DNS integration

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This page serves as a guide for how to use the DNS integration functionality of the Networking service. The functionality described covers DNS from two points of view:

- The internal DNS functionality offered by the Networking service and its interaction with the Compute service.
- Integration of the Compute service and the Networking service with an external DNSaaS (DNS-as-a-Service).

Users can control the behavior of the Networking service in regards to DNS using two attributes associated with ports, networks, and floating IPs. The following table shows the attributes available for each one of these resources:

Resource	dns_name	dns_domain
Ports	Yes	Yes
Networks	No	Yes
Floating IPs	Yes	Yes

> **⊘ Note**
>
> The **DNS Integration** extension enables all the attribute and resource combinations shown in the previous table, except for **dns_domain** for ports, which requires the **dns_domain for ports** extension.

> **⊘ Note**
>
> Since the **DNS Integration** extension is a subset of **dns_domain for ports**, if **dns_domain** functionality for ports is required, only the latter extension has to be configured.

> **⊘ Note**
>
> When the **dns_domain for ports** extension is configured, **DNS Integration** is also included when the Neutron server responds to a request to list the active API extensions. This preserves backwards API compatibility.

The Networking service internal DNS resolution¶

The Networking service enables users to control the name assigned to ports by the internal DNS. To enable this functionality, do the following:

1. Edit the **/etc/neutron/neutron.conf** file and assign a value different to **openstacklocal** (its default value) to the **dns_domain** parameter in the **[default]** section. As an example:

```
dns_domain = example.org.
```

2. Add **dns** (for the **DNS Integration** extension) or **dns_domain_ports** (for the **dns_domain for ports** extension) to **extension_drivers** in the **[ml2]** section of **/etc/neutron/plugins/ml2/ml2_conf.ini**. The following is an example:

```
[ml2]
extension_drivers = port_security,dns_domain_ports
```

After re-starting the **neutron-server**, users will be able to assign a **dns_name** attribute to their ports.

> **⊘ Note**
>
> The enablement of this functionality is prerequisite for the enablement of the Networking service integration with an external DNS service, which is described in detail in DNS integration with an external service (config-dns-int-ext-serv.html#config-dns-int-ext-serv).

The following illustrates the creation of a port with **my-port** in its **dns_name** attribute.

> **⊘ Note**
>
> The name assigned to the port by the Networking service internal DNS is now visible in the response in the **dns_assignment** attribute.

```
$ neutron port-create my-net --dns-name my-port
Created a new port:
+-----------------------+-----------------------------------------------------------------------------+
| Field                 | Value                                                                       |
+-----------------------+-----------------------------------------------------------------------------+
| admin_state_up        | True                                                                        |
| allowed_address_pairs |                                                                             |
| binding:vnic_type     | normal                                                                      |
| device_id             |                                                                             |
| device_owner          |                                                                             |
| dns_assignment        | {"hostname": "my-port", "ip_address": "192.0.2.67", "fqdn": "my-port.example.org."} |
| dns_name              | my-port                                                                     |
| fixed_ips             | {"subnet_id":"6141b474-56cd-430f-b731-71660bb79b79", "ip_address": "192.0.2.67"}    |
| id                    | fb3c10f4-017e-420c-9be1-8f8c557ae21f                                        |
| mac_address           | fa:16:3e:aa:9b:e1                                                           |
| name                  |                                                                             |
| network_id            | bf2802a0-99a0-4e8c-91e4-107d03f158ea                                        |
| port_security_enabled | True                                                                        |
| revision_number       | 1                                                                           |
| security_groups       | 1f0ddd73-7e3c-48bd-a64c-7ded4fe0e635                                        |
| status                | DOWN                                                                        |
| tenant_id             | d5660cb1e6934612a01b4fb2fb630725                                            |
+-----------------------+-----------------------------------------------------------------------------+
```

When this functionality is enabled, it is leveraged by the Compute service when creating instances. When allocating ports for an instance during boot, the Compute service populates the **dns_name** attributes of these ports with the **hostname** attribute of the instance, which is a DNS sanitized version of its display name. As a consequence, at the end of the boot process, the allocated ports will be known in the dnsmasq associated to their networks by their instance **hostname**.

The following is an example of an instance creation, showing how its **hostname** populates the **dns_name** attribute of the allocated port:

```
$ openstack server create --image cirros --flavor 42 \
  --nic net-id=37aaff3a-6047-45ac-bf4f-a825e56fd2b3 my_vm
+-------------------------------------+-----------------------------------------------------------+
| Field                               | Value                                                     |
+-------------------------------------+-----------------------------------------------------------+
| OS-DCF:diskConfig                   | MANUAL                                                     |
| OS-EXT-AZ:availability_zone         |                                                           |
| OS-EXT-STS:power_state              | 0                                                         |
| OS-EXT-STS:task_state               | scheduling                                                |
| OS-EXT-STS:vm_state                 | building                                                  |
| OS-SRV-USG:launched_at              | -                                                         |
| OS-SRV-USG:terminated_at            | -                                                         |
| accessIPv4                          |                                                           |
| accessIPv6                          |                                                           |
| adminPass                           | dB45Zvo8Jpfe                                              |
| config_drive                        |                                                           |
| created                             | 2016-02-05T21:35:04Z                                      |
| flavor                              | m1.nano (42)                                              |
| hostId                              |                                                           |
| id                                  | 66c13cb4-3002-4ab3-8400-7efc2659c363                      |
| image                               | cirros-0.3.5-x86_64-uec(b9d981eb-d21c-4ce2-9dbc-dd38f3d9015f) |
| key_name                            | -                                                         |
| locked                              | False                                                     |
| metadata                            | {}                                                        |
| name                                | my_vm                                                     |
| os-extended-volumes:volumes_attached | []                                                       |
| progress                            | 0                                                         |
| security_groups                     | default                                                   |
| status                              | BUILD                                                     |
| tenant_id                           | d5660cb1e6934612a01b4fb2fb630725                          |
| updated                             | 2016-02-05T21:35:04Z                                      |
| user_id                             | 8bb6e578cba24e7db9d3810633124525                          |
+-------------------------------------+-----------------------------------------------------------+

$ neutron port-list --device_id 66c13cb4-3002-4ab3-8400-7efc2659c363
+--------------------------------------+------+-------------------+-----------------------------------------------------
| id                                   | name | mac_address       | fixed_ips
+--------------------------------------+------+-------------------+-----------------------------------------------------
| b3ecc464-1263-44a7-8c38-2d8a52751773 |      | fa:16:3e:a8:ce:b8 | {"subnet_id": "277eca5d-9869-474b-960e-6da5951d09f7", "ip_address": "203.0
|                                      |      |                   | {"subnet_id": "eab47748-3f0a-4775-a09f-b0c24bb64bc4", "ip_address":"2001:d
+--------------------------------------+------+-------------------+-----------------------------------------------------

$ neutron port-show b3ecc464-1263-44a7-8c38-2d8a52751773
+------------------------+----------------------------------------------------------------------------------+
| Field                  | Value                                                                            |
+------------------------+----------------------------------------------------------------------------------+
| admin_state_up         | True                                                                             |
| allowed_address_pairs  |                                                                                  |
| binding:vnic_type      | normal                                                                           |
| device_id              | 66c13cb4-3002-4ab3-8400-7efc2659c363                                             |
| device_owner           | compute:None                                                                     |
| dns_assignment         | {"hostname": "my-vm", "ip_address": "203.0.113.8", "fqdn": "my-vm.example.org."} |
|                        | {"hostname": "my-vm", "ip_address": "2001:db8:10::8", "fqdn": "my-vm.example.org."} |
| dns_name               | my-vm                                                                            |
| extra_dhcp_opts        |                                                                                  |
| fixed_ips              | {"subnet_id": "277eca5d-9869-474b-960e-6da5951d09f7", "ip_address": "203.0.113.8"} |
|                        | {"subnet_id": "eab47748-3f0a-4775-a09f-b0c24bb64bc4", "ip_address": "2001:db8:10::8"} |
| id                     | b3ecc464-1263-44a7-8c38-2d8a52751773                                             |
| mac_address            | fa:16:3e:a8:ce:b8                                                                |
| name                   |                                                                                  |
| network_id             | 37aaff3a-6047-45ac-bf4f-a825e56fd2b3                                             |
| port_security_enabled  | True                                                                             |
| revision_number        | 1                                                                                |
| security_groups        | 1f0ddd73-7e3c-48bd-a64c-7ded4fe0e635                                             |
| status                 | ACTIVE                                                                           |
| tags                   | []                                                                               |
| tenant_id              | d5660cb1e6934612a01b4fb2fb630725                                                 |
+------------------------+----------------------------------------------------------------------------------+
```

In the above example notice that:

- The name given to the instance by the user, **my_vm**, is sanitized by the Compute service and becomes **my-vm** as the port's **dns_name**.
- The port's **dns_assignment** attribute shows that its FQDN is **my-vm.example.org.** in the Networking service internal DNS, which is the result of concatenating the port's **dns_name** with the value configured in the **dns_domain** parameter in **neutron.conf**, as explained previously.
- The **dns_assignment** attribute also shows that the port's **hostname** in the Networking service internal DNS is **my-vm**.
- Instead of having the Compute service create the port for the instance, the user might have created it and assigned a value to its **dns_name** attribute. In this case, the value assigned to the **dns_name** attribute must be equal to the value that Compute service will assign to the instance's **hostname**, in this example **my-vm**. Otherwise, the instance boot will fail.

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