Guide to the Calico Plugin for Fuel ver 1.0.0

Calico Plugin

Calico provides seamless, scalable, secure Layer 3 Virtual Networking for your Mirantis OpenStack Deployment.

By replacing OpenStack's native networking model, Calico provides efficient, easy to troubleshoot networking, without the complexity and inefficiency of overlay networking models. Calico does not require any additional nodes or Calico specific management – it just works, and gets out of your way!

More details can be found at http://docs.projectcalico.org/en/latest/

Requirements

The Calico plugin is currently only compatible with Mirantis OpenStack 6.1.

Limitations

In the current release, Calico requires a deployment with a single OpenStack controller.
The current release of this plugin only supports an Ubuntu OpenStack setup.

These limitations will be lifted in future releases.

Installation Guide

To install the Calico plugin, follow these steps:

1. Prepare a clean Fuel Master node, as described by the Mirantis documentation.

2. Download the Calico plugin from the Fuel Plugin Catalog.

3. Copy the plugin onto the Fuel Master node:
   ```
   scp calico-fuel-plugin-1.0-1.0.0-0.noarch.rpm root@<Fuel_Master_Node_IP>:/tmp
   ```

4. Log into the Fuel Master Node:
   ```
   ssh root@<Fuel_Master_Node_IP>
   ```

5. Install the plugin:
   ```
   cd /tmp
   fuel plugins --install calico-fuel-plugin-1.0-1.0.0-0.noarch.rpm
   ```

6. Check the plugin was installed correctly by running:
   ```
   fuel plugins --list
   ```

   The expected output is:

   ```
   [root@fuel-master tmp]# fuel plugins --list
   id | name               | version | package_version
   ---|--------------------|---------|----------------
   1  | calico-fuel-plugin | 1.0.0   | 2.0.0
   ```

User Guide

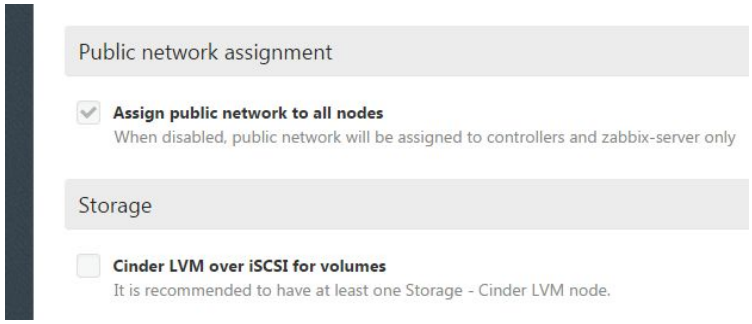
Deploying Mirantis OpenStack with Calico Networking

Use the Fuel web UI to deploy an OpenStack cluster, observing the following guidelines:

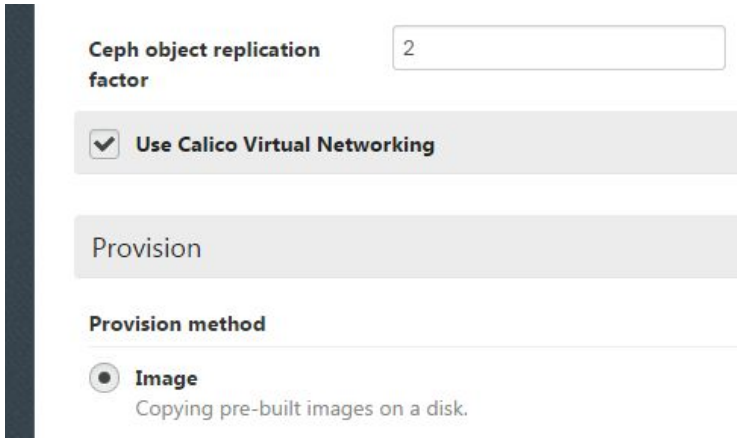
1. Create a new OpenStack environment, selecting:
    - "Juno on Ubuntu Trusty (14.04)" as the distribution
    - "Neutron with VLAN segmentation" as the networking setup
    - All other options can be left as their defaults

2. Under the Settings tab, make sure the following options are checked and then save your changes:

    - "Assign public network to all nodes"



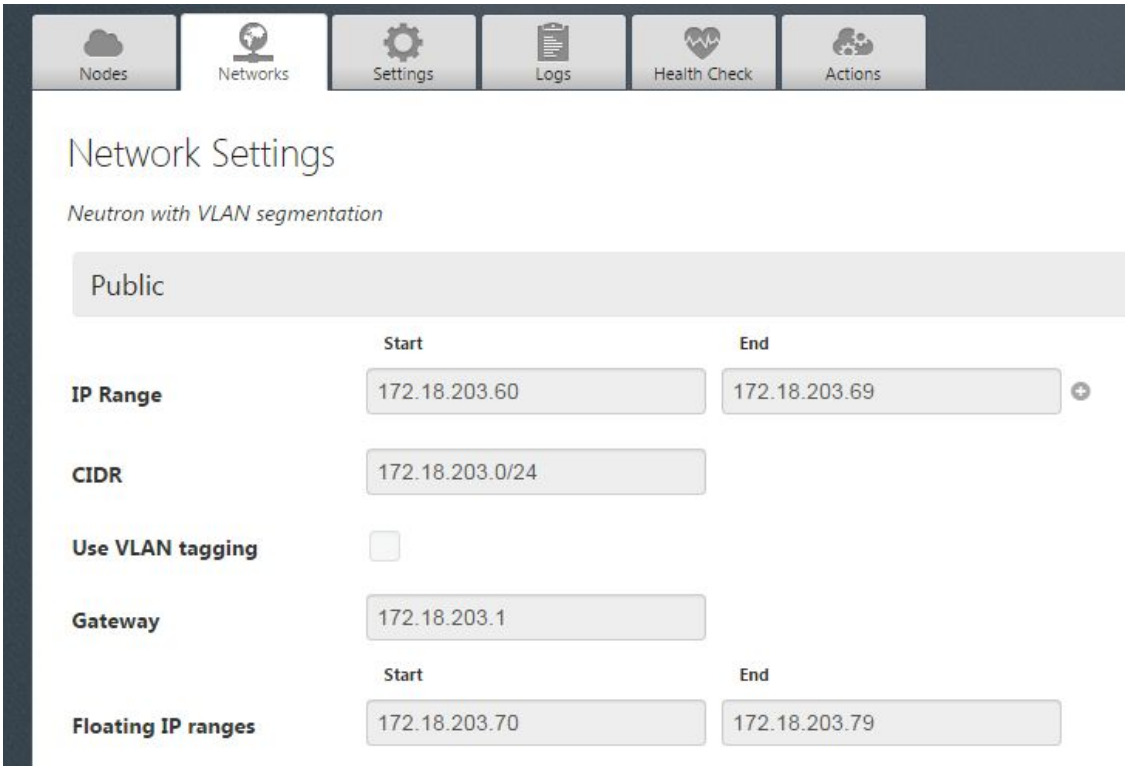
    - "Use Calico Virtual Networking"



3. Under the Networks tab, configure the 'Public' settings (these will need to be set to sensible values for your network setup):
    - IP Range
    - CIDR
    - Use VLAN tagging: No
    - Gateway
    - Floating IP range

    All of the other network settings should be left with their default values. Ensure you save your changes once you are finished.

    Example network configuration:



4. Under the Nodes tab, add some nodes (for meaningful testing, you will need at least two compute nodes in addition to the controller). Note that, in this release of Calico, only a single controller node is supported (see Limitations section above).

5. Deploy changes.

Using your Calico networked Mirantis OpenStack deployment

You are now ready to use the OpenStack dashboard to configure your deployment. Your particular requirements will determine how you use your OpenStack deployment, but you may wish to refer to the Calico documentation for some common next steps.

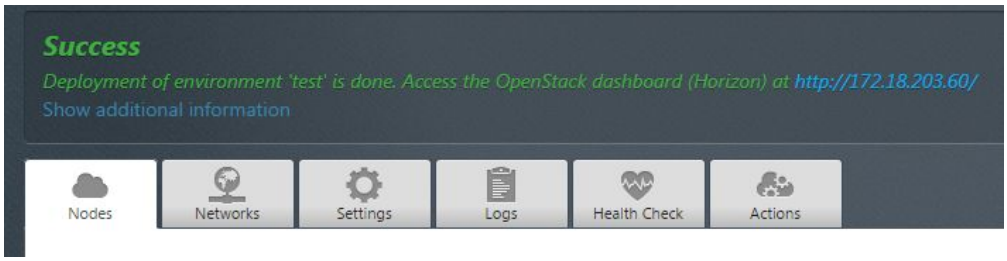
Demonstration Setup

The following is a demonstration OpenStack setup that, if wished, can be followed to verify the Calico elements of your OpenStack deployment are operating as intended.

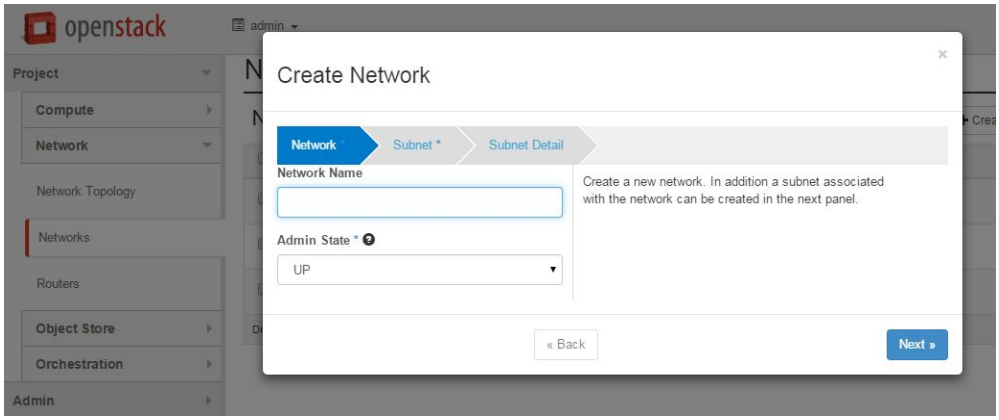
In this example, we will launch a number of VMs (load balanced across the compute hosts), split into two security groups - with VMs in the same security group able to contact each other, but not VMs in the other security group (regardless of which compute host the VMs are on).

Steps:

1. Follow the link from the Fuel web UI to the OpenStack dashboard:



2. Under Project->Network->Networks in the OpenStack dashboard, create a network and subnet from which instance IP addresses will be allocated.



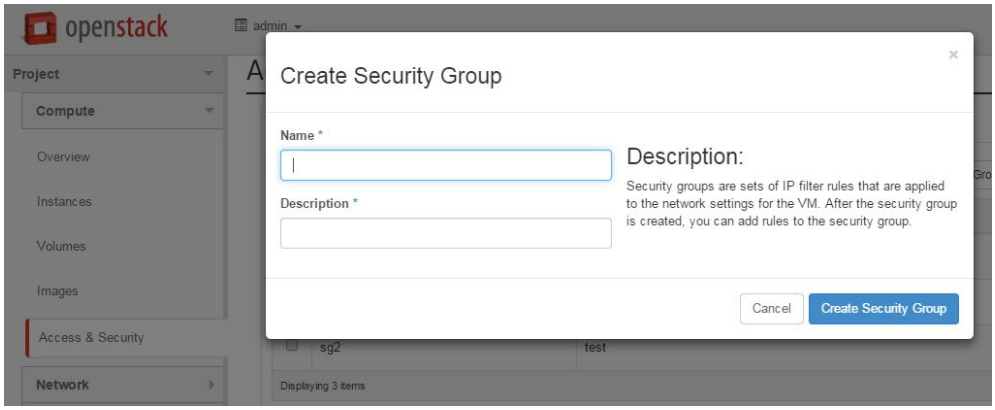
Use the following settings:

- Network:
  - Name: demo
  - Admin State: UP

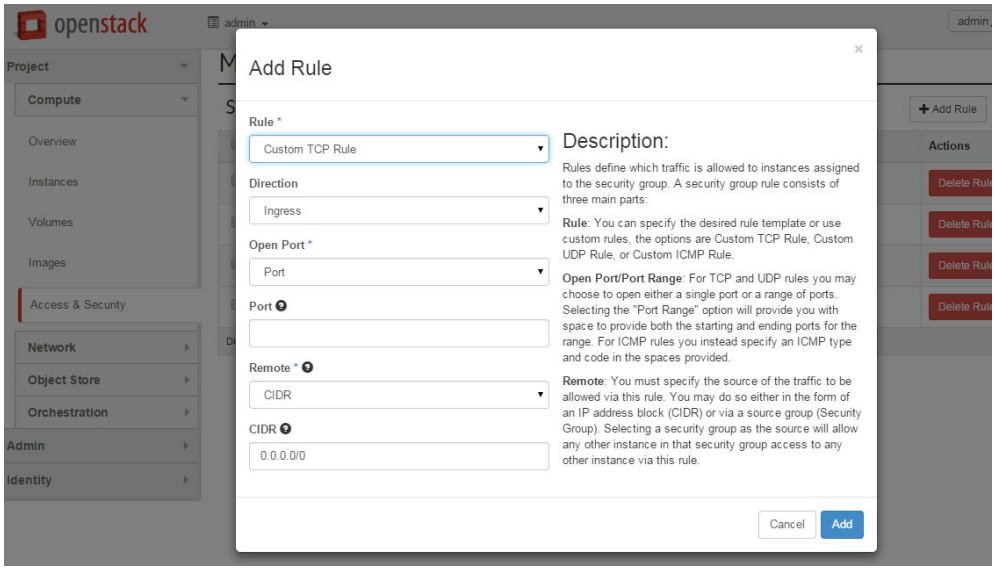
- Subnet:
  - Create Subnet: Yes
  - Name: demo_subnet
  - Network Address: 10.65.0.0/24
  - IP Version: IPv4
  - Gateway IP: 10.65.0.1

- Subnet Detail:
  - Enable DHCP: Yes

3. Under Project->Compute->Access&Security in the OpenStack dashboard, create two new security groups, named ‘sg1’ and ‘sg2’, and both with description ‘test’.



4. For each security group, select ‘Manage Rules’ and add two new rules.

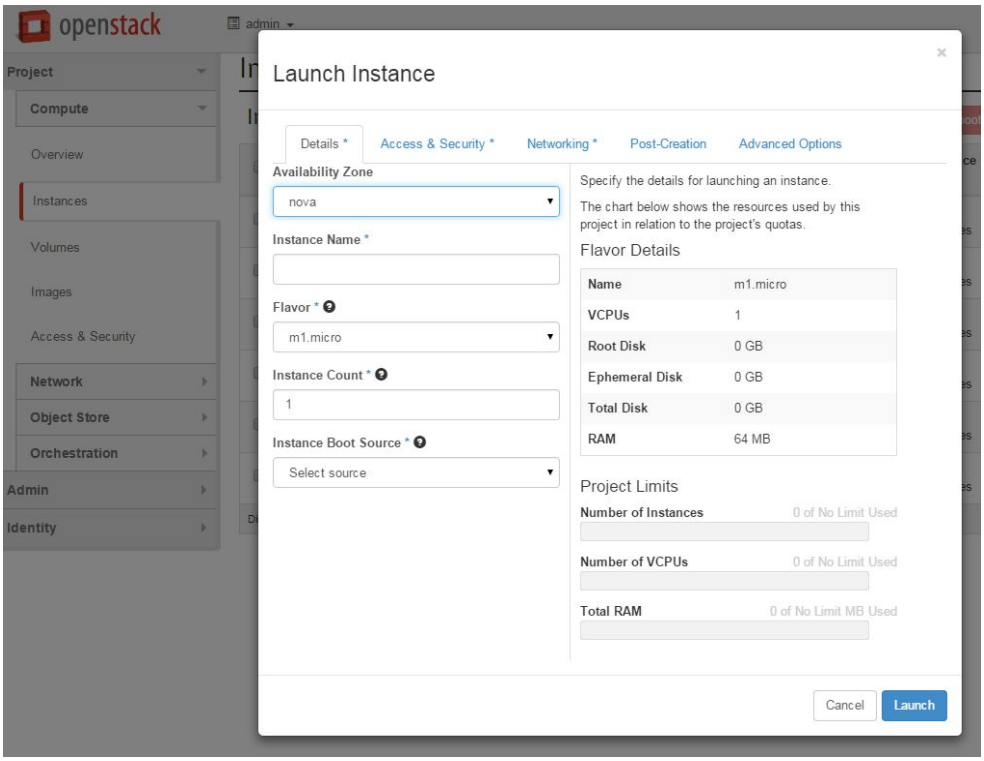


Use the following settings:

- First Rule:
  - Rule: ALL ICMP
  - Direction: Ingress
  - Remote: Security Group
  - Security Group: <whichever of sg1/sg2 is followed by '(current)'>
  - Ether Type: IPv4

- Second Rule:
  - Rule: SSH
  - Remote: CIDR
  - CIDR: 0.0.0.0/0

5. Under Project->Compute->Instances in the OpenStack dashboard, launch several instances.

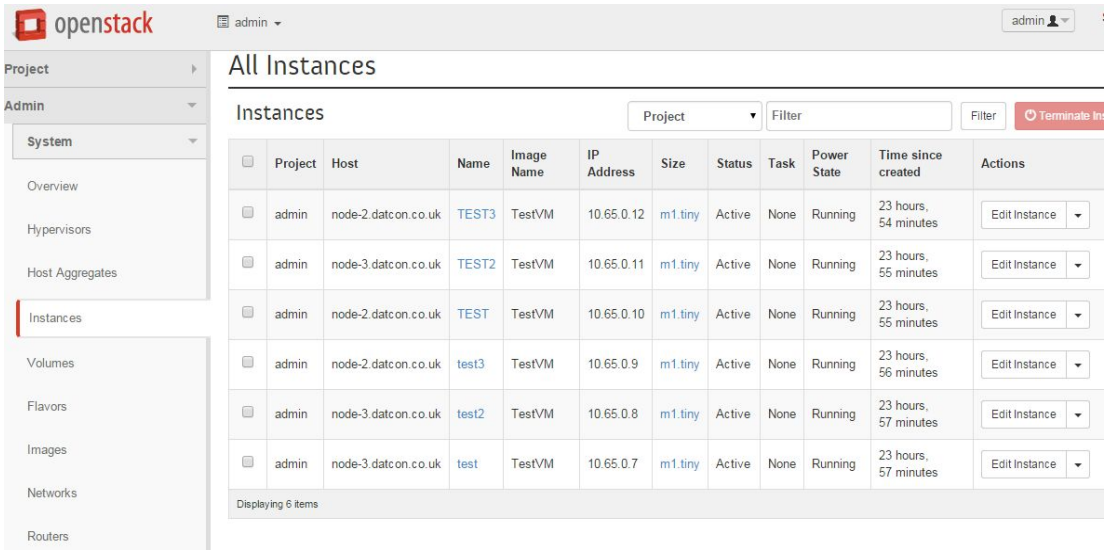


Use the following settings:

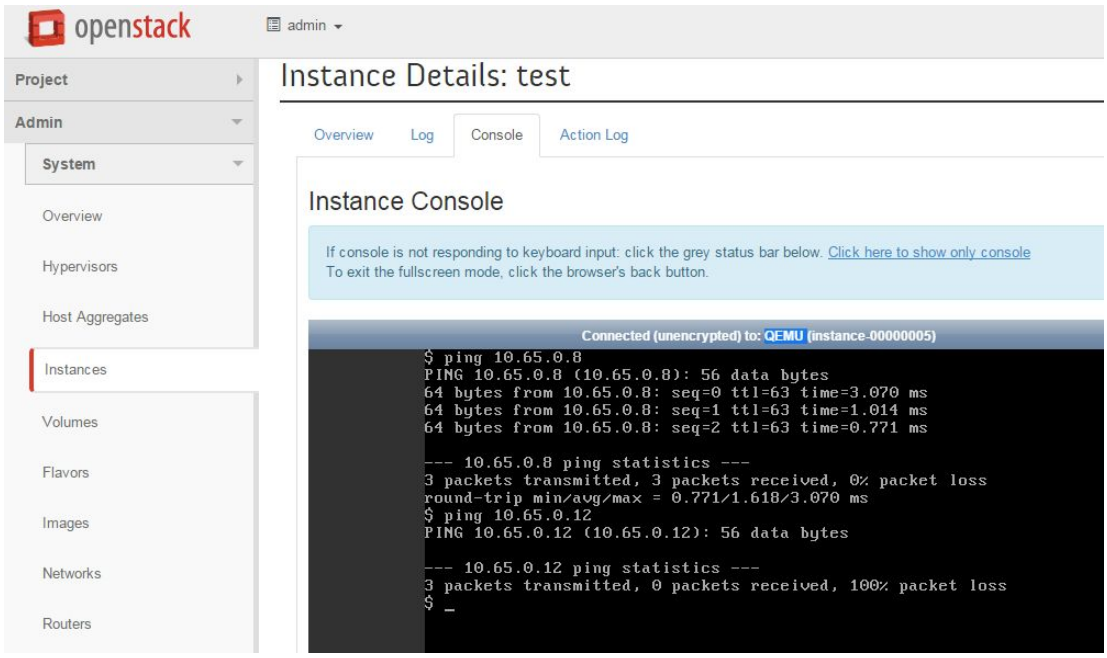
- Flavor: m1.tiny
- Instance Boot Source: Boot from Image
- Image Name: TestVM
- Under the Access & Security tab, select one of sg1/sg2 (split your instances roughly 50:50 between the two security groups).
- Under the Networking tab, drag 'demo' into the 'Selected Networks' box.

6. Under Admin->Instances in the OpenStack dashboard, verify that:

   - the requested instances have been launched
   - they are distributed roughly evenly across the two compute hosts
   - they have each been assigned an IP address from the range that you configured above (e.g. 10.65.0.0/24)
   - they reach Active status within about a minute.



7. Open a console on one of the instances. You should find that you can ping the other instances in the same security group, but not the instances in the other security group.



Frequently Asked Questions

How do I setup instances with internet access?

For outbound access, you need to ensure that your VMs can send traffic to your border gateway router (typically this will be the case, because usually your compute hosts will be able to do so). The border gateway can then perform SNAT.

For inbound connections, you need assign a publically routable IP address to your VM – that is, attach it to a network with a public IP address. You will also need to make sure that your border router (and any intermediate routers between the border router and the compute host) can route to that address too. The simplest way to do that is to peer the border router with the route reflector on the control host.

The Calico documentation has an overview of addressing and connectivity.

On the controller, BIRD lists routes to my instances listed as unreachable - is that a problem?

No, this is expected. On the control node, BIRD is acting as a route reflector, so won't write routes into the Linux forwarding table. Hence these routes are unreachable from the control node. That's ok though – they are reachable from the compute hosts, and therefore from the instances themselves.

Why do instances in different networks have connectivity?

With Calico networking, any two networks will have connectivity, unless you have specifically disabled it using security groups. This is different to standard OpenStack networking – you can find more information in the Calico Neutron API documentation.

Appendix

General Calico docs can be found at http://docs.projectcalico.org/en/latest/
The official Calico website is at http://www.projectcalico.org/
The Calico code base lives at https://github.com/projectcalico/calico

Revision history

Version	Revision date	Editor	Comment
0.1	*04.30.2015*	*Brook Roberts (brook@projectcalico.org)*	*Created the document.*
0.2	*05.07.2015*	*Emma Gordon (emma@projectcalico.org)*	*Review markups from Mirantis feedback.*
0.3	*03.08.2015*	*Emma Gordon (emma@projectcalico.org)*	*Updated link to calico repository on GitHub.*