



## Day 2 Operations

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## Data Plane Verification

### Data Plane Verification Overview

This chapter describes how to verify the Cisco ACI plugin for OpenStack has been installed correctly, how to test basic connectivity of an OpenStack instance with its default gateway and with the externally created network.

### Prerequisite

Before you get started, make sure that you have met the following prerequisites:

- Make sure the commands are executed sourcing the keystone file for the project where you want to create the network constructs and instance.
- Make sure one external network called external-network-shared has already been created as a shared resource for any OpenStack project.
- Make sure Nova already has a pre-defined flavor in order to create instances.
- Make sure Glance already has a pre-defined with an image to boot instances.

### Creating a Neutron Network

This section describes how to create a Neutron network.

#### Procedure

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- Step 1** Create a Neutron network, enter the following command:

```
$ openstack network create test_net
```

Sample output:

Field	Value
admin_state_up	UP
availability_zone_hints	
availability_zone	
created_at	2018-07-24T20:32:27z
description	
dns_domain	None
id	016b9885-c8ac-4a2d-be7e-e5203c945ba4
ipv4_address_scope	None
ipv6_address_scope	None
is_default	None
mtu	1500
name	test_net
port_security_enabled	True
project_id	7d0be879a12c47ae9c0a26d3fd4407d1
provider:network_type	opflex
provider:physical_type	physnet1
provider:segmentation_id	None
qos_policy_id	None
revision_number	3
router:external	Internal
segments	None
shared	False
status	ACTIVE
subnets	
updated_at	2018-07-24T20:32:27Z

Similarly, ACI fabric, it should be possible to verify that in the corresponding tenant the EPG and BD with the Neutron network name have been defined like in

**Step 2** Verify the EPG and BD with the Neutron network name have been defined.

- In the APIC GUI, on the menu bar, choose **Tenants > tenant\_name > Application Profiles > OpenStack > Application EPGs > EPG\_name**. Check if the EPG has been defined.
- In the APIC GUI, on the menu bar, choose **Tenants > tenant\_name > Networking > Bridge Domains > BD\_name**. Check if the BD has been defined.

## Creating a Neutron Subnet

This section describes how to create a Neutron Subnet.

### Procedure

Create a Neutron subnet and bound to the network previously created, enter the following CLI command:

#### Example:

```
openstack subnet create --network test_net --gateway 192.168.1.254 \
--subnet-range 192.168.1.0/24 subnet01
```

Sample output:

Field	Value
allocation_pools	192.168.1.1-192.168.1.253
cidr	192.168.1.0/24
created_at	2018-07-24T20:37:03Z
description	
dns_nameservers	
enable_dhcp	True
gateway_ip	192.168.1.254
host_routes	
id	d3341f6d-5fbc-476e-a0b7-d0e1b546eba4
ip_version	4
ipv6_address_mode	None
ipv6_ra_mode	None
name	subnet01
network_id	016b9885-c8ac-4a2d-be7e-e5203c945ba4
project_id	7d0be879a12c47ae9c0a26d3fd4407d1
revision_number	2
segment_id	None
service_types	
subnetpool_id	None
updated_at	2018-07-24T20:37:03Z

This command will not result in any change on ACI. The subnet is not yet attached to any router and this is not enabled for L3 routing. Therefore the ACI bridge domain keeps not having any subnet associated yet.

## Creating a Neutron Router

This section describes how to create a Neutron router.

### Procedure

**Step 1** Create a Neutron router, enter the following CLI command:

#### Example:

```
openstack router create router01
```

Sample output:

Field	Value
admin_state_up	UP
availability_zone_hints	None
availability_zone	None
created_at	2018-07-24T20:44:11Z
description	
distributed	False
external_gateway_info	None
flavor_id	None
ha	False
id	236734ab-c39e-4ad7-a9ab-c0d1fb03691a
name	router01
project_id	7d0be879a12c47ae9c0a26d3fd4407d1
revision_number	None
routes	None

```
| status | ACTIVE |
| updated_at | 2018-07-24T20:41:11Z |
+-----+
```

This command creates an ACI contract in the ACI Common tenant. The OpenStack routers are in fact rendered as ‘permit IP any any’ type of contracts in ACI. The contracts are always placed in the Common tenant and then applied as consumer and provider to all the EPG created Neutron networks, which subnets are bound to that router.

**Step 2** Verify that the contract created in the Common ACI tenant.

In the APIC GUI, on the menu bar, choose **Tenants > common > Tenant Common > Contracts > Standards > router\_name**. Check if the router has been defined.

## Bind the Subnet to the Router

This section describes how to bind the subnet to the router.

### Procedure

**Step 1** Enable routing on the neutron network created, enter the following CLI command:

**Example:**

```
openstack router add subnet router01 subnet01
```

As a result, on APIC a VRF called DefaultRouterVRF will be created. The BD will be bound to this VRF and also the Neutron subnet will be created as BD subnet.

**Step 2** Verify the VRF called DefaultRouterVRF was created, BD was bounded to the VRF and also the Neutron subnet was created as BD subnet.

- a) In the APIC GUI, on the menu bar, choose **Tenants > tenant\_name > Networking > Bridge Domains > BD\_name > Subnets > subnet**. Check if the subnet has been defined.
- b) In the APIC GUI, on the menu bar, choose **Tenants > tenant\_name > VRFs > DefaultRoutedVRF (DefaultVRF)**. Check if the DefaultRouterVRF has been defined.

## Set a Gateway to the Router

This section describes how to set a gateway to the router.

### Procedure

**Step 1** In order to provide external connectivity from OpenStack domain to an external router, it is necessary to set a gateway for the OpenStack router previously created. The following command assumes that an external network defined as external-net-shared exists already and can be consumed by the OpenStack project:

**Example:**

```
openstack router set --external-gateway external-net-shared router01
```

**Step 2** Verify that the L3out was created.

In the APIC GUI, on the menu bar, choose **Tenants > tenant\_name > Networking > External Routed Networks > l3out1-DefaultVRF (l3out1-DefaultVRF)**. Check if the l3out1-DefaultVRF has been defined.

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## Creating an Instance and Attach its NIC to the Network Previously Created

This section describes how to create an instance and attach its NIC to the network perviously created.

### Procedure

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**Step 1** Now that network is created and configured to be routable to the external router, an OpenStack instance can be created and attached to the Neutron network to verify the connectivity. Create a Nova VM, enter the following CLI command:

**Example:**

```
NET1=$(openstack network list | awk '/test_net/ {print $2}')
nova boot --flavor ml.tiny --image cirros --nic net-id=$NET1 vm1
```

**Step 2** Verify the VM vm1 is visible under the EPG test\_net Operational tab.

In the APIC GUI, on the menu bar, choose **Tenants > tenant\_name > Application Profiles > EPG\_name > Application EPGs > EPG**. Click on the Operational tab in the pane. Check if the VM is visible. The IP address should be correctly sensed by APIC.

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## Verifying through ICMP that the VM is Correctly Connected to the Rest of the Infrastructure

This section describes how to verify through ICMP that the VM is correctly connected to the rest of the infrastructure.

### Procedure

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Verify that ICMP connectivity from the VM to its default gateway and to an external IP is reachable through the L3out, enter the following CLI commands:

**Example:**

```
$ ifconfig eth0
$ ping 192.168.1.254
```

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## Changing DNS Parameters or Static Routes

When you update the Domain Name System (DNS) parameters or static routes for a subnet, you must take extra steps to make the changes visible at a particular port or instance. We recommend that you use one of the two following sets of steps:

- Associate and then disassociate the affected port with a dummy security group.

A dummy security group is an extra security group that you add to any security groups already configured on the port. The dummy security group does not need to contain any rules.

- Set the administrative state of the affected port to down, and then set the state to up.

Either set of steps triggers an update notification for the port, which allows the port to start using the changed parameters.