Maxta and Mirantis OpenStack Installation and Configuration Run Book

Version 1.1

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Maxta Storage Platform Architecture

Maxta provides a distributed data store, using disk drives located on the Openstack compute hosts themselves. This removes the necessity of having large data storage devices (JBODs), exported across the network.

The Maxta datastore at a minimum includes a controller host, and at least two compute hosts.

Maxta Storage Platform (MxSP) is a hypervisor agnostic, software-only implementation of enterprise storage solution for virtualized environments providing VM-level storage abstraction and full integration into server virtualization management scheme and user interface. Maxta Storage eliminates the need for storage arrays (either SAN or NAS) delivering shared storage by aggregating dispersed storage resources from multiple servers. It dramatically simplifies IT by eliminating storage provisioning, storage management and storage networking, enabling administrators to focus on high value-add initiatives. Maxta Storage delivers VM-centric enterprise-class data services to support advanced capabilities such as live migration of virtual machines, dynamic load balancing, high availability, data protection, and disaster recovery.
Maxta Storage enables significant capital savings by converging compute and storage resources on standard commodity servers, without compromising performance or scalability for virtual workloads. Maxta Storage can coexist alongside traditional storage arrays and servers thereby providing investment protection. The versatile architecture provides the ability to scale capacity and performance independently, on-demand, without having to over-provision resources.
The following illustrates how the Maxta Storage Platform fits into virtualized environments.

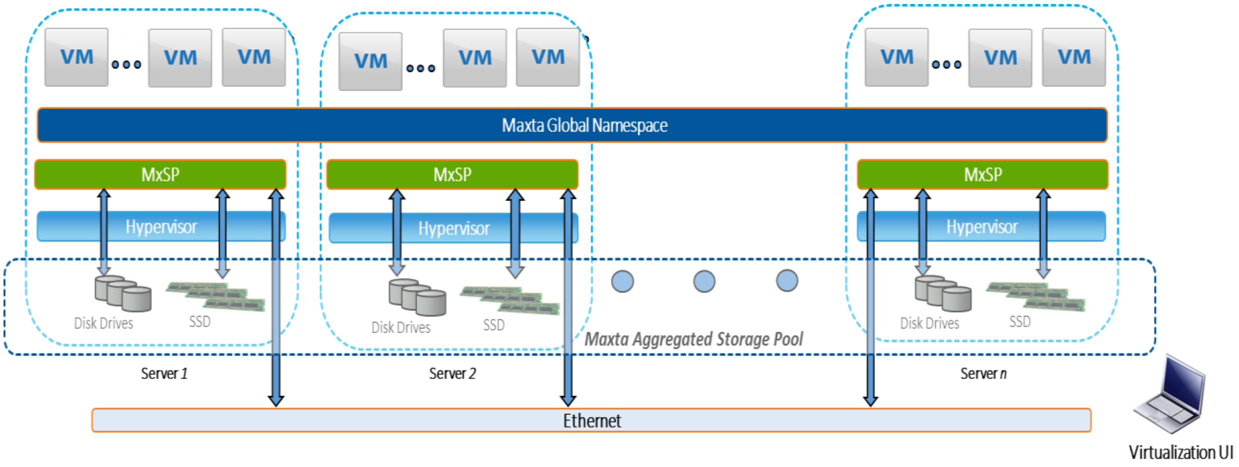


Figure 1: Maxta Storage Platform Architecture

The MxSP Software

As shown in *Figure 1*, an instance of the MxSP software is installed on each of the servers that are part of a server virtualization cluster. MxSP creates a Maxta global namespace that all the virtual machines (that are part of the cluster) can access. The servers running an instance of MxSP can be of two types:

1. Converged compute/storage servers – these have access to the MxSP storage pool and also contribute storage to it.
2. Compute-only servers – these have access to MxSP storage pool but do not contribute storage to it.

MxSP intelligently maps VMs to storage resources, optimizing data layout for virtual workloads. MxSP leverages any combination of magnetic disk drives and SSDs on standard servers to deliver flash performance and hard disk capacity at an attractive price for all storage workloads in a virtualized environment.

MxSP supports the following options in managing the KVM and Openstack environment simplifying storage management and minimizing the learning curve.

1. In a KVM environment MxSP can be managed though a native user interface from a web browser.
2. In an Openstack environment MxSP can be managed though the Openstack Horizon user interface. MxSP management is completely integrated into the Openstack Horizon UI though native Openstack Nova compute and Openstack Cinder storage driver plugins.

MxSP Key Benefits

The key benefits of Maxta Storage Platform are:

Dramatically Simplify IT:

MxSP dramatically simplifies IT by eliminating the need for storage provisioning and storage management. The Maxta storage and all data services such as local replication, snapshots and zero-copy clones are configured and managed at VM-level granularity. This simplification eliminates the day-to-day tasks of storage management and enables administrators to focus on managing applications and VMs.

Deliver Enterprise-class data services

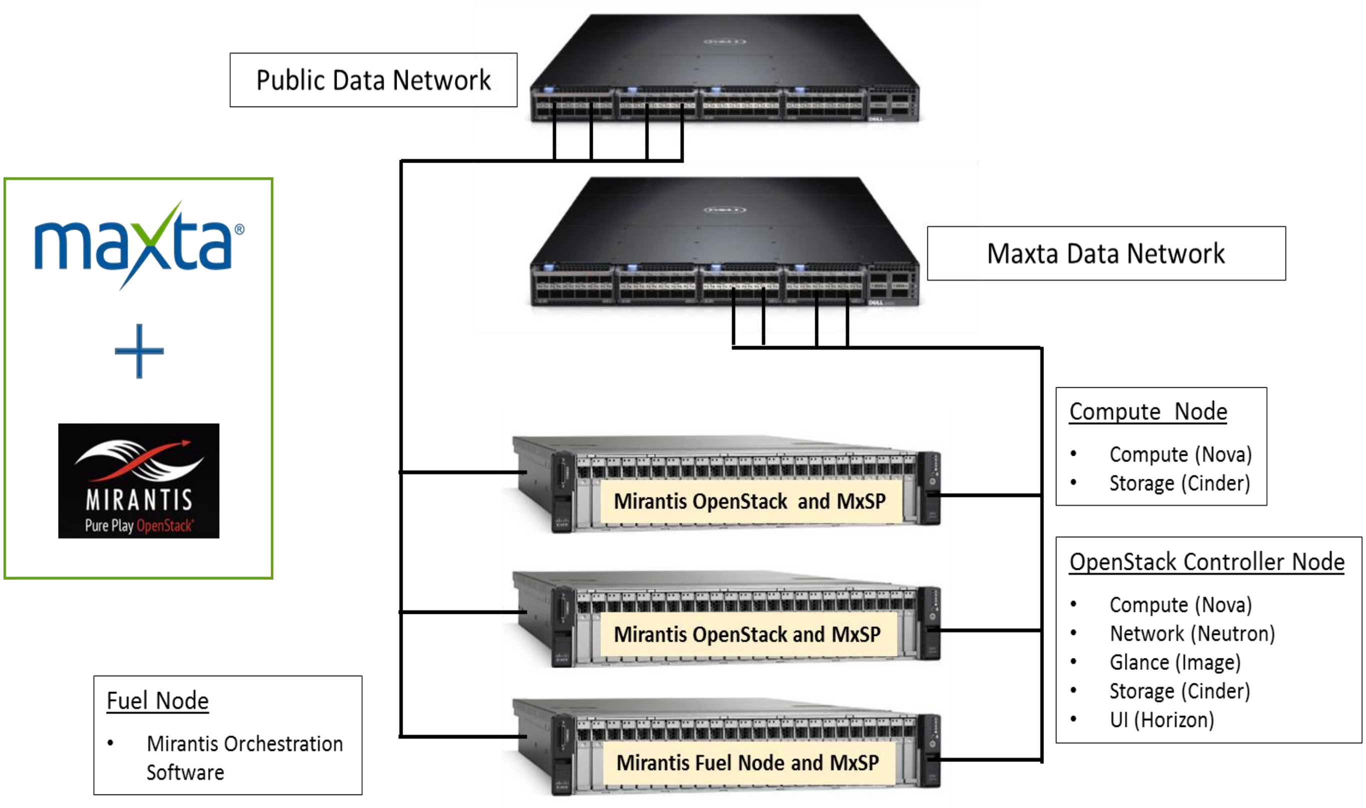
MxSP eliminates single point of failure by delivering best-in-class data resiliency, integrity and high availability leveraging strong checksums and data replication for all stored data. Time, performance and capacity efficient snapshots and clones provide the first layer of data protection and the ability to rapidly provision VMs. MxSP seamlessly integrates with all the advanced capabilities of the server virtualization software.

Maximize Cost Savings

MxSP enables significant capital savings by converging compute and storage resources on industry standard servers, without compromising performance or scalability. This provides considerable up-front capital savings and even greater savings on upgrades compared to the capital expenses associated with purchasing and expanding storage arrays or storage appliances. In addition, MxSP leverages commodity disk drives, SSD, snapshots, zero-copy clones, thin provisioning, in-line compression to increase storage efficiency and reduce storage expenses. MxSP can coexist alongside traditional storage array and servers thereby providing investment protection. By significantly simplifying IT, increasing IT efficiency, and enabling administrators to focus on managing applications and VMs, MxSP enables dramatic reduction in operating expenses.

Maxta and Mirantis OpenStack Configuration diagram

The figure below provides the configuration information of Maxta Storage Platform (MxSP) and Mirantis OpenStack.



Installation

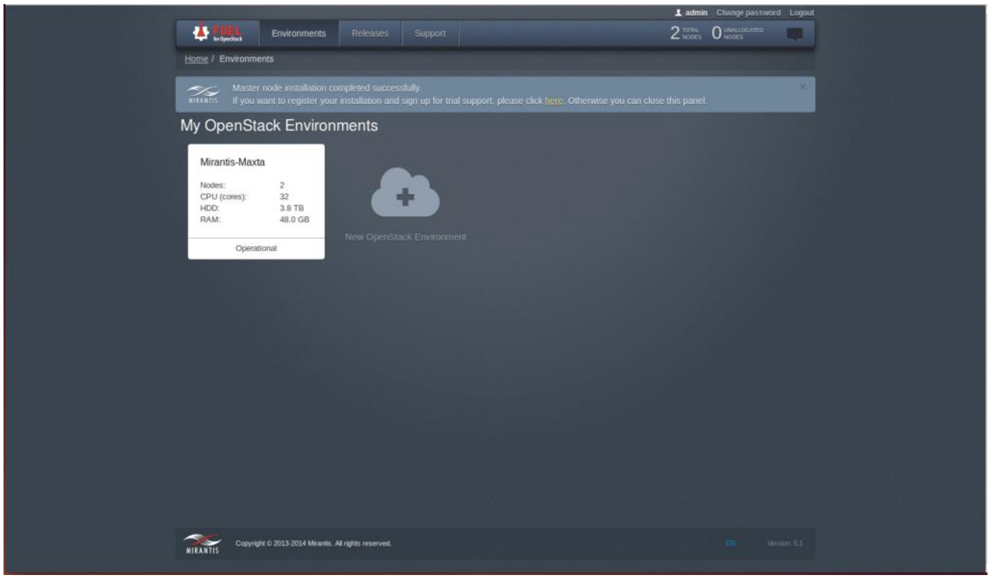
Prerequisites:

Openstack installation (Icehouse)

Compute hosts with nova-compute, and cinder-volume installed

Mirantis Install Requirements

- When installing Mirantis Openstack, you will need to leave one network interface card unused for Maxta.
- Maxta does not affect the Openstack Networking, so the user is free to select whatever VM networking is best for their purpose.
- Disks that are to be used for Maxta storage should be left unallocated.
- As mentioned elsewhere, Maxta requires the base OS be either CentOS or Redhat (see next section).



Master node installation completed successfully.
If you want to register your installation and sign up for trial support, please click here. Otherwise you can close this panel.

My OpenStack Environments

Mirantis-Maxta

Nodes:	2
CPU (cores):	32
HDD:	3.8 TB
RAM:	48.0 GB

Operational

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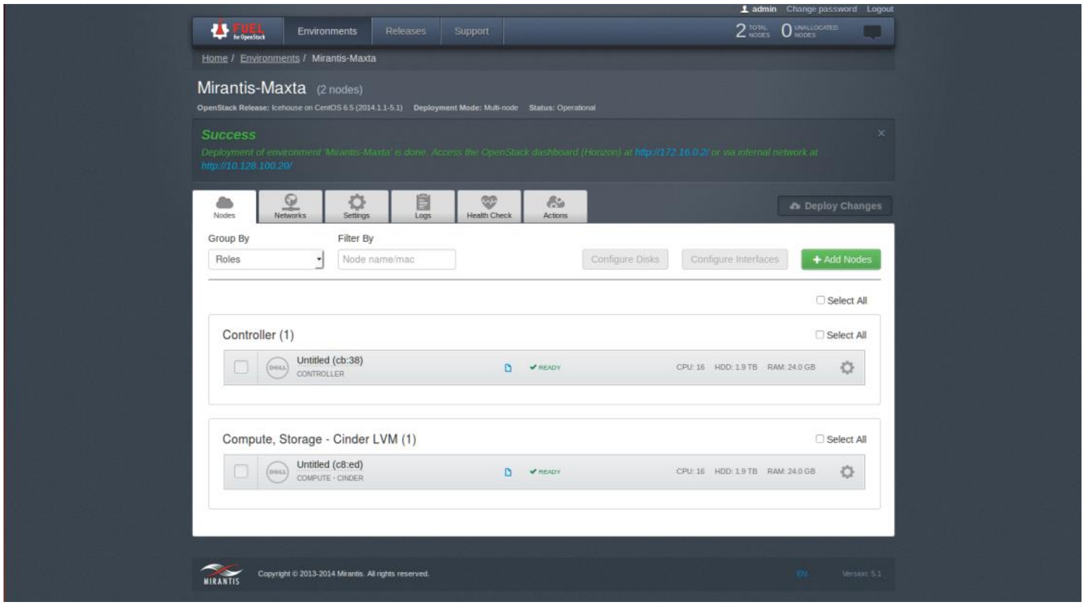
Mirantis Fuel install provides an easy way to install and manage Openstack.



admin Change password Logout

FUEL for OpenStack | Environments | Releases | Support | 2 TOTAL NODES | 0 UNALLOCATED NODES

Home / Environments / Mirantis-Maxta

Mirantis-Maxta (2 nodes)

OpenStack Release: Icehouse on CentOS 6.5 (2014.1.1-5.1) **Deployment Mode:** Multi-node **Status:** Operational

Success

Deployment of environment 'Mirantis-Maxta' is done. Access the OpenStack dashboard (Horizon) at http://172.16.0.2/ or via internal network at http://10.128.100.20/

Nodes | Networks | Settings | Logs | Health Check | Actions | Deploy Changes

Group By: Roles | Filter By: Node name/mac | Configure Disks | Configure Interfaces | + Add Nodes

□ Select All

Controller (1) □ Select All

□ Untitled (cb:38) CONTROLLER ✓ READY CPU: 16 HDD: 1.9 TB RAM: 24.0 GB

Compute, Storage - Cinder LVM (1) □ Select All

□ Untitled (c8:ed) COMPUTE - CINDER ✓ READY CPU: 16 HDD: 1.9 TB RAM: 24.0 GB

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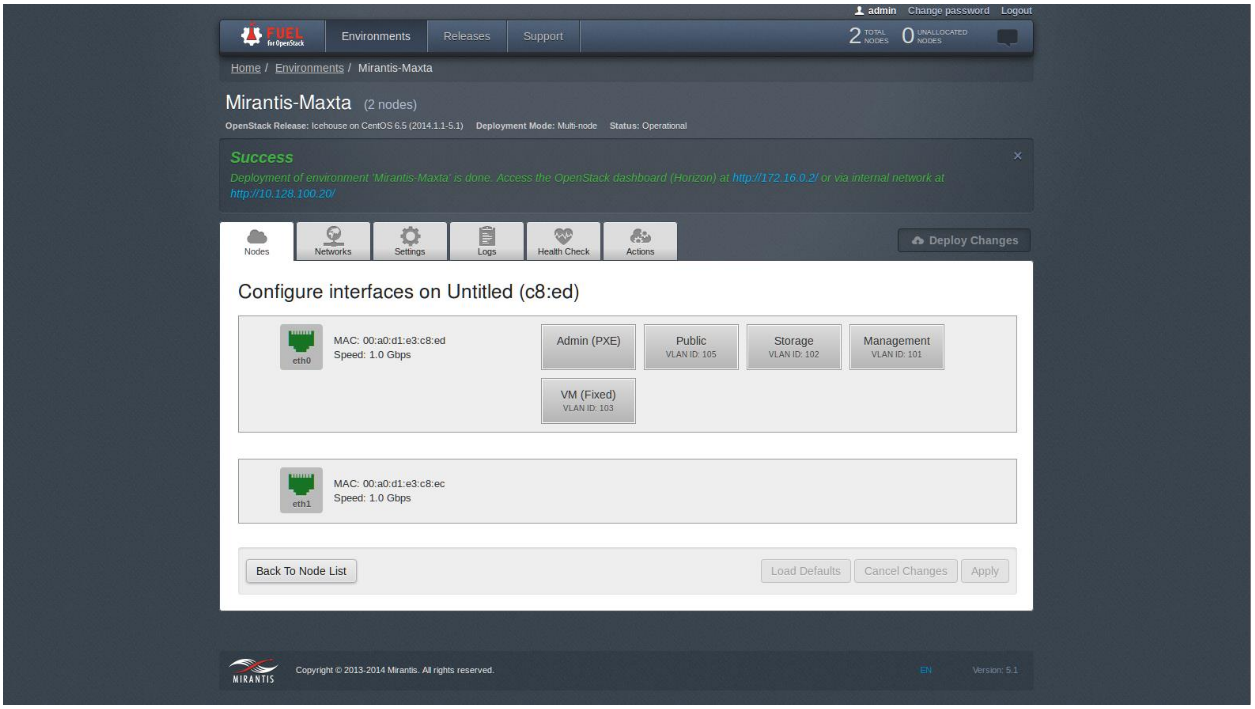
Target the compute nodes for the maxta data store install.



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Mirantis-Maxta (2 nodes)

OpenStack Release: Icehouse on CentOS 6.5 (2014.1.1-5.1) **Deployment Mode:** Multi-node **Status:** Operational

Success

Deployment of environment 'Mirantis-Maxta' is done. Access the OpenStack dashboard (Horizon) at http://172.16.0.2/ or via internal network at http://10.128.100.20/

Nodes | Networks | Settings | Logs | Health Check | Actions | Deploy Changes

Configure interfaces on Untitled (c8:ed)

eth0 MAC: 00:a0:d1:e3:c8:ed Speed: 1.0 Gbps

Admin (PXE) | Public VLAN ID: 105 | Storage VLAN ID: 102 | Management VLAN ID: 101 | VM (Fixed) VLAN ID: 103

eth1 MAC: 00:a0:d1:e3:c8:ec Speed: 1.0 Gbps

Back To Node List | Load Defaults | Cancel Changes | Apply

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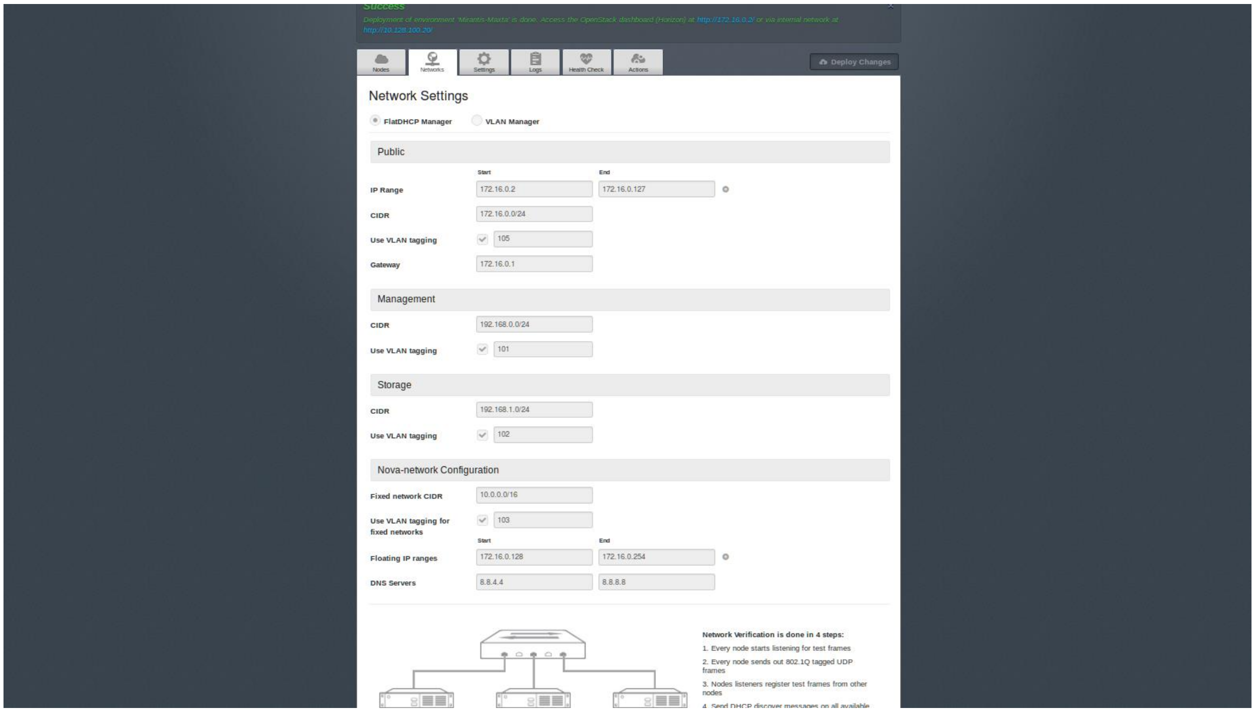
One NIC on each compute node will need to be reserved for Maxta.



Success

Deployment of environment 'Mirantis-Maxta' is done. Access the OpenStack dashboard (Horizon) at http://172.16.0.2/ or via internal network at http://10.128.100.20/

Network Settings

● FlatDHCP Manager ○ VLAN Manager

Public

	Start	End
IP Range	172.16.0.2	172.16.0.127
CIDR	172.16.0.0/24	
Use VLAN tagging	✓ 105	
Gateway	172.16.0.1	

Management

CIDR	192.168.0.0/24
Use VLAN tagging	✓ 101

Storage

CIDR	192.168.1.0/24
Use VLAN tagging	✓ 102

Nova-network Configuration

	Start	End
Fixed network CIDR	10.0.0.0/16	
Use VLAN tagging for fixed networks	✓ 103	
Floating IP ranges	172.16.0.128	172.16.0.254
DNS Servers	8.8.4.4	8.8.8.8

Network Verification is done in 4 steps:

1. Every node starts listening for test frames
2. Every node sends out 802.1Q tagged UDP frames
3. Nodes listeners register test frames from other nodes
4. Send DHCP discover messages on all available

Mirantis Openstack provides many networking options. For Maxta install, all MOS managed networks should use VLAN's.

Installing Maxta Storage Platform

SYSTEMS REQUIREMENTS for the Maxta Installation

Operating System Installation

1) Centos 6.5 standard Desktop client or Red Hat Enterprise Linux (RHEL) 6.x
2) Minimum 3 Storage servers which have Centos 6.5 or RHEL 6.x installed.
   On each of these servers, SELINUX has to be disabled
   To disable SELINUX
   - Edit file /etc/selinux/config
   - Set SELINUX=disabled
   - If SELINUX value was changed the system has to be restarted. On the command prompt type “reboot”

Now the system is ready to install Maxta Storage Platform.

Maxta Installation

The Maxta Storage Platform software can be downloaded from:

https://maxtainc.box.com/s/klyxyrc4c0sh50rguopw

The Maxta software has to be installed from a Linux virtual machine of a Linux server. Install CentOS 6.5 standard Desktop client or Red Hat Enterprise Linux 6.x on the system from where Maxta software will be installed.

1. Create a new directory on the VM or system from where Maxta software will be installed.
2. Download the file from the location above to this newly created directory.
3. Extract the contents of the file in to the directory.

   ```
   tar -xvf  baremetalInstaller.tar
   ```

4. Change to subdir baremetalInstaller/src, where the host configuration file installer.cfg and installer.py reside

   ```
   cd baremetalInstaller/src
   ```

5. Edit the host configuration file installer.cfg. The host configuration file defines the hosts where Maxta should be installed and associated parameters such as IP address, the network interface to use. The installer.cfg has sample parameters. Modify the parameters based on the network configuration.
6. Once the configuration file is modified the system is ready to install the Maxta software. The software is installed using the following command

   ```
   ./installer.py -c installer.cfg
   ```

   Usage of the installer.py is has follows:

   ```
   usage: installer.py [options]

   Options:
     -h, --help                   show this help message and exit
     -c CONFIG, --config=CONFIG   The configuration file to use
     -n, --nokvm                  Do not install KVM
     -j JUMP, --jump=JUMP         Skip certain steps. MX, MGMT
                                  MX=Skip to Maxta Installation
                                  MGMT=Skip to Management Installation
   ```

The installer will perform the following steps on all the servers in parallel. On each server, the installer acts sequentially. For example: Step B is executed only after Step A is completed and Step C is executed only after Step A and Step B are completed.

A. Copy and Install all needed apps.

B. Reset system and bring up Maxta cluster

C. Install the Maxta Management module

D. Install KVM (default case)

Step A is executed by default. If "-j MX or –jump=MX" is used it will jump to Step B. If "-j MGMT or –jump=MGMT" is used it will jump to Step C. If kvm is already installed, use the "-n or –nokvm" option (which will skip step D).

If step "B" above fails, you can reboot the system, and rerun the installer with parameter jump to MX which will skip step "A", and execute Step B and C.
To execute step C onwards (Maxta Management module and KVM), execute the command "installer.py -c installer.cfg -j MGMT"

Once the process is completed without any errors Maxta Storage platform is successfully installed.

Maxta storage can be independently managed by a web browser. Point the web browser to <Server address:8080>

For example:
http://10.1.0.101:8080/

Installing Maxta Openstack Drivers:

- Extract OpenStack drivers from the Maxta source tarball. The drives can be downloaded from:
  - Nova: https://maxtainc.box.com/s/8is5yth16a61ztkrvg1h
  - Cinder: https://maxtainc.box.com/s/dyxxd5ya8n7t8s65v72a

- Copy drivers to the Mirantis OpenStack install dir:

  For example, if OpenStack is installed in /usr/lib/python2.6/site-packages, you would run:
  - tar -xvf nova_driver.tar -C /usr/lib/python2.6/site-packages/
  - tar -xvf cinder_driver.tar -C /usr/lib/python2.6/site-packages/cinder/volumes/drivers

- Modify configuration files. Add:
  - /etc/cinder/cinder.conf:

```
[DEFAULT]
rootwrap_config = /etc/cinder/rootwrap.conf
volume_name_template = volume-%s
volume_backend_name = cinder-maxta
storage_availability_zone=Maxta
verbose = True
```

- /etc/cinder/rootwrap/volume.filters

```
# cinder/volume/drivers/maxta.py
    mkdir: CommandFilter, mkdir, root
    mxTool: CommandFilter, mxTool, root
```

- /etc/nova/nova.conf:

```
instances_path=/var/lib/nova/instances
   volume_drivers=['maxta=nova.virt.libvirt.volume.LibvirtDriver']
   libvirt_images_type=maxta
   libvirt_images_maxta_root=%Maxta Instances Dir%
```

Configure Mirantis OpenStack

Restart all openstack services on the hosts that will now use Maxta storage.

Create Host Aggregate

Through the dashboard, create a host aggregate group ‘maxta’, and add the compute hosts now running the maxta service.

Administering Mirantis OpenStack and Maxta

Running VM’s with Maxta

Maxta brings together VM’s and the supporting storage to a single host, in a way that is robust and fast. The Maxta OpenStack drivers allow the basic OpenStack functions to take advantage of the advanced feature set Maxta provides, including fast snapshots and local block volumes.

To use, simply add virtual machines or volumes in the ‘maxta’ host aggregate/storage zone. The vm’s and volumes will take advantage of Maxta store natively.

Testing

For each vm spun up with ephemeral storage (ie., not backed by cinder volume), there should be a disk file located in the %Maxta Instances Dir% specified in the nova.conf file.

For each cinder volume created, there should be a file in the volumes directory (specified in the cinder.conf file), with a single file - the directory name and the file name should be %pre%[volume-id]/[volume-id], where the %pre% is set in the cinder.conf file.