

JUNIPER TECHFEST 2019  
ENTERPRISE MULTICLOUD – DC FABRIC  
HANDS-ON LAB – SOLUTION GUIDE

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*Simple, Open, and Smart.*



# INTRODUCTION

The goal of the present lab session is to get a hands-on experience on the EM (Enterprise Multicloud) 5.1 fabric manager for the baseline networking capabilities implementation such as deploying the Edge-Routed-Bridging brownfield fabric overlay, implementing Virtual-Port-Groups for BMS server connectivity, Logical-Routers, L2 VXLAN gateway signalized by EVPN. The following are the high level and ultimate goals of the present lab session.

## EVPN-VXLAN ERB – HANDS ON LAB HIGH LEVEL GOALS

### Engineering simplicity

- The contrail EM 5.1 based virtual-network, logical router definition, virtual-port-group helps in simplifying the day to day operations on the dc fabric.

### DC agility

- In the enterprise data center success demands agility. Introducing automation is an excellent start, but for real agility we need orchestration—the ability to abstract tasks into a concert of workflows.

### Legacy and new workloads smooth integration

- The hands-on lab exercises ultimate goal is to integrate the legacy (BMS) and new data center workloads (VMs) using the unified data center network infrastructure

## EVPN-VXLAN ERB – HANDS ON LAB ULTIMATE GOALS

- L2 communication between BMS1 and BMS2 - they should reside in the same virtual-network with VLAN-VNIs, ESIs allocated dynamically by contrail
- L3 symmetric inter-vni communication should be used and take place only at the leafs, delivering full IP reachability between all BMSs and VMs with route-targets, RD automatically assigned by contrail
- L2 VXLAN gateway for BMS1 to VM2 (on compute-node server 3/4) should allow for communication between the BMS1 and the VM2 using the same subnet/broadcast domain using EVPN instead of OVSDB

## Lab topology

QFX credentials:  
root/Juniper1!

server login:  
root/c0ntrail123

EM 5.1 dashboard login:  
admin/contrail123

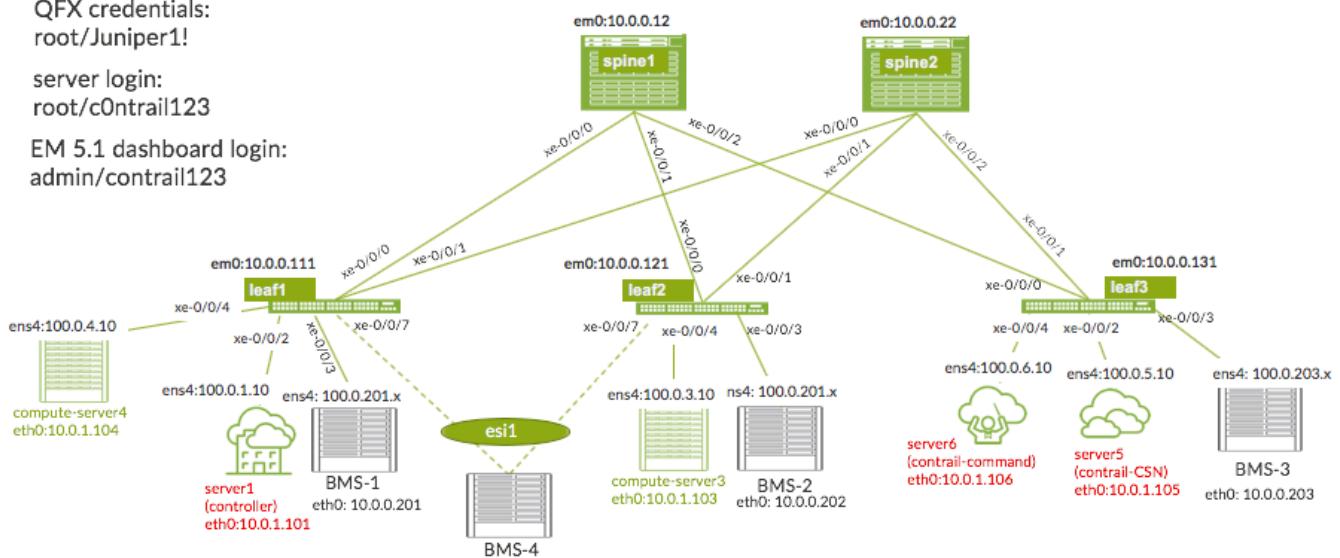


Figure 1 EM 5.1. for DC fabrics - main lab topology

The following diagram gives an overview of the flows between the EM main dashboard (server6) and the config API (server1)

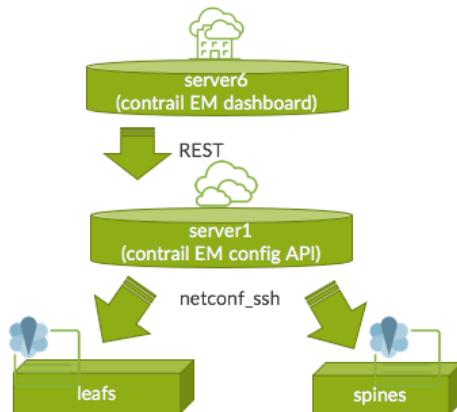


Figure 2 EM 5.1 - high level flow diagram

## Lab access

The lab topology is delivered within the Ravello Oracle cloud system. Every user gets his own virtual lab setup as per the main topology diagram.

The Oracle Ravello cloud system URL will be allowing to get the nodes IP addresses and ravello login/password are on the printed lab material student gets during the in-person hands-on lab session.

You can ssh using putty or secure-crt with the dns names or IP@ listed in ravello interface using your internet connectivity

- the lab vqfx device access info: root and Juniper1!
- the contrail EM dashboard login/password is: admin and contrail123
- the servers ssh access login/password is: root and c0ntrail123

## Lab objectives

The goal of the present lab is to build the overlay **Edge Routed Bridging** fabric architecture using the Juniper QFX series EVPN-VXLAN technologies in order to deliver L2 active/active forwarding within the datacenter between the BMS servers and VMs.

The ZTP process was already conducted for the present fabric so the first step is to onboard the devices from the topology and create an overlay iBGP fabric.

The iBGP EVPN sign. overlay will be used in order to advertise the MAC@ and MAC+IP in DC-1 and EVPN-type5 between the DC1 and DC2.

The inter-vni tenant routing will be taking place at the leaf1/leaf2/leaf3 level only i.e. spines should not be provisioned with any tenant information but should play the role of Route Reflectors and IP Forwarders between the leafs

The ultimate goal of the present lab is to deliver:

- L2 communication between BMS1 and BMS2 - they should reside in the same virtual-network with VLAN-VNIs allocated dynamically by contrail
- L3 inter-vni communication should be symmetric and take place only at the leafs
- L2 VXLAN gateway for BMS1 to VM2 (on compute-server-3) should allow to communicate between the BMS1 and the VM2 using the same subnet

## Lab environment

The environment is composed of the following vqfx nodes:

- 2 x vQFX Spines - spine1, spine2
- 3 x vQFX Leafs: leaf1, leaf2, leaf3
- 3 x BMS servers - bms1, bms2, bms3, bms4
- 2 x compute-servers - server3 and server4
- 1 x CSN server - server5
- 1 x controller - server1
- 1 x EM dashboard - server6

The underlay eBGP is already pre-provisioned in order to deliver full IP reachability between the loopback0.0 IP@ of the given IP fabric – loopback0.0 of each node are within the subnet 1.1.1.0/24

All nodes from the lab are accessible via internet, so you can verify each individual node state from your laptop using SSH sessions

Use the username: `root` and password: `Juniper1!`

## Lab tasks

### Task 1.0 Verify the full IPv4 underlay reachability within the [main topology](#)

- Ensure the full IP reachability of your fabric
- Verify the eBGP underlay peering are all in the established state
- verify the contrail container and services are working fine in your lab

*Expected result:*

- two eBGP peerings per leaf device in the Established state,
- Full IP reachability between the lo0.0 IP addresses of each fabric node
- contrail components containers are running at server1 and server6

Note: for contrail UI based verifications you can login to the EM dashboard via

`https://<server6_public_IP_address>:9091`

or to the legacy contrail dashboard

`https://<server1_public_IP_address>:8143`

login/password is: `admin/contrail123`

- the servers ssh access login/password are: `root` and `c0ntrail123`

When ssh'ed into the contrail server1/server6 or the compute-nodes/CSN you can verify the baseline status by running the `contrail-status` command or by checking the state of the contrail containers `docker ps`

You can check the type of containers running on server1 vs server6 and the containers running on the compute-nodes server3/server4/server5(CSN)

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### Task 1.1 Deploy the overlay iBGP EVPN network using the BGP ASN 64512

- Discover the devices as based on the given range of subnet 10.0.0.0/24
- Associate the devices with the roles
- Deploy the overlay

*Expected result:*

- The leaf and spine devices are discovered and each device is associated with the Edge-Routed architecture roles
- Spines1/2 should have role: null (aka Lean Spine) and Route-Reflector
- Leaf1/2/3 should have the role: ERB-UCAST-Gateway

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### Task 1.2 Verify the iBGP peering is established between all the leafs and spines route reflectors

- Using the "show bgp summary" command make sure all leafs have a total of four BGP peerings - two for underlay and two for overlay

*Expected results:*

- four BGP peerings are in the Established state - two for the underlay and two for the overlay

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### Task 1.3 Enable the Virtual-Network1-2 used for BMS-1 and BMS-2 communication

- Go to the Overlay EM 5.1 dashboard and enable new Virtual-Network used for BMS1 and BMS2 in the subnet range 100.0.201.0/24

*Expected result:* The new Virtual-Network is created but not yet pushed to the leaf devices

*Ask yourself:* why the virtual-network is not pushed to the leaf devices in this case ?

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## Task 1.4 Create two VPG-1 and VPG-2 ports: one for BMS1 at leaf1 and one for BMS2 at leaf2 - use the interfaces from the topology diagram

- Go to the Overlay -> Virtual-Port-Group option of the EM dashboard and create two VPG ports associated with the virtual-network created in the previous task

*Expected result:* The virtual-network VLAN and IRB configuration is pushed to the leaf1 and leaf2. BMS1 can ping BMS2 and EVPN based MAC@ learning is taking place

*Ask yourself:*

- did you have to enable any VNI or VLAN ?
  - are the new virtual-network configurations enabled on all leafs or just selected leafs ?
- 

## Task 1.5 Create a new Virtual-network for BMS3

- Go to the Overlay EM 5.1 dashboard and enable new Virtual-Network used for BMS3 in the range 100.0.203.0/24

*Expected result:* The new Virtual-Network is not yet pushed to the leaf devices but is successfully created in the contrail config API

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## Task 1.6 Create third VPG-3 ports for BMS3 at leaf3

- Go to the Overlay -> Virtual-Port-Group option of the EM dashboard and create two VPG ports associated with the virtual-network created for BMS3 in the previous task

*Expected result:* The virtual-network VLAN and IRB configuration is pushed to the leaf3 only BMS3 cannot ping the BMS1 and BMS2

## Task 1.7 Create a VPG-4 which will be ready to connect in the future the BMS-4 connected to leaf1 xe-0/0/7 and leaf2 xe-0/0/7

- Go to the Overlay -> Virtual-Port-Group option of the EM dashboard and create two VPG ports associated with the same virtual-network as used by BMS-1 and BMS-2

*Expected result:* interfae xe-0/0/7 on leaf1 and leaf2 should be part of a new ESI-LAG, ESI and LACP system-id values of the new ESI-LAG should be allocated automatically by the Fabric Manager

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## Task 1.8 Create a new Logical-Router in order to communicate between the BMS1/2 and BMS3

- integrate the BMS1 and BMS3 virtual-networks under the same logical-router

- Go to the Overlay -> Logical Router dashboard option and create a new Logical Router name that associates the two Virtual-Networks enabled in previous tasks
- Specify at which leaf devices the logical router (T5 instance) should be enabled Note: before enabling the logical-routers make sure in the EM 5.1 the vxlan-routing capability is explicitly enabled in the given fabric project

The screenshot shows the Contrail Command interface with the 'Users' tab selected. On the left, there's a navigation bar with 'Domains', 'Projects' (which is selected), 'Users', and 'RBAC'. The main area shows a table of users with columns for NAME, DESCRIPTION, and ROLES. One user, 'admin', is listed with roles 'admin' and 'heat\_stack\_owner'. To the right of the table is a sidebar with sections for 'Settings' and 'Tags'. The 'Settings' section contains 'Security Policy Draft (Beta)' (disabled) and 'VxLAN Routing' (enabled). The 'Tags' section lists Application, Deployment, Site, Tier, and Labels, each with a value of '-'.

Note: the BMS-1/BMS-2 will have to get the static route for BMS-3 subnet and BMS-3 will have to get the static route for BMS-1/2 subnet You can add the routes by going to the BMS-1/2 and BMS-3 console and adding it: route add -net 100.0.203.0/24 gw 100.0.201.1 on BMS-1 and BMS-2 route add -net 100.0.201.0/24 gw 100.0.203.1 on BMS-3

*Expected result:*

- BMS3 is able to ping BMS1/2
- T5 instance is pushed dynamically to BMS1/2/3 when new LR is created in contrail EM

## Task 1.9 Ensure the CSN is onboarded using server5 and services it offers are fully functional

- ensure the DHCP daemon is running at the CSN server
- check what other service are running on that server *Ask yourself:*
- what's the purpose of that server ?
- if we were deploying only the BMSes in the fabric do you still need CSN services ?

## Task 1.10 Check the servers server3 and server4 from the topology are onboarded as compute-nodes (aka vrouters)

- server4 attached to leaf1 and server3 attached to leaf2 are successfully onboarded already so in this task we have to verify the IP full reachability from hypervisor point of view via the fabric underlay is delivered

*Expected result:*

- you can ping from these servers their default gateway
- ping between server3 and server4
- ping from server3/server4 to the CSN server works as well using the in-band network

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## Task 1.11 Using a Cirros linux image enable two VMs in the same virtual-network as BMS-1 and BM-2

Note: before enabling the VMs ensure the local compute-node /etc/hosts file is updated with the IP in-band and hostname. In the current version of the lab this should be already done at the pre-staging phase so adding manually the hosts shouldn't be required anymore.

Here's the example of adding the in-band IP@ at the server3 shell 100.0.3.10 server3 server3 is added manually You'll have to make the same changes for server4 and CSN server5 Here's the example of the change to be done at the server3 - first check the local IP@ of the in-band fabric interface and add it to /etc/hosts file.

```
[root@server3 ~]# vi /etc/hosts
127.0.0.1 localhost localhost.localdomain localhost4 localhost4.localdomain4
10.0.1.101 server1.local server1
::1 localhost localhost.localdomain localhost6 localhost6.localdomain6

10.0.1.104 server4.local server4
10.0.1.105 server5.local server5
10.0.1.102 server2.local server2
10.0.1.103 server3.local server3
100.0.3.10 server3 server3
100.0.4.10 server4 server4
100.0.5.10 server5 server5
100.0.1.10 server1 server1

cd /etc/contrail/vrouter
```

```
[root@server3 ~]# docker-compose down
[root@server3 ~]# docker-compose up -d
```

Repeat the same for the server4 by adding on server4 the local IP@ and server4 name

- VM-1 and VM-2 should be enabled in the already existing virtual-network dedicated to BMS-1 and BMS-2
- upload the cirros image. Using the contrail EM dashboard go to workloads > images and upload the Cirros tiny linux you can first download to your laptop

<https://docs.openstack.org/image-guide/obtain-images.html>

Note: In a CirrOS based VM default login is `cirros` and the password is `gocubsgo`

Note:

- the VM created may need a static arp entry for the BMS due to the vqfx limitation where tunneled arp messages sometimes use vni 0
- make sure the BMSes from the lab are not using as the last octet the IP@ .1 or .2 as these are reserved IP@ - change it to an unused IP@ from the given subnet at the BMS when needed

```
arp -s 100.0.201.12 2c:c2:60:63:51:e4 arp -an
[root@server4 ~]# route -n | grep 169
169.254.0.0      0.0.0.0          255.255.0.0      U      1002    0          0 ens3
169.254.0.3      0.0.0.0          255.255.255.255 UH     0      0          0 vhost0
169.254.0.4      0.0.0.0          255.255.255.255 UH     0      0          0 vhost0
[root@server4 ~]#
[root@server4 ~]# ssh cirros@169.254.0.3
cirros@169.254.0.3's password:
$
```

*Expected result:*

- BMS1 can ping the VM-2
- BMS-2 can ping VM-1

## Task 1.12 Create a VM-3 an associate it with the existing virtual-network, created already for the BMS-3

*Expected result:*

- VM-3 can ping the BMS-3
- VM-3 can ping BMS-1

*Ask yourself:*

- which part of the routing is at the vrouter and which at the qfx leaf device ?

### Implementation details:

- The fabric discovery network: 10.0.0.0/24

- Overlay iBGP ASN number: 64512
- BMS1 and BMS2 virtual network IP@ range: 100.0.201.30-100.0.201.45 subnet mask /24
- BMS3 virtual network IP@ range: 100.0.203.30-100.0.203.45 subnet mask /24
- BMS4 virtual network IP@ range: 100.0.204.30-100.0.204.45 subnet mask /24
- use the fabric, virtual-network, VPG and LR names that are significant for you as the fabric administrator

## Solution guide for EVPN/VXLAN lab

### 1.0 Verify the full IP reachability between the fabric nodes

- Using the Ravello system provided leafs and spines IP@ verify using the SSH access the full IP reachability between the loopbacks and eBGP peerings are fully operations within the global routing table

#### 1.1 Auto-discovery of the fabric nodes role assignment

- Check the IP@ of your server6 and connect to the EM 5.1. main dashboard from the Safari or Firefox browser
- Log into the EM 5.1 aka CEM fabric management tool



**Log in**

Select Cluster

DemoLab-34e661d0-51a3-4dd2-a4a3-5f34faec80... ▾

Username

admin

Password

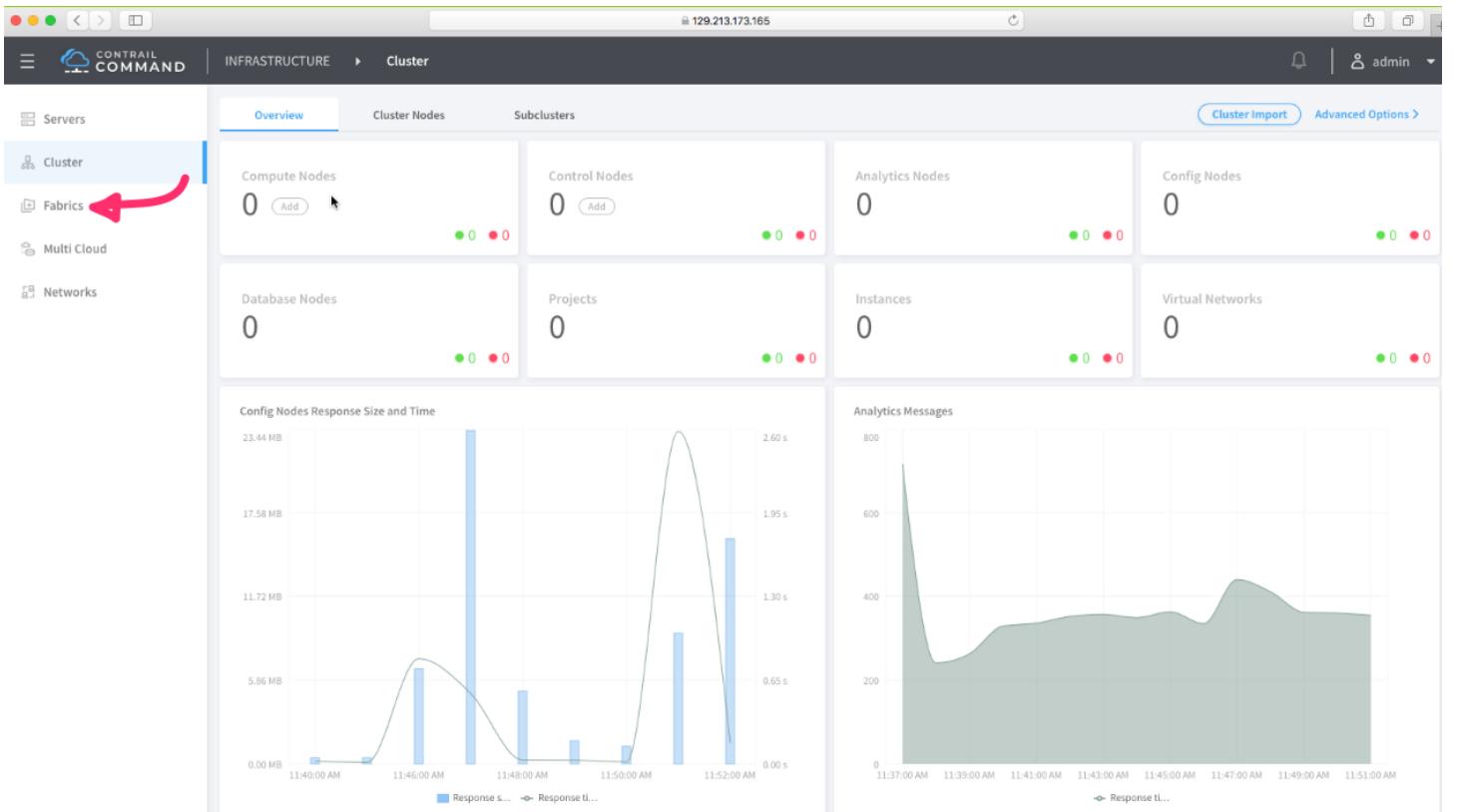
admin/contrail123

Log in

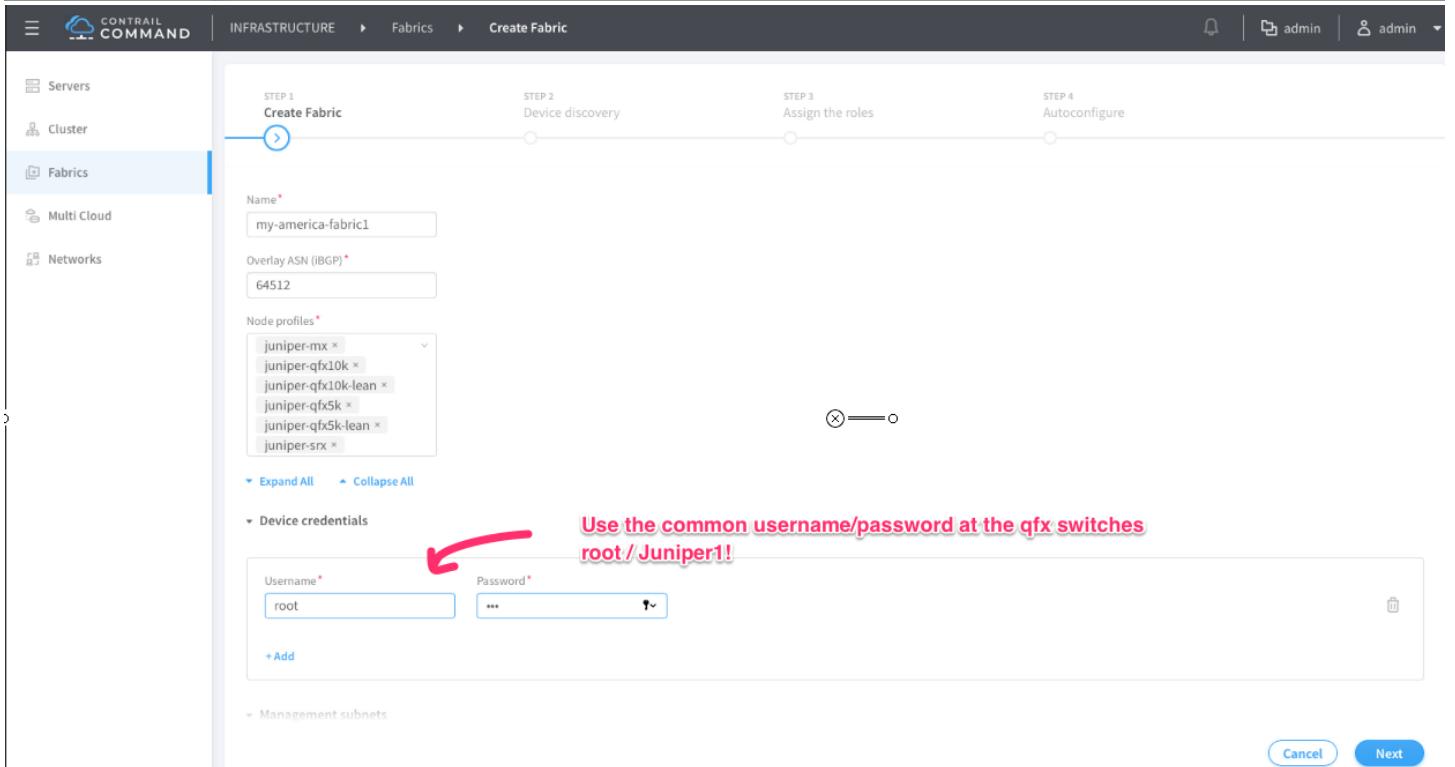
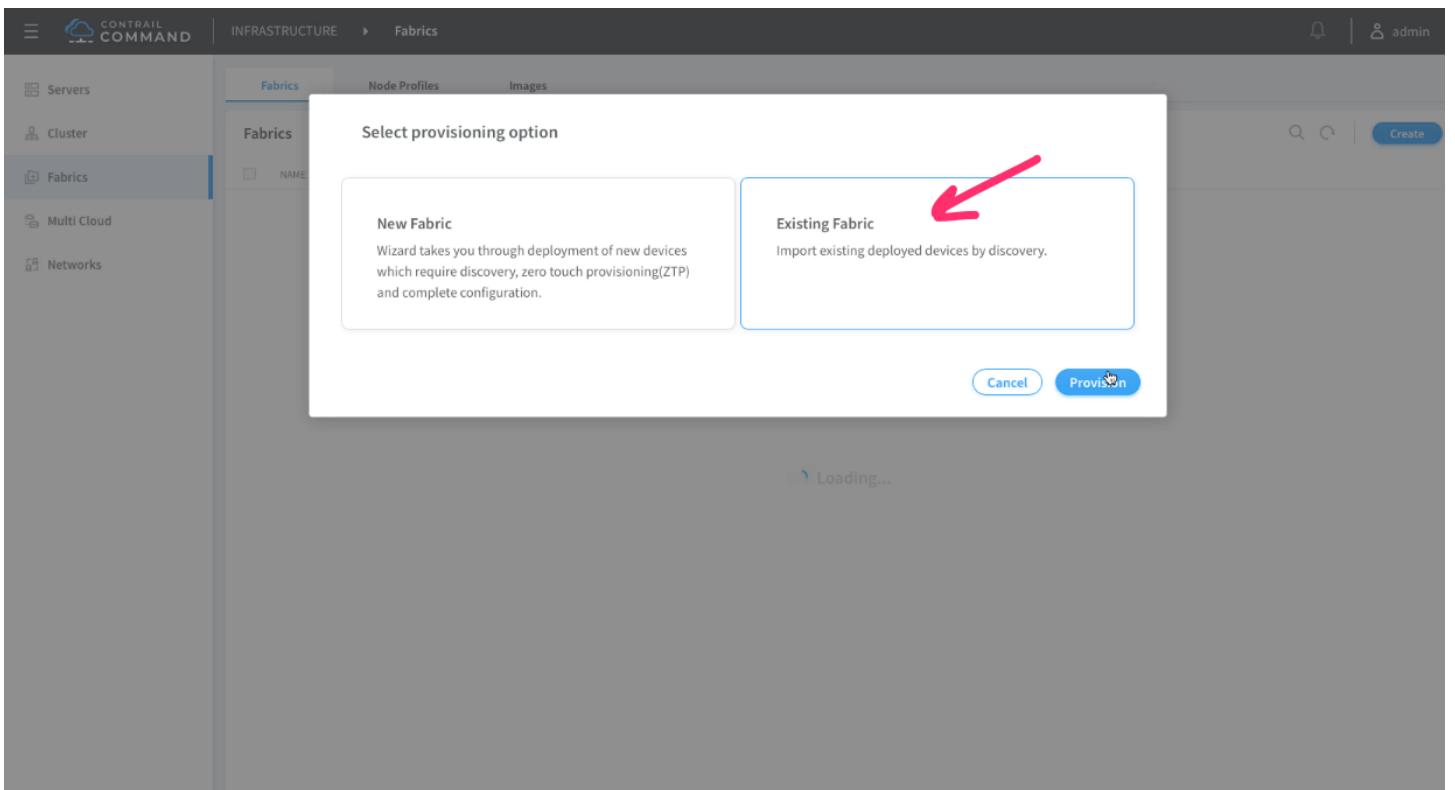
Select the demo lab domain

A red arrow points from the text "Select the demo lab domain" to the dropdown menu labeled "DemoLab-34e661d0-51a3-4dd2-a4a3-5f34faec80... ▾".

- Once logged-in go to the fabric tab of the EM 5.1 dashboard



- Then select the “Existing Fabric” option aka ‘Brownfield’ and click ‘Provision’



- Use the OOB management subnet that should be used for the auto discovery of the devices

STEP 1 Create Fabric      STEP 2 Device discovery      STEP 3 Assign the roles      STEP 4 Autoconfigure

**Device credentials**

Username\*  Password\*

**Management subnets**

CIDR\*  Gateway

In the present  
Lab the Gateway IP is not  
needed

**Advanced interface filters**

**Additional configuration**

Cancel Next

- Enable the fabric loopbacks subnet 1.1.1.0/24

STEP 1 Create Fabric      STEP 2 Device discovery      STEP 3 Assign the roles      STEP 4 Autoconfigure

**Advanced interface filters**

**Underlay ASNs (eBGP)**

**Fabric subnets**

**Loopback subnets**

CIDR\*

In the present  
Lab the Gateway IP is not  
needed

**PNF Servicechain subnets**

Cancel Next

- Fabric on boarding should start which will take around 3-5 minutes

The screenshot shows the Contrail Command interface for creating a new fabric. The top navigation bar includes 'CONTRAIL COMMAND', 'INFRASTRUCTURE', 'Fabrics', 'Create Fabric', and user information ('admin'). The left sidebar lists 'Servers', 'Cluster', 'Fabrics' (which is selected), 'Multi Cloud', and 'Networks'. The main content area displays a four-step wizard: 'STEP 1 Create Fabric' (completed), 'STEP 2 Device discovery' (in progress, indicated by a blue circle with a dot and a right-pointing arrow), 'STEP 3 Assign the roles' (not yet started), and 'STEP 4 Autoconfigure' (not yet started). Below the steps is a table titled 'Discovered devices' with columns: NAME, MANAGEMENT IP, PRODUCT NAME, STATUS, and INTERFACES. The status for all devices listed is 'ONBOARDED'. To the right is a 'Device discovery progress' section with a message: 'This might take a while, please wait...'. A notification box at the bottom right states: 'Fabric Onboarding job for my-america-fabric1 has started'.

- The devices should be first onboarded and then the role assignment phase will start

This screenshot continues from the previous one, showing the progress of the device discovery step. The 'Discover devices' table now lists five devices: leaf1, leaf2, leaf3, spine1, and spine2, all with the 'ONBOARDED' status. The 'Device discovery progress' section contains log entries for the onboarding process, including messages about physical interface creation and playbook execution. A red arrow points to a message box at the bottom right: 'Fabric Onboarding job for my-america-fabric1 has finished'.

- Select the onboarded leafs and assign the leaf roles

INFRASTRUCTURE > Fabrics > Create Fabric

STEP 1 Create Fabric    STEP 2 Device discovery    STEP 3 Assign the roles    STEP 4 Autoconfigure

**Assign to devices**

| NAME                                      | MANAGEMENT IP | NODE PROFILE   | ROLE    | ROUTING ROLES | AUTOCONFIGURE |
|---|---------------|----------------|---------|---------------|---------------|
| <input checked="" type="checkbox"/> leaf1 | 10.0.0.5      | juniper-qfx10k | -       | -             | False         |
| <input checked="" type="checkbox"/> leaf2 | 10.0.0.8      | juniper-qfx10k | -       | -             | False         |
| <input checked="" type="checkbox"/> leaf3 | 10.0.0.3      | juniper-qfx10k | -       | -             | False         |
| <input type="checkbox"/> spine1           | 10.0.0.12     | juniper-qfx10k | X --- O | -             | False         |
| <input type="checkbox"/> spine2           | 10.0.0.7      | juniper-qfx10k | -       | -             | False         |

3 items selected | Select all | Deselect all

Previous | Cancel | Autoconfigure | Assign Role

INFRASTRUCTURE > Fabrics > Create Fabric

STEP 1 Create Fabric    STEP 2 Device discovery

**Assign to devices**

| NAME                                      | MANAGEMENT IP | NODE PROFILE   | ROUTING ROLES | AUTOCONFIGURE |
|---|---------------|----------------|---------------|---------------|
| <input checked="" type="checkbox"/> leaf1 | 10.0.0.5      | juniper-qfx10k | -             | False         |
| <input checked="" type="checkbox"/> leaf2 | 10.0.0.8      | juniper-qfx10k | -             | False         |
| <input checked="" type="checkbox"/> leaf3 | 10.0.0.3      | juniper-qfx10k | -             | False         |
| <input type="checkbox"/> spine1           | 10.0.0.12     | juniper-qfx10k | X --- O       | -             |
| <input type="checkbox"/> spine2           | 10.0.0.7      | juniper-qfx10k | -             | False         |

3 items selected | Select all | Deselect all

**Assign role to 3 devices**

Physical Role: leaf

Routing Bridging Roles:

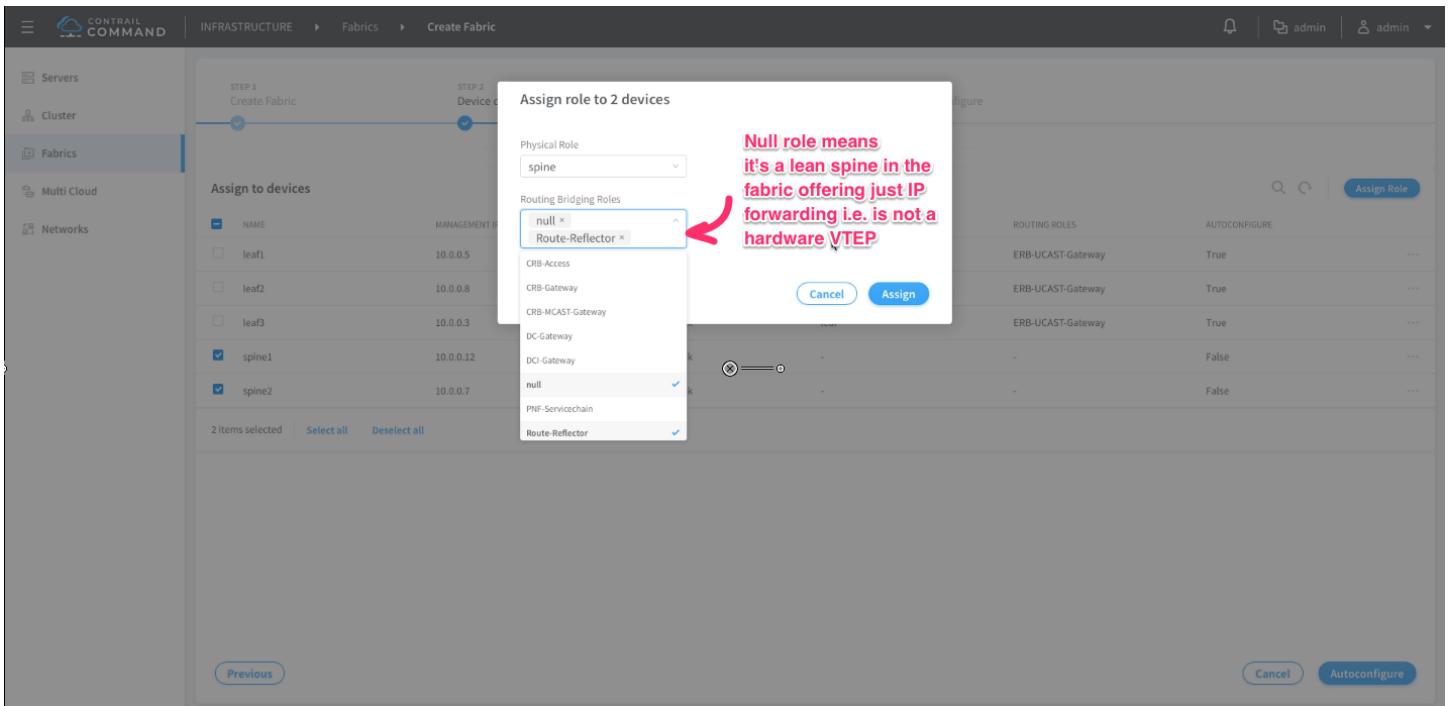
- ERB-UCAST-Gateway
- CRB-Access
- CRB-Gateway
- CRB-MCAST-Gateway
- DC-Gateway
- DCI-Gateway
- ERB-UCAST-Gateway
- PNF-Servicchain
- Route-Reflector

**Leaf role to be used for Edge Routed fabric architecture**

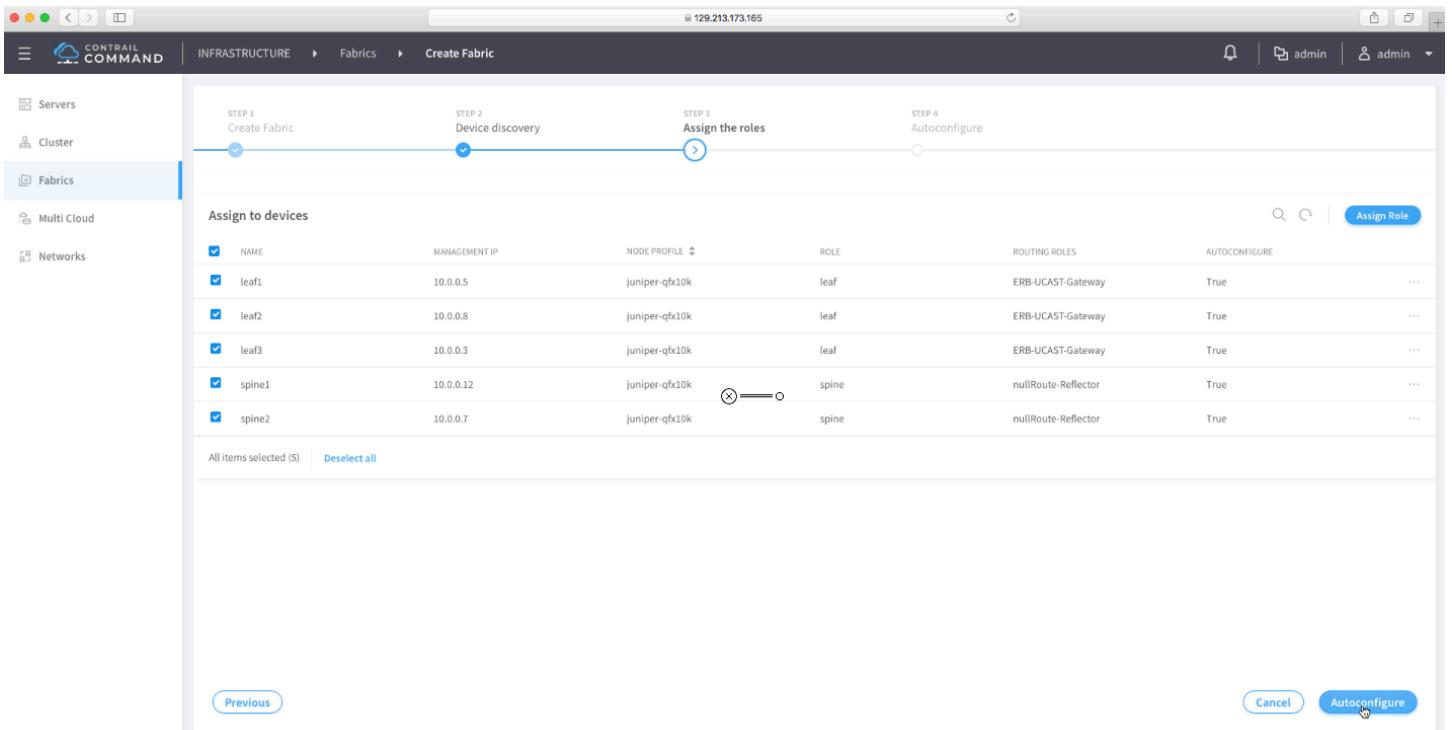
Cancel | Assign Role

Previous | Cancel | Autoconfigure

- Select and assign the spine roles in the Edge Routed architecture



- Then proceed to ‘autoconfigure’ the new ERB fabric



- The log from the tasks execution should show up in the dashboard

The screenshot shows the Contrail Command interface for creating a fabric. The top navigation bar includes 'INFRASTRUCTURE', 'Fabrics', and 'Create Fabric'. On the left, a sidebar lists 'Servers', 'Cluster', 'Fabrics' (which is selected), and 'Multi Cloud'. The main area displays a progress bar with four steps: 'STEP 1 Create Fabric' (complete), 'STEP 2 Device discovery' (complete), 'STEP 3 Assign the roles' (in progress), and 'STEP 4 Autoconfigure' (in progress). Below the progress bar is a table titled 'Discovered devices' listing five devices: leaf1, leaf2, leaf3, spine1, and spine2. To the right is an 'Autoconfigure progress' section showing log entries for role assignment. A red arrow points to a success message at the bottom right: 'Fabric Autoconfiguring job for my-americafabric1 has finished'.

This screenshot is identical to the one above, showing the 'Create Fabric' wizard at Step 4: Autoconfigure. The 'Autoconfigure progress' section shows the job has completed successfully. A red arrow points to the 'Finish' button at the bottom right, which is overlaid with the text 'You can click 'Finish!''.

- The roles should be at that moment associated with the given leafs and spines

The screenshot shows the Contrail Command interface for managing a fabric. On the left, a sidebar lists 'Cluster', 'Fabrics', 'Multi Cloud', and 'Networks'. The main area displays 'Fabric devices' with columns: NAME, MANAGEMENT IP, LOOPBACK IP, VENDOR NAME, PRODUCT NAME, ROLE, ROUTING BRID..., and INTERFACES. The devices listed are leaf1, leaf2, leaf3, spine1, and spine2. A red bracket groups leaf1, leaf2, and leaf3. To the right, a 'Namespaces' section shows 'management-subnets' with value '10.0.0.0/24' and 'cidr' highlighted. Below it is a 'Device Credentials' section.

| NAME   | MANAGEMENT IP | LOOPBACK IP | VENDOR NAME | PRODUCT NAME | ROLE  | ROUTING BRID... | INTERFACES |
|--------|---------------|-------------|-------------|--------------|-------|-----------------|------------|
| leaf1  | 10.0.0.5      | 1.1.1.11    | Juniper     | vqfx-10000   | leaf  | ERB-UCAST...    | 13         |
| leaf2  | 10.0.0.8      | 1.1.1.12    | Juniper     | vqfx-10000   | leaf  | ERB-UCAST...    | 13         |
| leaf3  | 10.0.0.3      | 1.1.1.13    | Juniper     | vqfx-10000   | leaf  | ERB-UCAST...    | 13         |
| spine1 | 10.0.0.12     | 1.1.1.1     | Juniper     | vqfx-10000   | spine | null,Route-R... | 13         |
| spine2 | 10.0.0.7      | 1.1.1.2     | Juniper     | vqfx-10000   | spine | null,Route-R... | 13         |

| NAME               | VALUE       |
|--------------------|-------------|
| management-subnets | 10.0.0.0/24 |
| cidr               |             |
| overlay_ibgp_asn   | 64512 ASN   |

### 1.3. Create a virtual-network for BMS-1 to BMS-2 communication:

The screenshot shows the Contrail Command interface with a red arrow pointing to the 'Overlay' section in the navigation menu. The 'Overlay' section includes sub-options: Virtual Networks, Virtual Port Group, Network Policies, Multicast Policies, Logical Routers, Security Groups, Floating IPs, IPAM, Routing, Service Groups, Address Groups, Policies, and Policy Sets. To the right, a table lists clusters with their names and rules.

| CLUSTER NAME | CLUSTER RULES |
|--------------|---------------|
| DemoLab      | 8             |
| DemoLab      | 4             |
| DemoLab      | 2             |
| DemoLab      | 2             |
| DemoLab      | 1             |
|              | 0             |

This is optional.  
It can be blank.  
default will allow all

| OVERLAY > Virtual Networks |            | admin   admin |                |
|----------------------------|------------|---------------|----------------|
| All networks               |            | Summary       |                |
| NAME                       | INTERFACES | INSTANCES     | SUBNETS        |
| bms1-to-bms2               | 0          | 0             | 100.0.201.0/24 |

- At that stage because we didn't specify which leaf port is allocated with the virtual-network the JunOS configurations won't be pushed to the leafs yet

## 1.4. Enable the VPG1 for BMS1 at leaf1 and VPG2 for BMS2 at leaf2 and associate the virtual-network created in previous task

The screenshot shows the Contrail Command interface with the 'OVERLAY' tab selected. In the sidebar, under 'Virtual Networks', the 'Virtual Port Group' option is highlighted. The main content area displays a summary of resources: 1 Virtual Network, 0 Logical Routers, 0 Instances, and 1 Network Policy. Below the summary, there are sections for 'Virtual Networks', 'Instances', 'Domains', 'Projects', 'Images', 'Users', 'SSH Keys', 'RBAC', 'Logical Routers', 'Security Groups', 'Floating IPs', 'IPAM', 'Routing', and 'DCI'. A red arrow highlights the 'Virtual Networks' section.

- Associate the VPG port name my-vpg-bms1 with the physical interface connected to BMS-1 as per the topology diagram

The screenshot shows the 'Create Virtual Port Group' page. The 'Virtual Port Group Name' field contains 'my-vpg-bms1'. Under 'VLAN', 'VLAN id' is set to 1 and 'TOR Port VLAN id' is set to 4094. The 'Display Name' is 'my-vpg-bms1-4094'. The 'Network' dropdown is set to 'bms1-to-bms2' and the 'Security Groups' dropdown is set to 'default'. In the 'Available Physical Interface' section, a red checkmark is placed next to 'xe-0/0/3'. In the 'Assigned Physical Interface' section, 'xe-0/0/3' is listed under 'leaf1'. At the bottom, there are 'Create' and 'Cancel' buttons.

- Once you clicked on 'create' the leaf1 should enable the dynamically allocated VLAN with the port and the IRB configuration for the same Virtual-Network will be also pushed

```

root@leaf1> show ethernet-switching interface xe-0/0/3
Routing Instance Name : default-switch
Logical Interface flags (DL - disable learning, AD - packet action drop,
                           LH - MAC limit hit, DN - interface down,
                           MMAS - Mac-move action shutdown, AS - Autostate-exclude enabled,
                           SCTL - shutdown by Storm-control, MI - MAC+IP limit hit)

Logical          Vlan      TAG    MAC     MAC+IP   STP    Logical       Tagging
interface        members   limit   limit   state    interface flags
xe-0/0/3.0      bd-6      8192   8192   1024    Forwarding
                                         4094   1024

{master:0}
root@leaf1> show interfaces irb terse routing-instance all
Interface      Admin Link Proto      Local           Instance
irb.6          up    up    inet      100.0.201.1/24
                                         default

{master:0}
root@leaf1>

```

- Then repeat the same task for the BMS-2 to leaf-2 connectivity by creating a dedicated VPG port name and associating the physical interfaces from the selected leaf device

The screenshot shows the Contrail Command interface for creating a Virtual Port Group (VPG). The left sidebar has tabs for Virtual Networks, Virtual Port Group (selected), Network Policies, Multicast Policies, Logical Routers, Security Groups, Floating IPs, IPAM, Routing, Ports, and DCI. The main area shows the 'Create Virtual Port Group' screen. It includes fields for 'Virtual Port Group Name' (my-vpg2-bms2), 'VLAN' settings (VLAN id: 1, TOR Port VLAN id: 4094, Display Name: my-vpg2-bms2-4094), 'Network' (Auto Display Name: bms1-to-bms2, Network: bms1-to-bms2, Security Groups: default), and 'Fabric' (Fabric name: my-americafabric1). Below these are sections for 'Available Physical Interface' (listing 'xe-0/0/3', 'spine2', 'leaf2', 'spine1', and 'leaf3') and 'Assigned Physical Interface' (empty). A note with a red arrow points to the 'Available Physical Interface' list with the text: 'Click here to select the given port and leaf device'.

- Associate the my-vpg2-bms2 port name my-vpg-bms2 with the physical interface connected to BMS-2 as per the topology diagram

Virtual Port Group Name\*  
my-vpg2-bms-2

VLAN  
VLAN id\* 1 TOR Port VLAN id\* 4094 Display Name\* my-vpg2-bms-2-4094 Auto Display Name Network\* bms1-to-bms2 Security Groups default

+Add Fabric name\* my-americafabric1

Available Physical Interface  
DISPLAY NAME PHYSICAL ROUTER  
xe-0/0/3 spine2  
xe-0/0/3 spine1  
xe-0/0/3 leaf3

Assigned Physical Interface  
DISPLAY NAME PHYSICAL ROUTER  
xe-0/0/3 leaf2

Once the xe-0/0/3 is selected for leaf2  
Click on Create button

Create Cancel

- At that stage both BMS-1 and BMS-2 VPG ports should be created and the BMS-1 to BMS-2 ping should work

Virtual Port Group

| NAME          | VLAN IDS | TOR PORT VLAN IDS | PHYSICAL INTERFACES | VIRTUAL NETWORK |
|---------------|----------|-------------------|---------------------|-----------------|
| my-vpg-bms1   |          | 4094              | xe-0/0/3:leaf1      | bms1-to-bms2    |
| my-vpg2-bms-2 |          | 4094              | xe-0/0/3:leaf2      | bms1-to-bms2    |

- Here are the example of on how to verify if the given port was provisioned with the given bridge-domain bd-6 ( it can be a different value as the bd-id and vlan are dynamically allocated for the given virtual-network)

```

root@leaf2> show ethernet-switching interface xe-0/0/3
Routing Instance Name : default-switch
Logical Interface flags (DL - disable learning, AD - packet action drop,
                         LH - MAC limit hit, DN - interface down,
                         MMAS - Mac-move action shutdown, AS - Autostate-exclude enabled,
                         SCTL - shutdown by Storm-control, MI - MAC+IP limit hit)

Logical      Vlan      TAG   MAC    MAC+IP STP      Logical      Tagging
interface   members      limit  limit  state      interface flags
xe-0/0/3.0      bd-6      8192  8192
                           4094  1024  1024  Forwarding      untagged
                                         untagged

{master:0}
root@leaf2>

{master:0}
root@leaf2> show interfaces irb terse routing-instance all
Interface      Admin Link Proto      Local          Instance
irb.6          up     up    inet      100.0.201.1/24
                                         default

{master:0}
root@leaf2>
root@leaf2> show vlans

Routing instance      VLAN name      Tag      Interfaces
default-switch        bd-6          4094
                                         vtep.32769*
                                         xe-0/0/3.0*

{master:0}
root@leaf2>

root@leaf1> show ethernet-switching vxlan-tunnel-end-point remote ip 1.1.1.12
MAC flags (S -static MAC, D -dynamic MAC, L -locally learned, C -Control MAC
           SE -Statistics enabled, NM -Non configured MAC, R -Remote PE MAC , P -Pinned MAC)

Logical system  : <default>
Routing instance : default-switch
Bridging domain : bd-6+4094, VLAN : 4094
VXLAN ID : 6, Multicast Group IP : 0.0.0.0
Remote VTEP : 1.1.1.12, Nexthop ID : 1772
  MAC          MAC      Logical      Remote VTEP
  address      flags    interface    IP address
  2c:c2:60:42:5d:cc  D       vtep.32769  1.1.1.12

{master:0}
root@leaf1>

```

```

root@leaf2> show ethernet-switching vxlan-tunnel-end-point remote ip 1.1.1.11

MAC flags (S -static MAC, D -dynamic MAC, L -locally learned, C -Control MAC
          SE -Statistics enabled, NM -Non configured MAC, R -Remote PE MAC , P -Pinned MAC)

Logical system : <default>
Routing instance : default-switch
Bridging domain : bd-6+4094, VLAN : 4094
VXLAN ID : 6, Multicast Group IP : 0.0.0.0
Remote VTEP : 1.1.1.11, Nexthop ID : 1771

{master:0}
root@leaf2>

root@leaf1> show ethernet-switching table

MAC flags (S - static MAC, D - dynamic MAC, L - locally learned, P - Persistent static
          SE - statistics enabled, NM - non configured MAC, R - remote PE MAC, O - ovsdb MAC)

Ethernet switching table : 2 entries, 2 learned
Routing instance : default-switch
  Vlan           MAC             MAC      Logical      Active
  name          address        flags    interface   source
  bd-6          2c:c2:60:42:5d:cc  D       vtep.32769  1.1.1.12
  bd-6          2c:c2:60:63:51:e4  D       xe-0/0/3.0

{master:0}
root@leaf1>

root@leaf1> show route evpn-mac-address 2c:c2:60:42:5d:cc active-path table default-switch.evpn.0

default-switch.evpn.0: 6 destinations, 9 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

2:1.1.1.12:7999::6::2c:c2:60:42:5d:cc/304 MAC/IP
  *[BGP/170] 00:43:57, localpref 100, from 1.1.1.1
    AS path: I, validation-state: unverified
    > to 172.16.0.0 via xe-0/0/0.0
      to 172.16.0.2 via xe-0/0/1.0
2:1.1.1.12:7999::6::2c:c2:60:42:5d:cc::100.0.201.3/304 MAC/IP
  *[BGP/170] 00:43:57, localpref 100, from 1.1.1.1
    AS path: I, validation-state: unverified
    to 172.16.0.0 via xe-0/0/0.0
    > to 172.16.0.2 via xe-0/0/1.0

{master:0}
root@leaf1>

```

- The verification can be also conducted at the BMS1 and BMS2 server level

```
[root@bms1 ~]# ping 100.0.201.3
PING 100.0.201.3 (100.0.201.3) 56(84) bytes of data.
64 bytes from 100.0.201.3: icmp_seq=1 ttl=64 time=2578 ms
64 bytes from 100.0.201.3: icmp_seq=2 ttl=64 time=1579 ms
64 bytes from 100.0.201.3: icmp_seq=3 ttl=64 time=579 ms
64 bytes from 100.0.201.3: icmp_seq=4 ttl=64 time=303 ms
64 bytes from 100.0.201.3: icmp_seq=5 ttl=64 time=316 ms
64 bytes from 100.0.201.3: icmp_seq=6 ttl=64 time=400 ms
64 bytes from 100.0.201.3: icmp_seq=7 ttl=64 time=261 ms
64 bytes from 100.0.201.3: icmp_seq=8 ttl=64 time=374 ms
^C
--- 100.0.201.3 ping statistics ---
9 packets transmitted, 8 received, 11% packet loss, time 8005ms
rtt min/avg/max/mdev = 261.104/799.367/2578.740/785.053 ms, pipe 3
[root@bms1 ~]#
[root@bms2 ~]# tcpdump -i ens4 host 100.0.201.2
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on ens4, link-type EN10MB (Ethernet), capture size 262144 bytes
13:28:31.169094 IP pool-100-0-201-2.bstnma.fios.verizon.net > pool-100-0-201-3.bstnma.fios.verizon.net: ICMP echo request, id 3752, seq 1, length 64
13:28:31.169139 IP pool-100-0-201-3.bstnma.fios.verizon.net > pool-100-0-201-2.bstnma.fios.verizon.net: ICMP echo reply, id 3752, seq 1, length 64
13:28:32.278592 IP pool-100-0-201-2.bstnma.fios.verizon.net > pool-100-0-201-3.bstnma.fios.verizon.net: ICMP echo request, id 3752, seq 2, length 64
13:28:32.278617 IP pool-100-0-201-3.bstnma.fios.verizon.net > pool-100-0-201-2.bstnma.fios.verizon.net: ICMP echo reply, id 3752, seq 2, length 64
^C
4 packets captured
4 packets received by filter
0 packets dropped by kernel
[root@bms2 ~]#
```

## 1.5. Enable the BM3 dedicated new virtual-network and connecting with the existing BMS1 and BMS2 network

- Before enabling the new virtual-network we need to update the network policy to allow the BMS1/2/3 communication

Network Policy

Policy name\*  
my\_allow\_all\_policy

Policy Rule(s)

| Action                     | Protocol                                | Source Type                        | Source                            | Source Port     | Direction | Destination Type |
|----------------------------|---|------------------------------------|-----------------------------------|-----------------|-----------|------------------|
| pass                       | ANY                                     | Cidr                               | 100.0.201.0/24                    | Any             | <>        | Cidr             |
| Destination                | Destination Ports                       |                                    |                                   | Services        |           | QoS              |
| 100.0.201.0/24             | Any                                     |                                    |                                   | Select Services |           | Select QoS       |
| Mirror                     |   |                                    |                                   |                 |           | Log              |
| <input type="radio"/> None | <input type="radio"/> Analyzer Instance | <input type="radio"/> NIC assisted | <input type="radio"/> Analyzer IP |                 |           |                  |

| Action                                    | Protocol          | Source Type | Source         | Source Port     | Direction | Destination Type |
|---|-------------------|-------------|----------------|-----------------|-----------|------------------|
| pass                                      | ANY               | Cidr        | 100.0.201.0/24 | Any             | <>        | Cidr             |
| Destination                               | Destination Ports |             |                | Services        |           | QoS              |
| 100.0.203.0/24                            | Any               |             |                | Select Services |           | Select QoS       |
| <input type="checkbox"/> Advanced Options |                   |             |                |                 |           |                  |

+ Add

Save Cancel

- Then create the new virtual network dedicated to the BMS3

Virtual Networks

Network

Name\*  
bm3-network

Network Policies  
*my\_allow\_all\_policy* \* This is optional policy - it can be blank

Allocation Mode  
User defined subnet only

VxLAN Network Identifier  
1 - 16777215

Subnets

| Network IPAM*                                    | CIDR*                                    | Allocation Pools                        | Gateway*    | Service Address    |
|--|--|---|-------------|--------------------|
| default-domain:default...                        | 100.0.203.0/24                           | 100.0.203.50-100.0.203.100              | 100.0.203.1 | XXX.XXXX.XXXX.XXXX |
| <input checked="" type="checkbox"/> Auto Gateway | <input checked="" type="checkbox"/> DHCP | <input checked="" type="checkbox"/> DNS |             |                    |

+ Add

Host Routes  
+ Add

DNS Servers  
Create Cancel

- At that stage we still don't see any VPG ports associated with the given new virtual-network

The screenshot shows the Contrail Command interface with the 'Virtual Networks' tab selected. The main pane displays a table titled 'All networks' with columns: NAME, INTERFACES, INSTANCES, SUBNETS, and VPGS. Two entries are listed: 'bm3-network' and 'bm1-to-bms2'. The 'bm3-network' entry has 0 interfaces, 0 instances, and a subnet of 100.0.203.0/24. The 'VPGS' column for this entry contains 'my-vpg2-b...', with a red arrow pointing to it. The sidebar on the left lists various network-related categories like Virtual Port Group, Network Policies, Multicast Policies, etc.

## 1.6 Creating the third VPG port for BMS3 at leaf 3

- Now we need to proceed on adding the new VPG port for the BMS3

The screenshot shows the Contrail Command interface with the 'OVERLAY' tab selected. The main pane is titled 'Virtual Networks'. On the left, there's a navigation menu with sections like Monitoring, Infrastructure, Workloads, IAM, and various services. Under 'Infrastructure', the 'Overlay' section is expanded, and 'Virtual Networks' is highlighted with a red arrow. The right side of the screen shows a summary of network resources: 2 Virtual Networks, 0 Logical Routers, 0 Instances, and 1 Network Policies. The sidebar on the left lists categories like Virtual Port Group, Network Policies, Multicast Policies, etc.

- Associate the BMS3 virtual-network created previously with the physical interface on the given leaf3 node and click “create”

Virtual Port Group Name\*: my-vpg3-bm3

VLAN

Server is untagged so we don't tag it at the server to switch port level!

VLAN id\*: 1

TOR Port VLAN id\*: 4094

Display Name\*: my-vpg3-bm3-4094

Auto Display Name: checked

Network\*: bm3-network

Security Groups: default

Fabric name\*: my-america-fabric1

Available Physical Interface: xe-0/0/3

Assigned Physical Interface: xe-0/0/3 (spine3)

Create Cancel

| NAME         | VLAN IDS | TOR PORT VLAN IDS | PHYSICAL INTERFACES | VIRTUAL NETWORK |
|--------------|----------|-------------------|---------------------|-----------------|
| my-vpg-bms1  |          | 4094              | xe-0/0/3:leaf1      | bms1-to-bms2    |
| my-vpg2-bms2 |          | 4094              | xe-0/0/3:leaf2      | bms1-to-bms2    |
| my-vpg3-bm3  |          | 4094              | xe-0/0/3:leaf3      | bm3-network     |

The new VPG port should appear in the list of ports

- The given new VPG should show-up now as being associated with the bms3 virtual-network

The screenshot shows the Contrail Command interface with the 'OVERLAY > Virtual Networks' path selected. On the left, a sidebar lists various network components: Virtual Networks, Virtual Port Group, Network Policies, Multicast Policies, Logical Routers, Security Groups, Floating IPs, IPAM, Routing, Ports, and DCI. The main pane displays a table titled 'All networks' with two entries: 'bm3-network' and 'bms1-to-bms2'. The 'bm3-network' entry has 1 interface, 0 instances, and subnet 100.0.203.0/24, associated with VPG 'my-vpg3-bm3'. The 'bms1-to-bms2' entry has 2 interfaces, 0 instances, and subnet 100.0.201.0/24, associated with VPGs 'my-vpg2-bms2, my-vpg-bms1'. A red arrow points from the 'Create Virtual-network to VPG verification' button at the top right to the 'Virtual-network to VPG verification' section in the center.

```
root@leaf3> show interfaces irb terse
Interface          Admin Link Proto Local
irb                up    up    inet   100.0.203.1/24
```

Remote

```
{master:0}
root@leaf3> show interfaces irb terse routing-instance all
Interface          Admin Link Proto Local
irb.7              up    up    inet   100.0.203.1/24
```

Instance default

```
{master:0}
root@leaf3>
```

```
{master:0}
root@leaf3> show ethernet-switching interface xe-0/0/3
Routing Instance Name : default-switch
Logical Interface flags (DL - disable learning, AD - packet action drop,
                           LH - MAC limit hit, DN - interface down,
                           MMAS - Mac-move action shutdown, AS - Autostate-exclude enabled,
                           SCTL - shutdown by Storm-control, MI - MAC+IP limit hit)
```

| Logical interface | Vlan members | TAG  | MAC limit | MAC+IP limit | STP state  | Logical interface flags | Tagging  |
|-------------------|--------------|------|-----------|--------------|------------|-------------------------|----------|
| xe-0/0/3.0        | bd-7         | 4094 | 1024      | 1024         | Forwarding |                         | untagged |

```
{master:0}
root@leaf3>
```

At that stage the IRB for BMS3 is not associated with any routing-instance so it's present in the global routing-table until we associate it with a Logical-Router in EM dashboard

A new BD-7 was also generated for the BMS3 virtual-network and pushed to the switch once we associated it with the given VPG port

## 1.7. Enable the ESI-LAG for BMS-4 on leaf1/2 using the interface xe-0/0/7 - ensure the ESI value is automatically generated

The screenshot shows the Contrail Command interface for editing a Virtual Port Group (VPG). The VPG is named "vpg-ESI-test". It is assigned to VLAN 1 (TOR Port VLAN id 4094) and has a security group "default". It is associated with the fabric "my-americas-fabric1". On the right, the "Assigned Physical Interface" section shows two interfaces: "xe-0/0/7" on "leaf2" and "xe-0/0/7" on "leaf1". A red bracket groups these two entries. At the bottom, there are "Save" and "Cancel" buttons.

- The following should be the end-result of the VPG multihomed provisioning task

```
root@leaf1> show configuration interfaces xe-0/0/7 |display inheritance |except #
gigether-options {
    802.3ad ae2;
}

{master:0}
root@leaf1> show configuration interfaces ae2 | display inheritance |except #
mtu 9192;
esi {
    00:04:10:2f:39:da:e6:d4:14:00; ↗ Automatically generated ESI
    all-active;
}
aggregated-ether-options {
    lacp {
        active;
        periodic fast;
        system-priority 100;
        system-id 00:41:6d:6e:ad:93; ↗ Automatically generated LACP system-id
        admin-key 1;
    }
}
unit 0 {
    family ethernet-switching {
        interface-mode access;
        vlan {
            members bd-6;
        }
    }
}

{master:0}
root@leaf1>
```

## 1.8. Enable the BMS1/2 to BMS3 communication using the Logical-Router dashboard in EM 5.1

- In order to make sure the BMS1/2 and BMS3 can communicate between each other we'll enable a new logical router which interconnects the BMS1/2 and BMS3 virtual networks. In the Contrail Command click on the Overlay and then Logical-Router option - this will create the routing-instances type-5 at the leafs1/2/3 which glues both virtual-networks

The screenshot shows the Contrail Command interface with the 'OVERLAY' tab selected. The left sidebar has 'Virtual Networks' selected. The main content area shows sections for Monitoring, Infrastructure, Overlay, Workloads, IAM, and Security. Under Overlay, there is a 'Logical Routers' section. A red arrow points from the 'Logical Routers' link in the sidebar to the 'Logical Router' section in the main content area. The right side shows a summary of 2 Virtual Networks, 0 Logical Routers, 0 Instances, and 1 Network Policies.

- Associate the existing virtual-networks with the new Logical-Router name and explicitly define on which devices the logical-router should be enabled in order to allow the BMS1/2 and BMS3 symmetric inter-vni communication

The screenshot shows the Contrail Command interface with the 'Projects' tab selected. The 'admin' project is selected. The 'Users' section is shown with a single user 'admin'. A red arrow points from the 'Add' button in the top right of the user table to the 'VxLAN Routing' setting in the right-hand sidebar. The sidebar also shows 'Settings' for 'Security Policy Draft (Beta)' (disabled) and 'VxLAN Routing' (enabled). The 'Tags' section lists Application, Deployment, Site, Tier, and Labels, all with '-' values.

Name\* my-LR-bms123

Admin State  Up  Down

Extend to Physical Router  
leaf1 x leaf2 x leaf3 x

External Gateway None

Connected networks  
bm3-network x bms1-to-bms2 x

Public Logical Router

NAT

VXLAN Network Identifier 1 - 16777215

Route Target(s)

Click on create in order to enable the BMS1/2 to BMS3 communication via the Logical Router (T5 VRF) and use the symmetric inter-vni routing at the leafs 1/2 and leaf3

Create Cancel

- We should see two router interfaces associated with the given new Logical Router - the two interfaces correspond to two IRBs (irb.6 and irb.7) in the given example

|              | NAME | NETWORKS | INTERFACES |
|--------------|------|----------|------------|
| my-LR-bms123 |      | 0        | 2          |

Details

|                           |                                      |
|---------------------------|--------------------------------------|
| Display Name              | my-LR-bms123                         |
| UUID                      | e54ef401-670a-4ca7-ac3a-311fce4221a8 |
| SNAT                      | Enabled                              |
| Connected                 | -                                    |
| Extend to Physical Router | leaf2, leaf3, leaf1                  |
| Router interface(s)       | 2                                    |
| Route target(s)           | -                                    |

- The following is the end-result of the LR provisioning at the edge routed leaf QFX switch

The IRB.6 and IRB.7 from the two different virtual-networks are now under the common logical-router aka routing-instance

```
root@leaf1> show configuration routing-instances |display inheritance |except #  
_contrail__contrail_lr_internal_vn_5626ab97-2736-4c01-9e95-7785b33ba4c9__-l3-9 {  
    instance-type vrf;  
    interface lo0.1009;  
    interface irb.7;  
    interface irb.6;  
    vrf-import _contrail__contrail_lr_internal_vn_5626ab97-2736-4c01-9e95-7785b33ba4c9__-l3-9-import;  
    vrf-export _contrail__contrail_lr_internal_vn_5626ab97-2736-4c01-9e95-7785b33ba4c9__-l3-9-export;  
    routing-options {  
        rib _contrail__contrail_lr_internal_vn_5626ab97-2736-4c01-9e95-7785b33ba4c9__-l3-9.inet6.0 {  
            multipath;  
        }  
        static {  
            route 172.16.0.1/32 discard;  
        }  
        multipath;  
    }  
    protocols {  
        evpn {  
            ip-prefix-routes {  
                advertise direct-nexthop;  
                encapsulation vxlan;  
                vni 9;  
                export dummy_type5;  
            }  
        }  
    }  
}  
  
{master:0}  
root@leaf1>
```

## 1.9 Verifying compute-node integration - this step is already done so there's no need to integrate it again

Servers

| NAME    | TYPE                  | IP ADDRESS | NODE PROFILE | CLUSTER NAME | CLUSTER ROLES |
|---------|-----------------------|------------|--------------|--------------|---------------|
| server1 | physical/virtual node | 10.0.1.101 |              | DemoLab      | 8             |
| server2 | physical/virtual node | 10.0.1.102 |              | DemoLab      | 4             |
| server3 | physical/virtual node | 10.0.1.103 |              | DemoLab      | 2             |

**Details**

| Type                 | private   | Driver and Ports   |
|----------------------|---|--|
| Name                 | server3   | Ports<br>Name: ens4; IP: 100.0.3.2;<br>Name: ens3; IP: 10.0.1.103; |
| UUID                 | 7aef1ff-a302-427d-80ac-dd3ed4318d9e                                 | Port parent type<br>node   |
| Management Interface | ens3  | Port parent uid<br>7aef1ff-a302-427d-80ac-dd3ed4318d9e             |
| MAC address          | -   |  |
| IP address           | 10.0.1.103  |  |
| Disk Partition(s)    | -   |  |
| Cluster and Roles    |   |  |
| Roles                | openstack_compute_node_back_refs<br>contrail_vrouter_node_back_refs |  |
| Cluster              | DemoLab   |  |

- Loading a cirrus image

Images

| STATUS    | NAME   | OWNER | VISIBILITY | PROTECTED | DISK FORMAT | DISK SIZE |
|-----------|--------|-------|------------|-----------|-------------|-----------|
| green dot | cirros | admin | public     | false     | raw         | 12.13 MB  |

In a CirrOS image, the login account is **cirros**. The password is **gocubsgo**.

- Before enabling the VM also known as ‘instance’ the footprint of the VM called flavor has to be defined

Contrail COMMAND

WORKLOADS > Flavors > Create Flavor

Name\*: my-flavor1

VCPUs\*: 1

RAM (MB)\*: 256

Root Disk (GB)\*: 1

Ephemeral Disk (GB): 0

Swap Disk (MB): 0

RX/TX Factor: 1

Server Type:  Virtual Machine  Baremetal Server

Extra Specs: + Add

Create Cancel

Contrail COMMAND

WORKLOADS > Instances

|                          | STATUS | NAME | STATE | SERVER TYPE | NETWORKS | IP ADDRESSES | CONSOLE |
|--------------------------|--------|------|-------|-------------|----------|--------------|---------|
| <input type="checkbox"/> |        |      |       |             |          |              |         |

Instances

Create

## Baseline troubleshooting of the EM 5.1

- Verifying the containers state at the contrail command server6 and contrail control/config server1

```
[root@server6 ~]# docker ps
```

| CONTAINER ID                             | IMAGE  | COMMAND  | CREATED     | STATUS     | PORTS | NAMES          |
|--|--|--|-------------|------------|-------|----------------|
| d8155e5827ef                             | <a href="#">hub.juniper.net/contrail/contrail-command:5.1.0-0.38</a> | "/bin/contrail -c /etc/contrail/contrail-command.conf" | 4 weeks ago | Up 3 hours |       |                |
| hours                                    | contrail_command   |  |             |            |       |                |
| e709dc7c2509                             | circleci/postgres:10.3-alpine  | "docker-entrypoint.sudo"                               | 4 weeks ago | Up 3 hours |       | contrail_pgsql |
| systemctl status docker.service          |  |  |             |            |       |                |
| docker logs -f contrail_command_deployer |  |  |             |            |       |                |
| docker ps                                |  |  |             |            |       |                |

- The following are the containers running at the Contrail controller server 1 - we can check the container status and count in the following way

```
[root@server1 ~]# docker ps | grep "4 weeks ago"
d47adeb7dde7 hub.juniper.net/contrail-nightly/contrail-analytics-snmp-topology:5.1.0-0.38-queens
43541a653d40 hub.juniper.net/contrail-nightly/contrail-analytics-snmp-collector:5.1.0-0.38-queens
f19d76e08126 hub.juniper.net/contrail-nightly/contrail-nodemgr:5.1.0-0.38-queens
1729728ce4cc hub.juniper.net/contrail-nightly/contrail-analytics-alarm-gen:5.1.0-0.38-queens
b9f507720bf4 hub.juniper.net/contrail-nightly/contrail-control-nodemgr:5.1.0-0.38-queens
a79a0366629 hub.juniper.net/contrail-nightly/contrail-control-kafka:5.1.0-0.38-queens
59359bf121aa hub.juniper.net/contrail-nightly/contrail-analytics-api:5.1.0-0.38-queens
5ddcc91582fd hub.juniper.net/contrail-nightly/contrail-analytics-collector:5.1.0-0.38-queens
054c875ad008 hub.juniper.net/contrail-nightly/contrail-nodemgr:5.1.0-0.38-queens
df1982b867c hub.juniper.net/contrail-nightly/contrail-analytics-query-engine:5.1.0-0.38-queens
800e825fb6c2 hub.juniper.net/contrail-nightly/contrail-nodemgr:5.1.0-0.38-queens
eb84acebd0bb hub.juniper.net/contrail-nightly/contrail-external-cassandra:5.1.0-0.38-queens
e49c943e3415 hub.juniper.net/contrail-nightly/contrail-controller-control-named:5.1.0-0.38-queens
7009425c020a hub.juniper.net/contrail-nightly/contrail-nodemgr:5.1.0-0.38-queens
3dea2464998a hub.juniper.net/contrail-nightly/contrail-controller-control-control:5.1.0-0.38-queens
bf4208863e85 hub.juniper.net/contrail-nightly/contrail-controller-control-dns:5.1.0-0.38-queens
e7795ed75522 hub.juniper.net/contrail-nightly/contrail-controller-webui:5.1.0-0.38-queens
a2003a6655 hub.juniper.net/contrail-nightly/contrail-controller-webui-job:5.1.0-0.38-queens
02643d9f05766 hub.juniper.net/contrail-nightly/contrail-controller-svcmonitor:5.1.0-0.38-queens
e49fb13c210f hub.juniper.net/contrail-nightly/contrail-controller-config-svcmonitor:5.1.0-0.38-queens
ae2885835776 hub.juniper.net/contrail-nightly/contrail-nodemgr:5.1.0-0.38-queens
44092283132d hub.juniper.net/contrail-nightly/contrail-controller-config-api:5.1.0-0.38-queens
646b61c983c9 hub.juniper.net/contrail-nightly/contrail-controller-config-schema:5.1.0-0.38-queens
a7742cc1c10c0 hub.juniper.net/contrail-nightly/contrail-external-dnsmasq:5.1.0-0.38-queens
a921a0509176 hub.juniper.net/contrail-nightly/contrail-nodemgr:5.1.0-0.38-queens
1c2738fe9a4c hub.juniper.net/contrail-nightly/contrail-external-zookeeper:5.1.0-0.38-queens
98ca9a3dcd4b hub.juniper.net/contrail-nightly/contrail-external-rabbitmq:5.1.0-0.38-queens
3663ica0d87c hub.juniper.net/contrail-nightly/contrail-external-redis:5.1.0-0.38-queens
cd80deb5b01 [root@server1 ~]#
[root@server1 ~]#
[root@server1 ~]# docker ps | grep "4 weeks ago" | wc -l
29
[root@server1 ~]#
```

- checking the logs related to the ansible execution at the config API server1

```
[root@server1 ~]#
```

```
[root@server1 ~]# tailf /var/log/contrail/contrail-fabric-ansible-playbooks.log
```

07/03/2019 14:01:33.403 [ansible] pid=6477 [WARNING]: TASK [commit\_fabric\_config : Process additional error handler, if present] \*\*\*\*\*

07/03/2019 14:01:33.430 [ansible] pid=6477 [WARNING]: skipping: [localhost]

07/03/2019 14:01:33.442 [ansible] pid=6477 [WARNING]: TASK [commit\_fabric\_config : fail]

\*\*\*\*\*

07/03/2019 14:01:33.472 [ansible] pid=6477 [WARNING]: skipping: [localhost]

```
07/03/2019 14:01:33.485 [ansible] pid=6477 [WARNING]: PLAY RECAP
```

```
*****
```

```
07/03/2019 14:01:33.485 [ansible] pid=6477 [WARNING]: localhost      :  
ok=8  changed=0  unreachable=0  failed=1
```

```
07/03/2019 14:01:33.485 [ansible] pid=6477 [WARNING]: localhost      :  
ok=8  changed=0  unreachable=0  failed=1
```

```
07/03/2019 14:01:33.486 [ansible] pid=6477 [WARNING]:
```

- Before starting any VM at the compute nodes we need to make sure the local compute-node server `/etc/hosts` file by adding the local compute-node in-band IP addressing and the name - repeat the same at server3/server4 and CSN server5

```
[root@server3 ~]#
```

```
[root@server3 ~]# vi /etc/hosts
```

```
127.0.0.1  localhost localhost.localdomain localhost4 localhost4.localdomain4
```

```
10.0.1.101 server1.local server1
```

```
::1      localhost localhost.localdomain localhost6 localhost6.localdomain6
```

```
10.0.1.104 server4.local server4
```

```
10.0.1.105 server5.local server5
```

```
10.0.1.102 server2.local server2
```

```
10.0.1.103 server3.local server3
```

```
100.0.3.2 server3 server3 ← that part needs to correspond to your local server IP@ fabric in-band connectivity
```

```
[root@server3 ~]# docker-compose down
```

```
[root@server3 ~]# docker-compose up -d
```

- Checking the compute-node aka vrouter contrail state

```
[root@server3 ~]# contrail-status
Pod      Service Original Name      State   Id           Status
vrouter  agent    contrail-vrouter-agent  running  ecf89041623 Up 2 hours
vrouter  nodemgr contrail-nodemgr     running  b0c8641a06c1 Up 2 hours

vrouter kernel module is PRESENT
== Contrail vrouter ==
nodemgr: active
agent: active

[root@server3 ~]# _
```

- In order to debug the VM creation we can observe the following log at the compute-node

```
[root@server3 ~]# tail -f /var/lib/docker/volumes/kolla_logs/_data/nova/nova-compute.log
```

```
2019-07-09 15:59:36.936 5 INFO nova.compute.resource\_tracker [req-5a3e55d5-9bee-4cfe-81e9-a039245cc21c -----]
Final resource view: name=server3.local phys_ram=49151MB used_ram=512MB phys_disk=499GB used_disk=0GB
total_vcpus=2 used_vcpus=0 pci_stats=[]
```

```
2019-07-09 16:00:38.940 5 INFO nova.compute.resource\_tracker [req-5a3e55d5-9bee-4cfe-81e9-a039245cc21c -----]
Final resource view: name=server3.local phys_ram=49151MB used_ram=512MB phys_disk=499GB used_disk=0GB
total_vcpus=2 used_vcpus=0 pci_stats=[]
```

```
2019-07-09 16:01:41.010 5 INFO nova.compute.resource\_tracker [req-5a3e55d5-9bee-4cfe-81e9-a039245cc21c -----]
Final resource view: name=server3.local phys_ram=49151MB used_ram=512MB phys_disk=499GB used_disk=0GB
total_vcpus=2 used_vcpus=0 pci_stats=[]
```

```
2019-07-09 16:02:40.955 5 INFO nova.compute.resource\_tracker [req-5a3e55d5-9bee-4cfe-81e9-a039245cc21c -----]
Final resource view: name=server3.local phys_ram=49151MB used_ram=512MB phys_disk=499GB used_disk=0GB
total_vcpus=2 used_vcpus=0 pci_stats=[]
```

```
2019-07-09 16:03:43.000 5 INFO nova.compute.resource\_tracker [req-5a3e55d5-9bee-4cfe-81e9-a039245cc21c -----]
Final resource view: name=server3.local phys_ram=49151MB used_ram=512MB phys_disk=499GB used_disk=0GB
total_vcpus=2 used_vcpus=0 pci_stats=[]
```

```
2019-07-09 16:07:43.947 5 INFO nova.compute.resource\_tracker [req-5a3e55d5-9bee-4cfe-81e9-a039245cc21c -----]
Final resource view: name=server3.local phys_ram=49151MB used_ram=512MB phys_disk=499GB used_disk=0GB
total_vcpus=2 used_vcpus=0 pci_stats=[]
```

```
[root@server3 ~]#
```

- Verifying the compute-node ip addresses

```
[root@server3 ~]# ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: ens3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 2c:c2:60:2a:4f:94 brd ff:ff:ff:ff:ff:ff
    inet 10.0.1.103/16 brd 10.0.255.255 scope global ens3
        valid_lft forever preferred_lft forever
    inet6 fe80::2ec2:60ff:fe2a:4f94/64 scope link
        valid_lft forever preferred_lft forever
3: ens4: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 2c:c2:60:3d:29:29 brd ff:ff:ff:ff:ff:ff
4: pkt1: <UP,LOWER_UP> mtu 65535 qdisc noqueue state UNKNOWN group default qlen 1000
    link/void 4a:04:cf:98:91:35 brd 00:00:00:00:00:00
5: pkt3: <UP,LOWER_UP> mtu 65535 qdisc noqueue state UNKNOWN group default qlen 1000
    link/void ce:11:bf:42:5a:32 brd 00:00:00:00:00:00
6: pkt2: <UP,LOWER_UP> mtu 65535 qdisc noqueue state UNKNOWN group default qlen 1000
    link/void d2:f7:ad:50:17:d4 brd 00:00:00:00:00:00
7: vhost0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN group default qlen 1000
    link/ether 2c:c2:60:3d:29:29 brd ff:ff:ff:ff:ff:ff
    +inet 100.0.3.2/24 brd 100.0.3.255 scope global vhost0
        valid_lft forever preferred_lft forever
    inet6 fe80::2ec2:60ff:fe3d:2929/64 scope link
        valid_lft forever preferred_lft forever
8: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 02:42:83:87:b6:56 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
        valid_lft forever preferred_lft forever
10: pkt0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN group default qlen 1000
    link/ether 66:d9:63:53:51:8b brd ff:ff:ff:ff:ff:ff
    inet6 fe80::64d9:63ff:fe53:51b8/64 scope link
        valid_lft forever preferred_lft forever
[root@server3 ~]#
```

- Verifying the state of the compute-node interfaces

```
[root@server3 ~]# ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: ens3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
    link/ether 2c:c2:60:2a:4f:94 brd ff:ff:ff:ff:ff:ff
3: ens4: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
    link/ether 2c:c2:60:3d:29:29 brd ff:ff:ff:ff:ff:ff
4: pkt1: <UP,LOWER_UP> mtu 65535 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/void 4a:04:cf:98:91:35 brd 00:00:00:00:00:00
5: pkt3: <UP,LOWER_UP> mtu 65535 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/void ce:11:bf:42:5a:32 brd 00:00:00:00:00:00
6: pkt2: <UP,LOWER_UP> mtu 65535 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/void d2:f7:ad:50:17:d4 brd 00:00:00:00:00:00
7: vhost0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN mode DEFAULT group default qlen 1000
    link/ether 2c:c2:60:3d:29:29 brd ff:ff:ff:ff:ff:ff
8: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default
    link/ether 02:42:83:87:b6:56 brd ff:ff:ff:ff:ff:ff
10: pkt0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN mode DEFAULT group default qlen 1000
    link/ether 66:d9:63:53:51:8b brd ff:ff:ff:ff:ff:ff
[root@server3 ~]#
```

- Restarting the local compute-node vrouter agent

```
[root@server4 ~]#
[root@server4 ~]# docker restart vrouter_vrouter-agent_1
```

- Tcpdump the vxlan tunnel from the vrouter agent

```
[root@server4 ~]# docker exec -it vrouter_vrouter-agent_1 bash
```

```
(vrouter-agent)[root@server4 /]$ tcpdump -i ens4 -n -v udp port 4789 -e
```

```
(vrouter-agent)[root@server4 /]$ tcpdump -i ens4 -n -v udp port 4789 -e
tcpdump: listening on ens4, link-type EN10MB (Ethernet), capture size 262144 bytes
16:23:54.767969 02:05:86:71:5c:13 > 2c:c2:60:1d:8a:86, ethertype IPv4 (0x0800), length 96: (tos 0x0, ttl 64, id 0, offset 0, flags [none], proto UDP (17), length 82)
  1.1.1.11.26958 > 100.0.4.2.4789: VXLAN, flags [I] (0x08), vni 7
00:00:5e:01:00:01 > 01:00:00:00:01, ethertype IPv4 (0x0800), length 46: (tos 0xc0, ttl 1, id 33655, offset 0, flags [none], proto IGMP (2), length 32, options (RA))
  100.0.203.1 > 224.0.0.1: igmp query v2
16:23:56.378787 02:05:86:71:5c:13 > 2c:c2:60:1d:8a:86, ethertype IPv4 (0x0800), length 96: (tos 0x0, ttl 62, id 0, offset 0, flags [none], proto UDP (17), length 82)
  1.1.1.12.27073 > 100.0.4.2.4789: VXLAN, flags [I] (0x08), vni 7
00:00:5e:01:00:01 > 01:00:00:00:01, ethertype IPv4 (0x0800), length 46: (tos 0xc0, ttl 1, id 9094, offset 0, flags [none], proto IGMP (2), length 32, options (RA))
  100.0.203.1 > 224.0.0.22: igmp v2 report 224.0.0.22
16:23:56.870122 02:05:86:71:5c:13 > 2c:c2:60:1d:8a:86, ethertype IPv4 (0x0800), length 96: (tos 0x0, ttl 62, id 0, offset 0, flags [none], proto UDP (17), length 82)
  1.1.1.13.12508 > 100.0.4.2.4789: VXLAN, flags [I] (0x08), vni 7
00:00:5e:01:00:01 > 01:00:00:00:02, ethertype IPv4 (0x0800), length 46: (tos 0xc0, ttl 1, id 3493, offset 0, flags [none], proto IGMP (2), length 32, options (RA))
  100.0.203.52 > 224.0.0.2: igmp v2 report 224.0.0.2
16:24:08.420742 02:05:86:71:5c:13 > 2c:c2:60:1d:8a:86, ethertype IPv4 (0x0800), length 96: (tos 0x0, ttl 62, id 0, offset 0, flags [none], proto UDP (17), length 82)
  1.1.1.12.26958 > 100.0.4.2.4789: VXLAN, flags [I] (0x08), vni 7
00:00:5e:01:00:01 > 01:00:00:00:01, ethertype IPv4 (0x0800), length 46: (tos 0xc0, ttl 1, id 10336, offset 0, flags [none], proto IGMP (2), length 32, options (RA))
  100.0.203.1 > 224.0.0.1: igmp query v2
16:24:09.322961 02:05:86:71:5c:13 > 2c:c2:60:1d:8a:86, ethertype IPv4 (0x0800), length 96: (tos 0x0, ttl 62, id 0, offset 0, flags [none], proto UDP (17), length 82)
  1.1.1.13.24276 > 100.0.4.2.4789: VXLAN, flags [I] (0x08), vni 7
00:00:5e:01:00:01 > 01:00:00:00:16, ethertype IPv4 (0x0800), length 46: (tos 0xc0, ttl 1, id 4763, offset 0, flags [none], proto IGMP (2), length 32, options (RA))
  100.0.203.52 > 224.0.0.22: igmp v2 report 224.0.0.22
16:24:10.123877 02:05:86:71:5c:13 > 2c:c2:60:1d:8a:86, ethertype IPv4 (0x0800), length 96: (tos 0x0, ttl 62, id 0, offset 0, flags [none], proto UDP (17), length 82)
  1.1.1.13.12508 > 100.0.4.2.4789: VXLAN, flags [I] (0x08), vni 7
00:00:5e:01:00:01 > 01:00:00:00:02, ethertype IPv4 (0x0800), length 46: (tos 0xc0, ttl 1, id 4895, offset 0, flags [none], proto IGMP (2), length 32, options (RA))
  100.0.203.52 > 224.0.0.2: igmp v2 report 224.0.0.2
^C
6 packets captured
6 packets received by filter
0 packets dropped by kernel
(vrouter-agent)[root@server4 /]$
```

- Checking the drop stats at the router agent of the compute node

```
(vrouter-agent)[root@server4 /]$ dropstats | grep -v ' 0$'
```

|                 |      |
|-----------------|------|
| Discards        | 907  |
| Cloned Original | 1336 |

|            |   |
|------------|---|
| Invalid NH | 2 |
|------------|---|

|                |     |
|----------------|-----|
| Invalid VNID   | 247 |
| Invalid Source | 317 |
| No L2 Route    | 2   |

```
(vrouter-agent)[root@server4 /]$
(vrouter-agent)[root@server4 /]$
(vrouter-agent)[root@server4 /]$ dropstats | grep -v ' 0$'
```

|                 |      |
|-----------------|------|
| Discards        | 913  |
| Cloned Original | 1342 |

|            |   |
|------------|---|
| Invalid NH | 2 |
|------------|---|

|                |     |
|----------------|-----|
| Invalid VNID   | 247 |
| Invalid Source | 317 |
| No L2 Route    | 2   |

```
(vrouter-agent)[root@server4 /]$
```

- List the VMs (aka instance) tap interfaces on the compute-node

```
(vrouter-agent)[root@server4 /]$ vif --list | grep tap
vif0/3      OS: tap129d2c06-71
vif0/4      OS: tapa47e5af3-48
(vrouter-agent)[root@server4 /]$ tcpcdump -i tap129d2c06-71 -n -v -e
tcpcdump: listening on tap129d2c06-71, link-type EN10MB (Ethernet), capture size 262144 bytes
16:31:07.464882 00:00:5e:00:01:00 > 02:12:9d:2c:06:71, ethertype ARP (0x0806), length 42: Ethernet (len 6), IPv4 (len 4), Request who-has 100.0.201.42 tell 100.0.201.2, length 28
16:31:07.465518 02:12:9d:2c:06:71 > 00:00:5e:00:01:00, ethertype ARP (0x0806), length 42: Ethernet (len 6), IPv4 (len 4), Reply 100.0.201.42 is-at 02:12:9d:2c:06:71, length 28
16:31:09.205657 00:00:5e:01:00:01 > 01:00:5e:00:00:01, ethertype IPv4 (0x0800), length 46: (tos 0xc0, ttl 1, id 48942, offset 0, flags [none], proto IGMP (2), length 32, options (RA))
  100.0.201.1 > 224.0.0.1: igmp query v2
16:31:09.933237 00:00:5e:01:00:01 > 01:00:5e:00:00:16, ethertype IPv4 (0x0800), length 46: (tos 0xc0, ttl 1, id 19285, offset 0, flags [none], proto IGMP (2), length 32, options (RA))
  100.0.201.41 > 224.0.0.2: igmp v2 report 224.0.0.2
16:31:11.886948 00:00:5e:01:00:01 > 01:00:5e:00:00:02, ethertype IPv4 (0x0800), length 46: (tos 0xc0, ttl 1, id 19518, offset 0, flags [none], proto IGMP (2), length 32, options (RA))
  100.0.201.41 > 224.0.0.2: igmp v2 report 224.0.0.2
^C
5 packets captured
9 packets received by filter
0 packets dropped by kernel
(vrouter-agent)[root@server4 /]$
```

```
(vrouter-agent)[root@server4 /]$ vif --list | grep tap
```

```
vif0/3      OS: tap129d2c06-71
vif0/4      OS: tapa47e5af3-48
(vrouter-agent)[root@server4 /]$ vif --get 3
Vrouter Interface Table

Flags: P=Policy, X=Cross Connect, S=Service Chain, Mr=Receive Mirror
      Mt=Transmit Mirror, Tc=Transmit Checksum Offload, L3=Layer 3, L2=Layer 2
      D=DHCP, Vp=Vhost Physical, Pr=Promiscuous, Vnt=Native Vlan Tagged
      Mnp=No MAC Proxy, Dpdk=DPDK PMD Interface, Rfl=Receive Filtering Offload, Mon=Interface is Monitored
      Uuf=Unknown Unicast Flood, Vof=VLAN insert/strip offload, Df=Drop New Flows, L=MAC Learning Enabled
      Proxy=MAC Requests Proxied Always, Er=Etree Root, Mn=Mirror without Vlan Tag, Ig=Igmp Trap Enabled
```

```
vif0/3      OS: tap129d2c06-71
Type:Virtual HWaddr:00:00:5e:00:01:00 IPAddr:100.0.201.42
Vrf:4 Mcast Vrf:4 Flags:PL3L2Er QOS:-1 Ref:7
RX packets:934 bytes:45734 errors:0
TX packets:1287 bytes:73831 errors:0
  ISID: 0 Bmac: 02:12:9d:2c:06:71
  Drops:975
```

```
(vrouter-agent)[root@server4 /]$ vif --get 4
Vrouter Interface Table
```

```
Flags: P=Policy, X=Cross Connect, S=Service Chain, Mr=Receive Mirror
      Mt=Transmit Mirror, Tc=Transmit Checksum Offload, L3=Layer 3, L2=Layer 2
      D=DHCP, Vp=Vhost Physical, Pr=Promiscuous, Vnt=Native Vlan Tagged
      Mnp=No MAC Proxy, Dpdk=DPDK PMD Interface, Rfl=Receive Filtering Offload, Mon=Interface is Monitored
      Uuf=Unknown Unicast Flood, Vof=VLAN insert/strip offload, Df=Drop New Flows, L=MAC Learning Enabled
      Proxy=MAC Requests Proxied Always, Er=Etree Root, Mn=Mirror without Vlan Tag, Ig=Igmp Trap Enabled
```

```
vif0/4      OS: tapa47e5af3-48
Type:Virtual HWaddr:00:00:5e:00:01:00 IPAddr:100.0.201.43
Vrf:4 Mcast Vrf:4 Flags:PL3L2Er QOS:-1 Ref:7
RX packets:1232 bytes:88738 errors:0
TX packets:1817 bytes:113790 errors:0
  ISID: 0 Bmac: 02:a4:7e:5a:f3:48
  Drops:182
```

```
(vrouter-agent)[root@server4 /]$
```

- Dump the local vrouter on the compute-node server bridging table

```
(vrouter-agent)[root@server4 /]$ rt --dump 2 --family bridge
Flags: L=Label Valid, Df=DHCP flood, Mm=Mac Moved, L2c=L2 Evpn Control Word, N>New Entry, Ec=EvpnControlProcessing
VRouter bridge table 0/2
Index   DestMac           Flags     Label/VNID    Nexthop    Stats
30052   2c:c2:60:1d:8a:86  Df        -          3          0
31264   0:0:5e:0:1:0       Df        -          3          0
54652   2c:c2:60:33:c4:a2  LDf       7          53         0
112924  ff:ff:ff:ff:ff:ff LDf       7          51         349
115240  2:0:0:0:0:2       Df        -          12         0
205564  2:0:0:0:0:1       Df        -          12         0
243740  0:0:5e:1:0:1      LDf       7          58         0
(vrouter-agent)[root@server4 /]$
```

```
(vrouter-agent)[root@server4 /]$ nh --get 53
Id:53          Type:Tunnel      Fmly: AF_INET   Rid:0  Ref_cnt:5          Vrf:0
Flags:Valid, Vxlan, Etree Root,
Oif:0 Len:14 Data:02 05 86 71 5c 13 2c c2 60 1d 8a 86 08 00
Sip:100.0.4.2 Dip:1.1.1.13
```

```
(vrouter-agent)[root@server4 /]$ _
```

```
[root@server4 ~]# docker exec -it vrouter_vrouter-agent_1 bash
```

```
(vrouter-agent)[root@server4 /]$ rt --get 2:c2:60:1d:8a:86 --vrf 2 --family bridge
```

- How to ssh to the vm OS from the compute-node

```
[root@server4 ~]# route -n | grep 169
```

```
169.254.0.0  0.0.0.0    255.255.0.0    U    1002 0    0 ens3
169.254.0.3  0.0.0.0    255.255.255.255 UH   0    0    0 vhost0
169.254.0.4  0.0.0.0    255.255.255.255 UH   0    0    0 vhost0
```

```
[root@server4 ~]#
```

```
[root@server4 ~]# ssh cirros@169.254.0.3
```

cirros@169.254.0.3's password:

login account is **cirros**. The password is **gocubsgo**

```
$ arp -na
? (100.0.201.2) at 00:00:5e:00:01:00 [ether]  on eth0
? (100.0.201.43) at 02:a4:7e:5a:f3:48 [ether]  on eth0
? (100.0.201.12) at <incomplete>  on eth0
? (100.0.201.1) at 00:00:5e:00:01:00 [ether]  on eth0
$
```

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