



INSTALLATION RUNBOOK FOR NetScaler Management & Analytics System with Mirantis OpenStack 9.0

Application Type: [NetScaler Management Platform]

Application Version: [NetScaler MAS 11.1]

MOS Version: [9.0]

OpenStack version: [Mitaka]

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Document History

Version	Revision Date	Description
1.0	04-10-2016	Initial Version

2.0	13-10-2016	Reworked
3.0	19-10-2016	Reworked

1 Introduction

This document is to serve as a detailed Deployment Guide for NetScaler Management & Analytics System. Citrix offers NetScaler Management & Analytics System. This document describes the reference architecture, installation steps for certified MOS+ NetScaler Management & Analytics System, limitations and testing procedures.

1.1 Target Audience

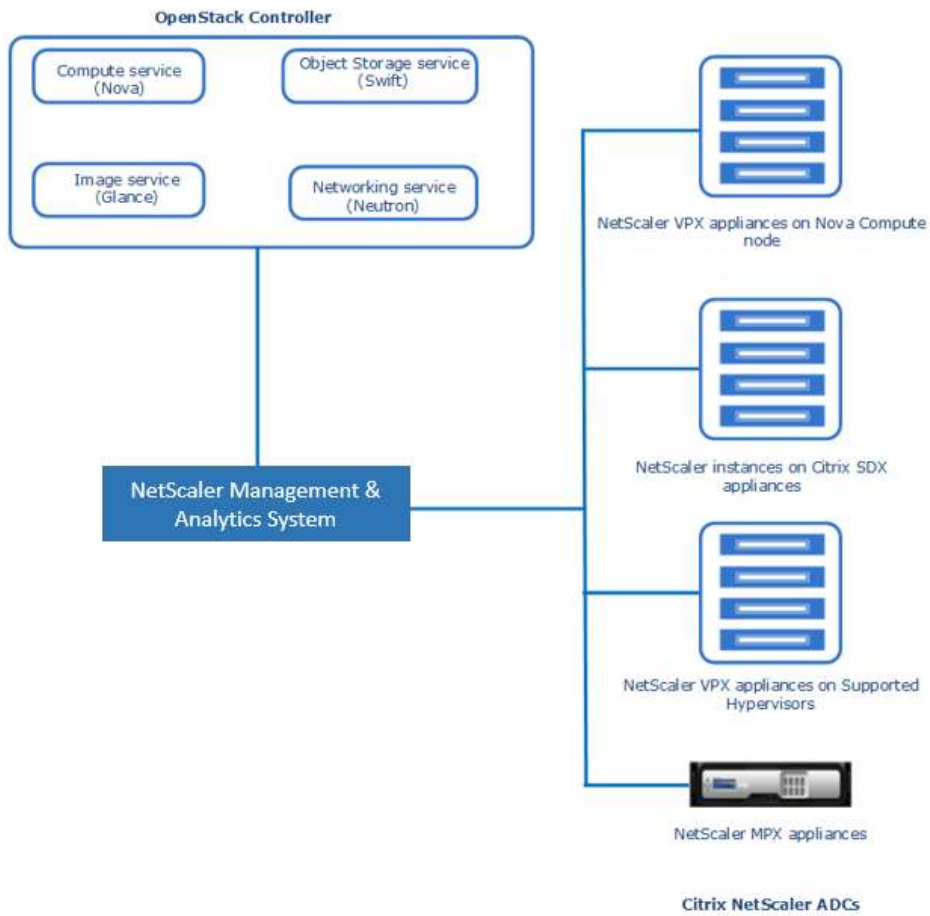
Customers interested in deploying Citrix NetScaler products (release 10.5 and later) with Mirantis OpenStack 9.0 (Mitaka release and later)

2 Application overview

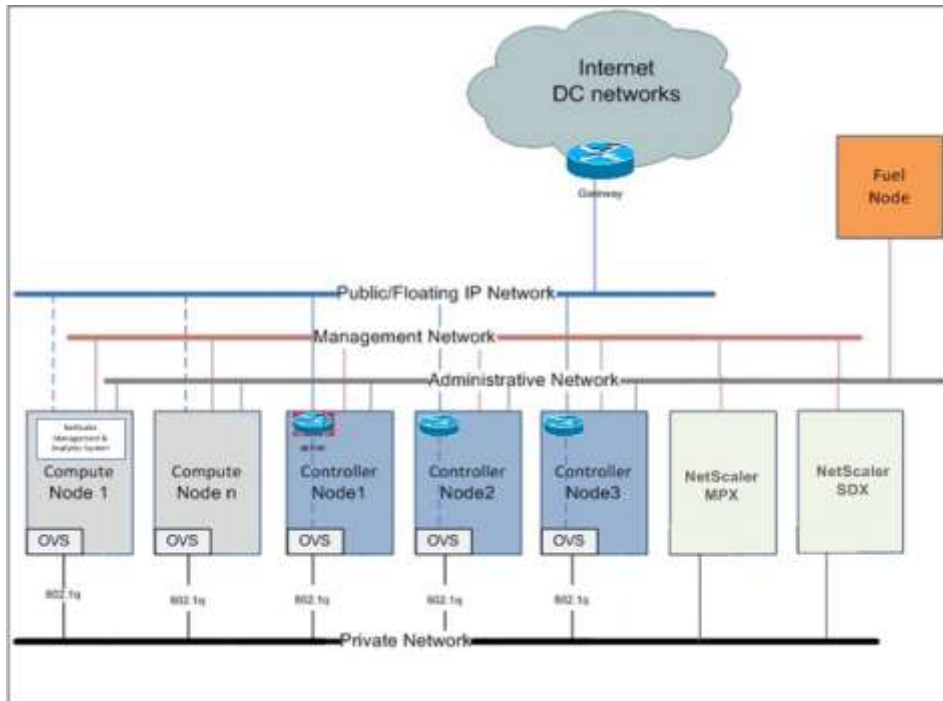
NetScaler Management and Analytics System (MAS) is a centralized management solution that simplifies operations by providing administrators with enterprise-wide visibility and automating management jobs that need to be executed across multiple NetScaler instances. You can manage and monitor Citrix application networking products that include Citrix NetScaler MPX, Citrix NetScaler VPX, Citrix NetScaler Gateway, Citrix NetScaler SDX, Citrix NetScaler CPX, and Citrix NetScaler SD-WAN. You can use NetScaler MAS to manage, monitor, and troubleshoot the entire global application delivery infrastructure from a single, unified console.

The Cloud Orchestration feature of NetScaler Management and Analytics System (MAS) enables integration of Citrix NetScaler products with Mirantis OpenStack platform. By using this feature with Mirantis OpenStack platform, the Mirantis OpenStack users are able to avail the load balancing feature (LBaaS) of the NetScaler. After this, the Mirantis OpenStack users can deploy their load balancer configurations from Mirantis OpenStack in NetScaler instance.

3 Joint Reference Architecture



4 Physical & Logical Network Topology



5 Installation & Configuration

5.1 Environment preparation

Hardware Required:

- 3 bare metal servers with at least 4 core CPU, 48GB RAM, 1 TB HDD for controller nodes
- 2 bare metal servers with at least 12 core CPU, 96GB RAM, 1 TB HDD for compute nodes
- 1 bare metal server with at least 2 core CPU, 3 GB RAM, 350 GB HDD for Fuel node
- NetScaler MPX
- NetScaler SDX

Software Required:

- Mirantis OpenStack 9.0 ISO file
- Neutron LBaaS package from <https://github.com/openstack/neutron-lbaas.git>
- NetScaler Management & Analytics System 11.1
- NetScaler Software version 10.5 and above

5.2 MOS installation

Fuel server is used to deploy and manage the OpenStack environment. Fuel acts as a DHCP server. The OpenStack nodes are configured to network boot, using PXE. It assigns IP addresses to the OpenStack nodes, performs PXE boot and initial configuration, and provisions the nodes according to their roles in the environment. In the testing environment, Fuel has

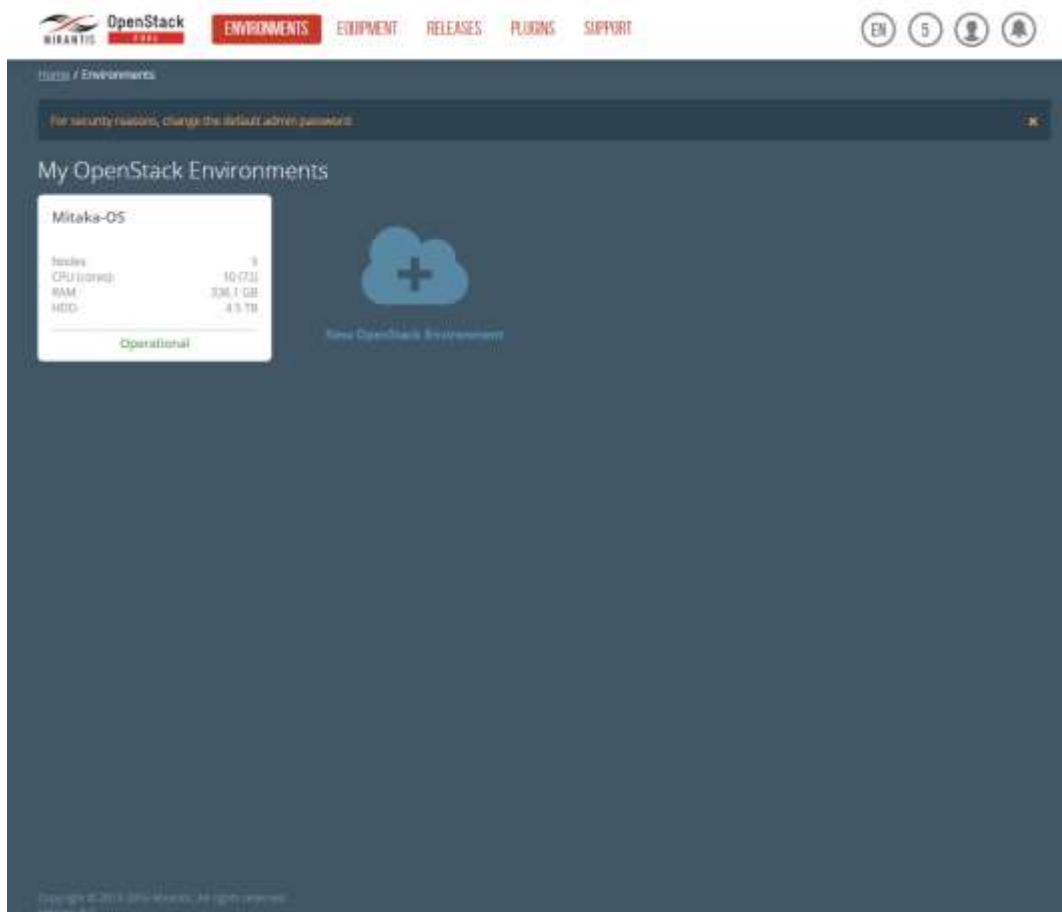
deployed Mirantis OpenStack with an operating system based on Ubuntu Linux. Mirantis OpenStack uses the MySQL/Galera for database replication in HA deployments that use the Ubuntu kernel.

For more information about Mirantis OpenStack Installation, see <https://docs.mirantis.com/openstack/fuel/fuel-9.0/>

<http://docs.openstack.org/developer/fuel-docs/userdocs/fuel-install-guide.html>

Creating OpenStack Environment:

<http://docs.openstack.org/developer/fuel-docs/userdocs/fuel-user-guide/create-environment.html>



5.2.1 Health Check Results

OpenStack Health Check			
<input type="checkbox"/> Select All		Provide credentials	Run Tests
<input type="checkbox"/> Sanity tests. Duration 30 sec - 2 min	Expected Duration	Actual Duration	Status
<input type="checkbox"/> Request flavor list	20 s.	1.3	✓
<input type="checkbox"/> Request image list using Nova	20 s.	1.7	✓
<input type="checkbox"/> Request instance list	20 s.	0.1	✓
<input type="checkbox"/> Request absolute limits list	20 s.	0.1	✓
<input type="checkbox"/> Request snapshot list	20 s.	0.2	✓
<input type="checkbox"/> Request volume list	20 s.	0.5	✓
<input type="checkbox"/> Request image list using Glance v1	10 s.	0.0	✓
<input type="checkbox"/> Request image list using Glance v2	10 s.	0.0	✓
<input type="checkbox"/> Request stack list	20 s.	0.0	✓
<input type="checkbox"/> Request active services list	20 s.	1.6	✓
<input type="checkbox"/> Request user list	20 s.	0.1	✓
<input type="checkbox"/> Check that required services are running	180 s.	5.4	✓
<input type="checkbox"/> Check internet connectivity from a compute	100 s.	0.5	✓
<input type="checkbox"/> Check DNS resolution on compute node	120 s.	1.0	✓
<input type="checkbox"/> Request list of networks	20 s.	0.2	✓
<input type="checkbox"/> Functional tests. Duration 3 min - 14 min	Expected Duration	Actual Duration	Status
<input type="checkbox"/> Create instance flavor	30 s.	0.8	✓
<input type="checkbox"/> Check create, update and delete image actions using Glance v2	70 s.	5.3	✓
<input type="checkbox"/> Create volume and boot instance from it	350 s.	66.2	✓
<input type="checkbox"/> Create volume and attach it to instance	350 s.	73.8	✓
<input type="checkbox"/> Check network connectivity from instance via floating IP	300 s.	41.4	✓
<input type="checkbox"/> Create keypair	25 s.	0.4	✓
<input type="checkbox"/> Create security group	25 s.	1.0	✓
<input type="checkbox"/> Check network parameters	30 s.	0.2	✓
<input type="checkbox"/> Launch instance	200 s.	25.0	✓
<input type="checkbox"/> Launch instance with file injection	200 s.	31.5	✓
<input type="checkbox"/> Launch instance, create snapshot, launch instance from snapshot	300 s.	63.4	✓
<input type="checkbox"/> Create user and authenticate with it	80 s.	5.3	✓

HA tests. Duration 30 sec - 8 min		Expected Duration	Actual Duration	Status
<input type="checkbox"/>	Check state of haproxy backends on controllers	10 s.	1.3	✓
<input type="checkbox"/>	Check data replication over mysql	10 s.	4.7	✓
<input type="checkbox"/>	Check if amount of tables in databases is the same on each node	10 s.	3.8	✓
<input type="checkbox"/>	Check galera environment state	10 s.	1.5	✓
<input type="checkbox"/>	Check pacemaker status	10 s.	2.0	✓
<input type="checkbox"/>	RabbitMQ availability	100 s.	13.9	✓
<input type="checkbox"/>	RabbitMQ replication	100 s.	27.9	✓
Platform services functional tests. Duration 3 min - 60 min		Expected Duration	Actual Duration	Status
<input type="checkbox"/>	Typical stack actions: create, delete, show details, etc.	720 s.	47.2	✓
<input type="checkbox"/>	Advanced stack actions: suspend, resume and check	900 s.	78.8	✓
<input type="checkbox"/>	Check stack rollback	470 s.	101.3	✓
<input type="checkbox"/>	Update stack actions: inplace, replace and update whole template	1300 s.	103.9	✓
<input type="checkbox"/>	Check creation of stack with Wait Condition/Handle resources	820 s.	620.9	✗
<p>Time limit exceeded while waiting for stack status becoming 'CREATE_COMPLETE' to finish. Please refer to OpenStack logs for more details.</p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"> <p>Target component: Heat</p> <p>Scenario:</p> <ol style="list-style-type: none"> 1. Create test flavor. 2. Create a keypair. 3. Save generated private key to file on Controller node. 4. Create a stack using template. 5. Wait for the stack status to change to 'CREATE_COMPLETE'. 6. Delete the file with private key. 7. Delete the stack. 8. Wait for the stack to be deleted. </div>				
Cloud validation tests. Duration 30 sec - 2 min		Expected Duration	Actual Duration	Status
<input type="checkbox"/>	Check disk space outage on controller and compute nodes	20 s.	1.8	✓
<input type="checkbox"/>	Check log rotation configuration on all nodes	20 s.	1.9	✓
Configuration tests. Duration 30 sec - 2 min		Expected Duration	Actual Duration	Status
<input type="checkbox"/>	Check usage of default credentials on master node	20 s.	—	—
<input type="checkbox"/>	Check if default credentials for OpenStack cluster have changed	20 s.	—	—
<input type="checkbox"/>	Check usage of default credentials for keystone on master node	20 s.	—	—

5.3 NetScaler MAS installation steps

NetScaler MAS can be downloaded from

<https://www.citrix.com/downloads/netscaler-mas.html>

Please download the build 50.XX

For NetScaler MAS installation please refer

<http://docs.citrix.com/en-us/netscaler-mas/11-1/single-server-deployment.html>

NetScaler MAS can be deployed on any of the supported hypervisor that are listed in the link above

To register NetScaler MOS with MAS please refer to the below link.

http://docs.citrix.com/en-us/netscaler-mas/11-1/integrating-netscaler-mas-with-openstack-platform/preconfiguration-tasks-mas-openstack.html#par_anchortitle_b14e

Note: For MAS builds earlier to 50.XX please follow the below work around for registering MOS with MAS.

Using any of the API tools, please fire the below API.

POST call with URL: `http://<MAS IP>/oca/v1/openstacks`

Copy the below payload as body:

```
{
  "openstack": {
    "name": "Openstack",
    "username": "<OpenStack Admin Username>",
    "password": "<password>",
    "admin_tenant_name": "<Openstack Tenant name>",
    "driver_username": "openstack_driver",
    "driver_password": "<Driver Password>",
    "keystone_uri": "<Keystone IP:port>/",
    "keystone_admin_uri": "<Keystone admin IP:port>",
    "neutron_uri": "<Neutron IP:port>",
    "glance_uri": "<Glance IP:port>",
    "nova_uri": "<Nova IP:port>"
  }
}
```

Payload content type: JSON

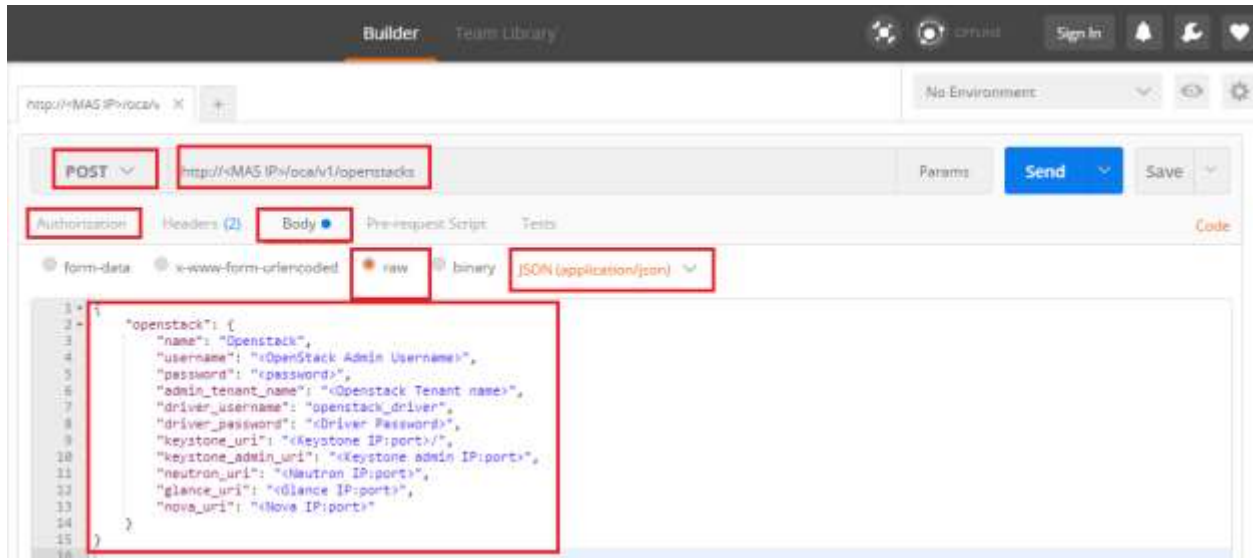
Authentication type: Basic Auth

For example Postman REST client can be used to fire the API.

Postman download link:

<https://chrome.google.com/webstore/detail/postman/fhbjgbfijnjbdggehcbncdddomop?hl=en>

Configurations in Postman



5.4 Limitations

<http://docs.citrix.com/en-us/netscaler-mas/11-1/Before-You-Begin.html>

<http://docs.citrix.com/en-us/netscaler-mas/11-1/single-server-deployment/install-mas-on-xenserver.html>

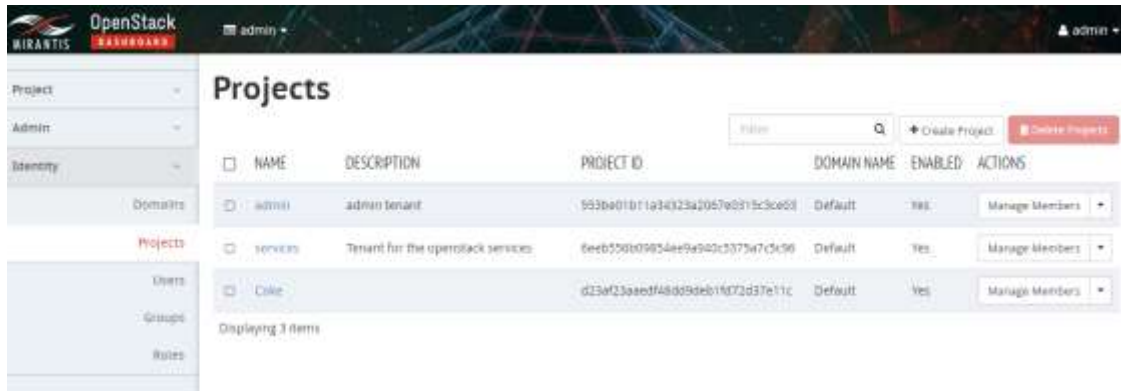
5.5 Testing

5.5.1 Integration Test cases and test results

Verify that NetScaler MAS is able to get the Tenants, Images, Networks and Flavors information configured in OpenStack. In NetScaler MAS only Flavors applicable to NetScaler Control Center (vCPU equal to 2 or more) will be displayed. (Screenshots are below)

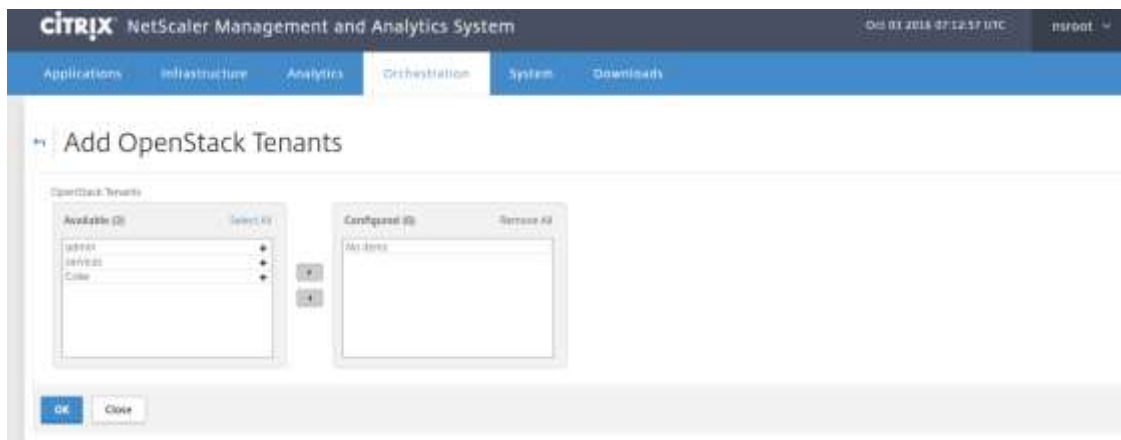
1. Compare the tenants present in MOS and MAS.

Tenants present in OpenStack.



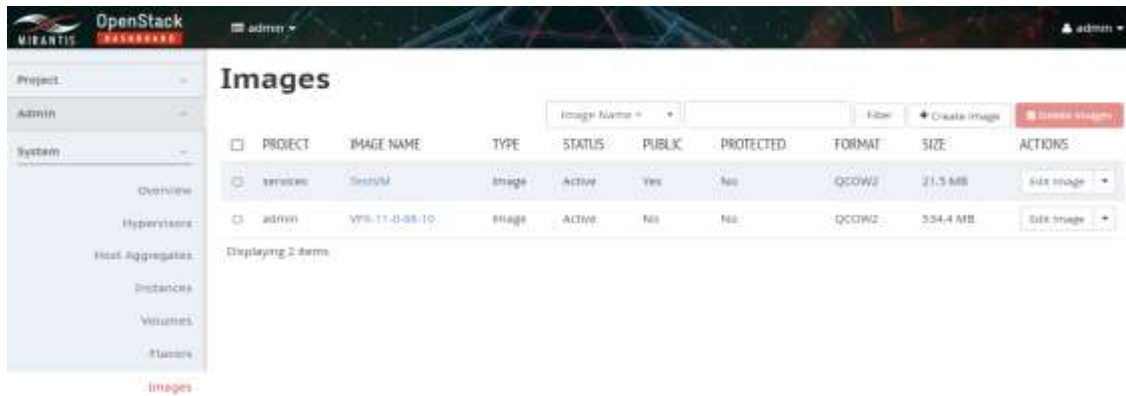
MAS fetches the Tenants from OpenStack.

Note: MAS can be accessed by typing the IP address of the NetScaler MAS server (IP address provided during MAS installation) in the address bar of the browser.

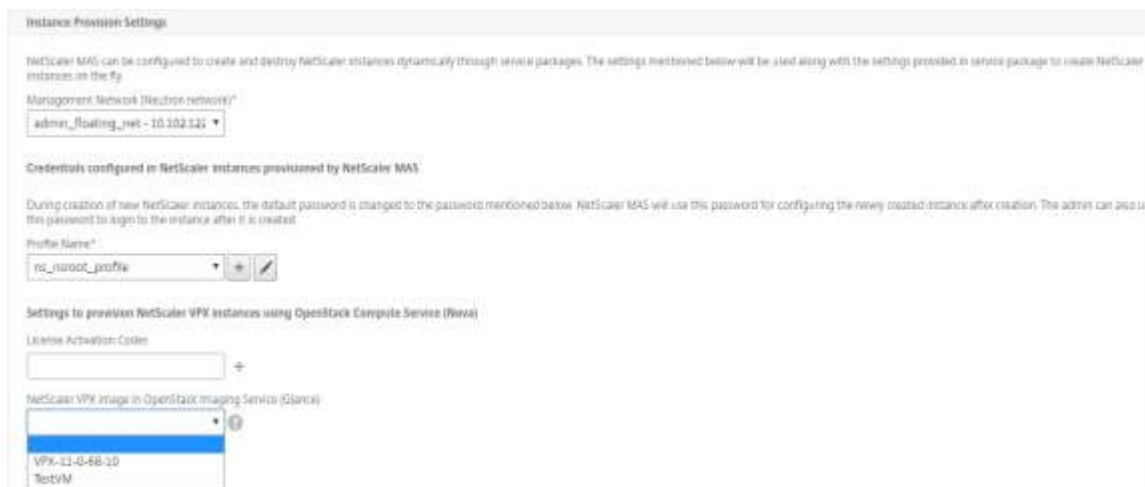


2. Compare the Images present in MOS and MAS.

Images present in OpenStack

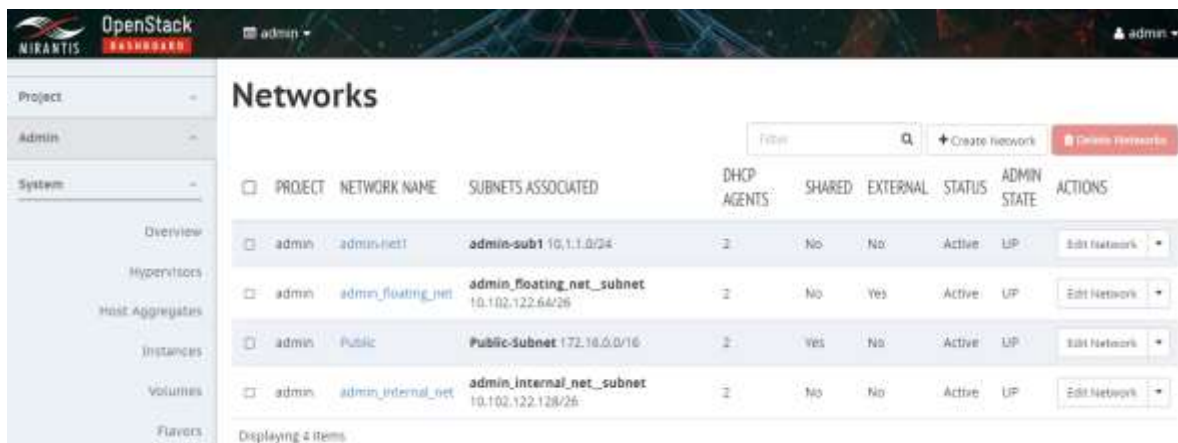


MAS fetches the Images from OpenStack

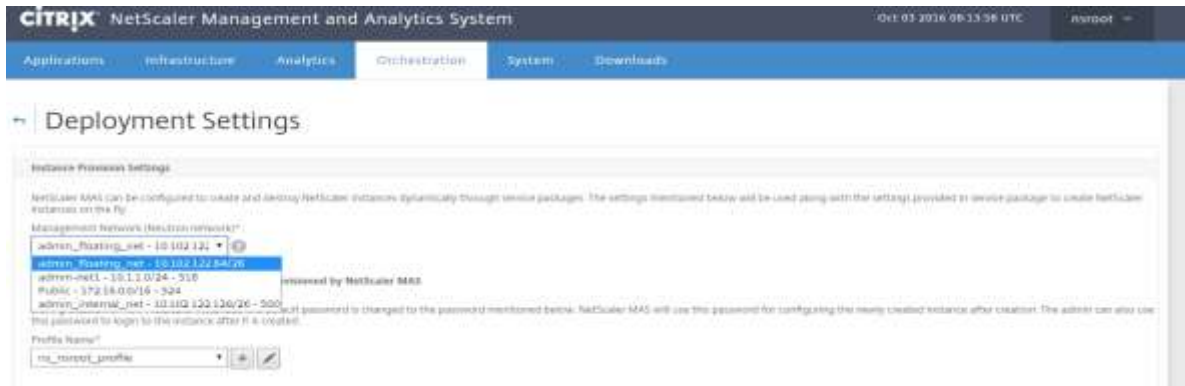


3. Compare the Networks present in MOS and MAS.

Networks present in OpenStack.



MAS fetches Networks from OpenStack



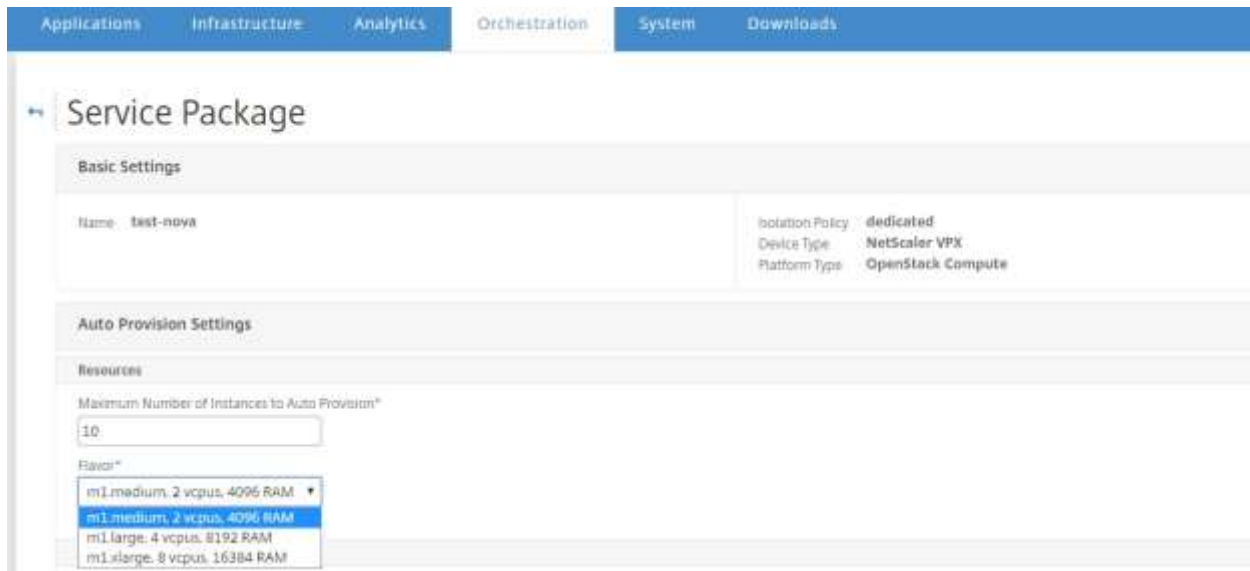
4. Compare the Flavors present in MOS and MAS.

Flavors present in OpenStack

FLAVOR NAME	VCPUS	RAM	ROOT DISK	EPHEMERAL DISK	SWAP DISK	RX/TX FACTOR	ID	PUBLIC	METADATA	ACTIONS
m1.large	4	8GB	80GB	0GB	0MB	1.0	4	Yes	No	Edit Flavor
m1.medium	2	4GB	40GB	0GB	0MB	1.0	3	Yes	No	Edit Flavor
m1.micro	1	64MB	0GB	0GB	0MB	1.0	c96c2930-bb33-4532-8e04-6453f668ad00	Yes	No	Edit Flavor
m1.small	1	2GB	20GB	0GB	0MB	1.0	2	Yes	No	Edit Flavor
m1.tiny	1	512MB	1GB	0GB	0MB	1.0	1	Yes	No	Edit Flavor
m1.xlarge	8	16GB	160GB	0GB	0MB	1.0	5	Yes	No	Edit Flavor

Displaying 6 items.

MAS fetches the Flavors from OpenStack.



5.5.2 Target Use case(s)

Provide LBaaS service through Mirantis OpenStack by integrating Citrix NetScaler devices through NetScaler MAS.

- Provide LBaaS with pre-provisioned Dedicated NetScaler VPX.
- Provide LBaaS with pre-provisioned NetScaler MPX.
- Provide LBaaS with VPX instances auto-provisioned(both in standalone and HA mode) on a NetScaler SDX appliance,

Deployment modes and configuration options

The following table lists the minimum combination of Mirantis OpenStack deployment options. Example:

OS	Mode	HV	Network	Storage	
			VLAN	Object	Block
Ubuntu (14.04.5)	HA	KVM	X	Ceph	Cinder

LTS)					
------	--	--	--	--	--

NS Release version	Pre-Provisioned VPX	Pre-Provisioned MPX	SDX	Nova based VPX
10.5	Yes		Yes	
10.5.e	Yes		Yes	
11.0	Yes		Yes	
11.1	Yes		Yes	

Functional testing

- 1) Auto provision on SDX :
 - a. In MAS, add the SDX devices under infrastructure.
 - b. Create a Service package with **SDX** as the platform and **NetScaler VPX** as the device type. Specify the values (integer only) for cores, memory, SSL chips, and throughput.
 - c. Assign the Device and Tenant to the Service package.
 - d. The tenant then creates the Loadbalancer, Listener, pool and VIP from OpenStack.

- 2) LBaaS for Pre provisioned MPX device with dedicated isolation policy :
 - a. In NSMAS, add the MPX device under infrastructure
 - b. Create a Service Package with isolation policy as "dedicated."
 - c. Assign the Device and Tenant to the Service Package.
 - d. The tenant creates the Loadbalancer, Listener, pool and VIP from OpenStack

- 3) LBaaS for Pre provisioned VPX device with dedicated isolation policy
 - a. In NSMAS, add the VPX device under infrastructure
 - b. Create a Service Package with isolation policy as "dedicated."
 - c. Assign the Device and Tenant to the Service Package.
 - d. The tenant creates the Loadbalancer, Listener, pool and VIP from OpenStack

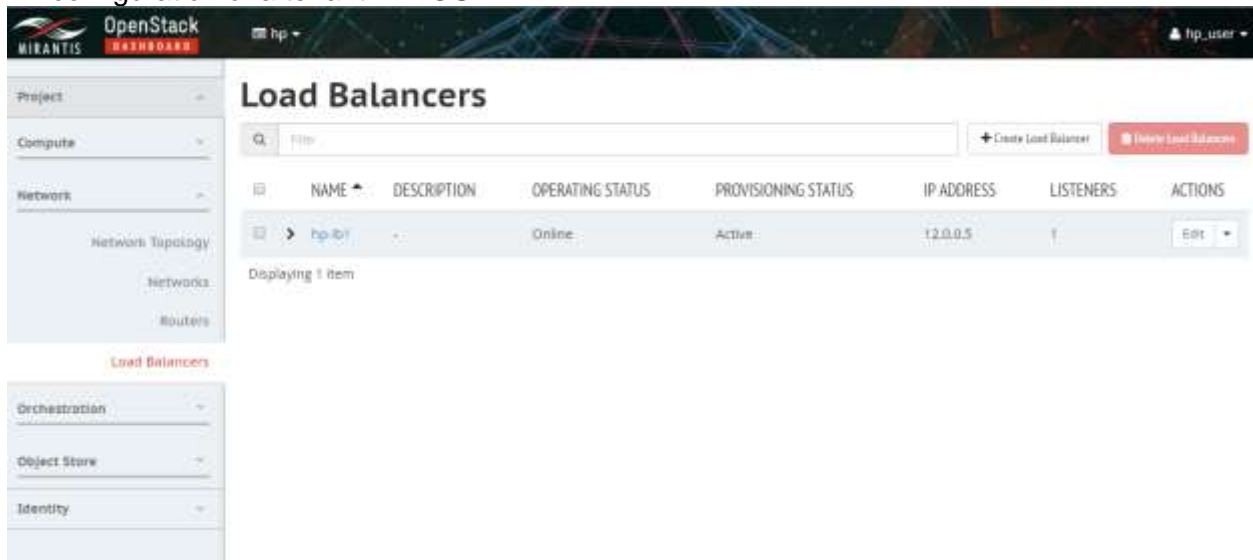
Negative testing

- 1) Verify registering Mirantis OpenStack with NetScaler MAS fails if the OpenStack credentials are incorrect.
- 2) Verify a tenant that does not exist in OpenStack keystone cannot log on to the NetScaler MAS user interface.
- 3) Verify the OpenStack driver cannot communicate with NetScaler MAS without proper credentials in the neutron.conf file.
- 4) Verify VPX provisioning fails if the OpenStack Nova service is down.
- 5) Verify VPX provisioning fails if the OpenStack Keystone service is down.
- 6) Verify if OpenStack Neutron service is down after provisioning the device, VPX device is not connected to the network.
- 7) Verify that insufficient resources on the Compute node cause VPX provisioning to fail.
- 8) Verify that insufficient resources on the SDX device cause VPX provisioning to fail.

Use Case Test Results

1. Pre-provision Dedicated VPX Use case:

LB configuration of a tenant in MOS



The screenshot displays the OpenStack Horizon dashboard for a tenant named 'hp'. The main heading is 'Load Balancers'. On the left, a navigation sidebar includes 'Project', 'Compute', 'Network', 'Orchestration', 'Object Store', and 'Identity'. Under 'Network', there are sub-links for 'Network Topology', 'Networks', and 'Routers'. A red link for 'Load Balancers' is visible below the 'Network' section. The main content area features a search bar, a '+ Create Load Balancer' button, and a '- Delete Load Balancers' button. Below these is a table with the following columns: NAME, DESCRIPTION, OPERATING STATUS, PROVISIONING STATUS, IP ADDRESS, LISTENERS, and ACTIONS. One load balancer is listed with the name 'hp-lb1', an IP address of '12.0.0.5', and a provisioning status of 'Active'. The table also shows 'Online' for operating status and '1' for listeners. An 'Edit' button is present in the actions column. Below the table, it says 'Displaying 1 item'.

NAME	DESCRIPTION	OPERATING STATUS	PROVISIONING STATUS	IP ADDRESS	LISTENERS	ACTIONS
hp-lb1		Online	Active	12.0.0.5	1	Edit

LB configuration of a tenant in MAS

CITRIX NetScaler Management and Analytics System Oct 04 2016 05:10:07 UTC nsroot

Applications Infrastructure Analytics **Orchestration** System Downloads

Cloud User Details

OpenStack Tenant Name
hp

Description
OpenStack Tenant:44f8a93c4e6433fb632f9cd4050661

Service Package
sp-preprod

Devices VPs Pools **Listeners_v2** Pools_v2

IP Address	Profile Name	Version	Type	State
10.106.43.13	m_nsroot_profile	NetScaler NS10.5 (Build 58.11;rc:State: 1/1/2015: 13:54:05)	nsip	Up

Close

Listener details

CITRIX NetScaler Management and Analytics System Oct 04 2016 05:10:33 UTC nsroot

Applications Infrastructure Analytics **Orchestration** System Downloads

Cloud User Details

OpenStack Tenant Name
hp

Description
OpenStack Tenant:44f8a93c4e6433fb632f9cd4050661

Service Package
sp-preprod

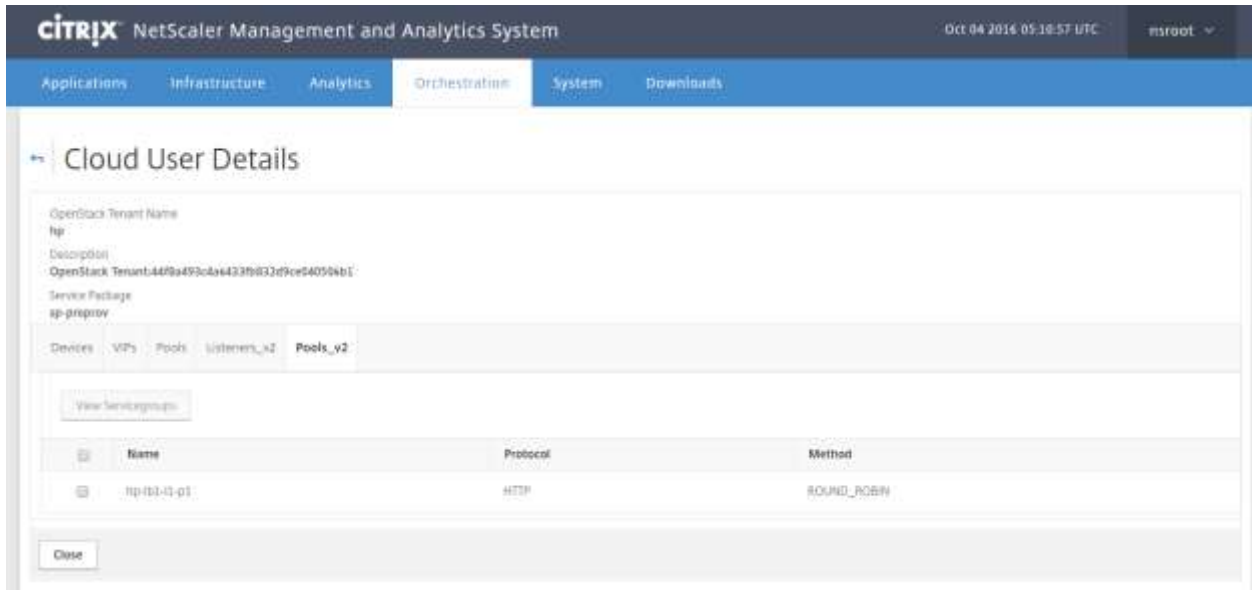
Devices VPs Pools **Listeners_v2** Pools_v2

View IP Details View LB Details **Statistics**

ID	Name	LB IP Address	Port	Protocol	State
1	hp-lb1-01	120.0.0.1	80	HTTP	ACTIVE

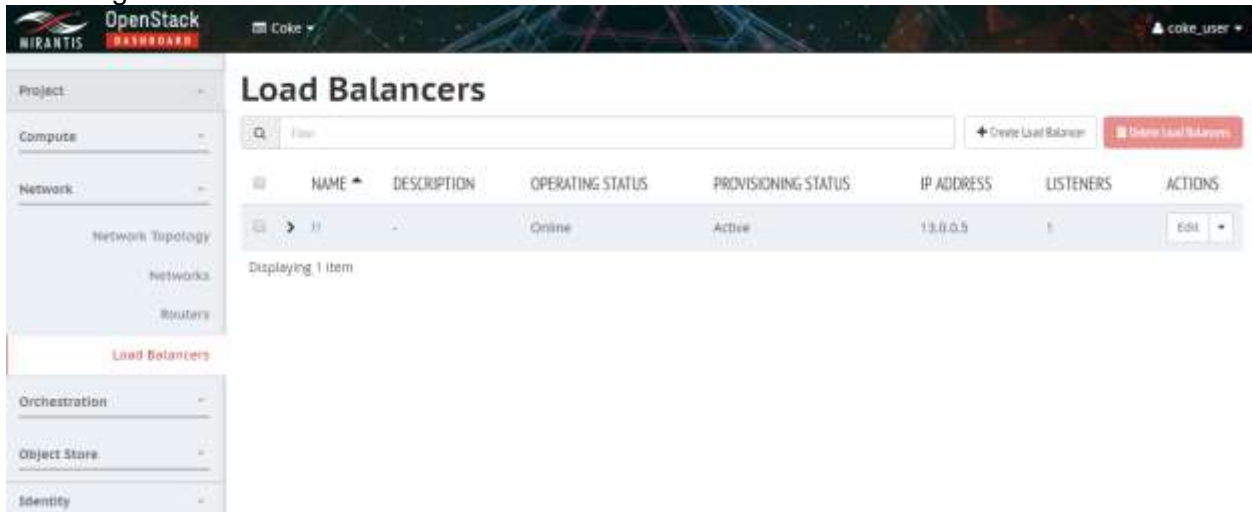
Close

Pool details



2. Auto-provision of VPX in HA on SDX use case:

LB configuration of a tenant on MOS



LB configuration of a tenant in MAS

CITRIX NetScaler Management and Analytics System Oct 04 2016 06:41:58 UTC nsroot

Applications Infrastructure Analytics **Orchestration** System Downloads

Cloud User Details

OpenStack Tenant Name
Coke

Description
OpenStack TenantId23af23aedf48d9Web1672d37e11c

Service Package
sp-sdr-ha

Devices VIPs Pools **Listeners_v2** Pools_v2

IP Address	Profile Name	Version	Type	State
10.102.122.100-10.102.122.101	m_https_profile	NetScaler NS11.1 Build 21.1 rc. Date: Dec 28 2015 01:40:06	https	Up

[Close](#)

Listener details

CITRIX NetScaler Management and Analytics System Oct 04 2016 06:42:28 UTC nsroot

Applications Infrastructure Analytics **Orchestration** System Downloads

Cloud User Details

OpenStack Tenant Name
Coke

Description
OpenStack TenantId23af23aedf48d9Web1672d37e11c

Service Package
sp-sdr-ha

Devices VIPs Pools **Listeners_v2** Pools_v2

[View All Servers](#) [View LB Servers](#) [Refresh](#)

Name	LB IP Address	Port	Protocol	State
lbr-01	10.0.0.5	80	HTTP	ACTIVE

[Close](#)

Pool details

CITRIX NetScaler Management and Analytics System Oct 04 2016 06:43:05 UTC nsroot

Applications Infrastructure Analytics **Orchestration** System Downloads

Cloud User Details

OpenStack Tenant Name
Code
 Description
 OpenStack Tenant:d23af23aaedf46d45deb10f72d37e13e
 Service Package
 ip-addr-ns

Devices VPs Pools Listeners_v2 **Pools_v2**

View Sensinggroup

Name	Protocol	Method
lb1-l1-p1	HTTP	ROUND_ROBIN

Close

3. Pre-provision Dedicated MPX Use case:

LB configuration of a tenant in MOS

OpenStack Dashboard hp user

Project Compute Network **Load Balancers** Orchestration Object Store Identity

Load Balancers

Filter

+ Create Load Balancer + Delete Load Balancers

NAME	DESCRIPTION	OPERATING STATUS	PROVISIONING STATUS	IP ADDRESS	LISTENERS	ACTIONS
mpx-lb1	-	Online	Active	12.0.0.8	1	Edit

Displaying 1 item

LB configuration of a tenant in MAS

CITRIX NetScaler Management and Analytics System Oct 04 2016 08:53:18 UTC nsroot

Applications Infrastructure Analytics **Orchestration** System Downloads

Cloud User Details

OpenStack Tenant Name: sp
 Description: OpenStack Tenant:4475e493e4a4433f6d32d9ce040506b1
 Service Package: sp-mpa

Devices VIPs Pools **Listeners_v2** Pools_v2

IP Address	Profile Name	Version	Type	State
10.257.204.39	ns_netout_profile	NetScaler NS11.0 Build 64.5rc, Date: Aug 31 2016, 19:22:57	IN	UP

Close

Listener details

CITRIX NetScaler Management and Analytics System Oct 04 2016 08:53:44 UTC nsroot

Applications Infrastructure Analytics **Orchestration** System Downloads

Cloud User Details

OpenStack Tenant Name: sp
 Description: OpenStack Tenant:4475e493e4a4433f6d32d9ce040506b1
 Service Package: sp-mpa

Devices VIPs Pools **Listeners_v2** Pools_v2

View CL Viewlet View LB Viewlet Statistics

Name	LB IP Address	Port	Protocol	State
mpx-lb-l1	128.0.0.0	80	HTTP	ACTIVE

Close

Pool details

Cloud User Details

OpenStack Tenant Name

hp

Description

OpenStack Tenant-44f0a493c04e432fb8220f0e040596b1

Service Package

sp-mpa

Devices VFPs Pools **Listeners_v2** **Pools_v2**

[View Service Package](#)

	Name	Protocol	Method
	mpa-80-0-g1	HTTP	ROUNDRobin

[Close](#)