------------------------------------------------+
| admin_state_up        | UP                                                                             |
| device_id             | 3d0c98eb-bca3-45cc-8aa4-90ae3deb0844                                           |
| device_owner          | network:floatingip_agent_gateway                                               |
| extra_dhcp_opts       |                                                                                |
| fixed_ips             | ip_address='198.51.100.10',                                                    |
|                       | subnet_id='67c251d9-2b7a-4200-99f6-e13785b0334d'                               |
| id                    | a2d1e756-8ae1-4f96-9aa1-e7ea16a6a68a                                           |
| mac_address           | fa:16:3e:f4:5d:fa                                                              |
| network_id            | 02d236d5-dad9-4082-bb6b-5245f9f84d13                                           |
| project_id            |                                                                                |
| revision_number       | 1                                                                              |
| status                | ACTIVE                                                                         |
| tags                  | []                                                                             |
+-----------------------+--------------------------------------------------------------------------------+
```

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UPDATED: 2018-03-07 21:05

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