Guide to the ScaleIO Plugin for Fuel 6.1

Intro

This document will guide you through the steps of install, configure and use of the ScaleIO Plugin for Fuel

Sections

ScaleIO Plugin for Fuel 6.1

EMC ScaleIO is a software-only server-based storage area network (SAN) that converges storage and compute resources to form a single-layer, enterprise-grade storage product. ScaleIO storage is elastic and delivers linearly scalable performance. Its scale-out server SAN architecture can grow from a few to thousands of servers.

ScaleIO uses servers' direct-attached storage (DAS) and aggregates all disks into a global, shared, block storage. ScaleIO features single-layer compute and storage architecture without requiring additional hardware or cooling/ power/space.

Breaking traditional barriers of storage scalability, ScaleIO scales out to hundreds and thousands of nodes and multiple petabytes of storage. The parallel architecture and distributed volume layout delivers a massively parallel system that deliver I/O operations through a distributed system. As a result, performance can scale linearly with the number of application servers and disks, leveraging fast parallel rebuild and rebalance without interruption to I/O. ScaleIO has been carefully designed and implemented with ScaleIO software components so as to consume minimal computing resources.

With ScaleIO, any administrator can add, move, or remove servers and capacity on demand during I/O operations. The software responds automatically to any infrastructure change and rebalances data accordingly across the grid nondisruptively. ScaleIO can add capacity on demand, without capacity planning or data migration and grow in small or large increments and pay as you grow, running on any server and with any storage media.

ScaleIO natively supports all leading Linux distributions and hypervisors. It works agnostically with any solid-state drive (SSD) or hard disk drive (HDD) regardless of type, model, or speed.

ScaleIO Components

ScaleIO Data Client (SDC) - Acts as Block Device Driver - Exposes volumes to applications - Service must run to provide access to volumes - Over TCP/IP

ScaleIO Data Service (SDS) - Abstracts storage media - Contributes to storage pools - Performs I/O operations

ScaleIO Metadata Manager (MDM) - Not located in the data path - Provides Monitoring and Configuration management - Holds cluster-wide component mapping

ScaleIO Cinder Driver

ScaleIO includes a Cinder driver, which interfaces between ScaleIO and OpenStack, and presents volumes to OpenStack as block devices which are available for block storage. It also includes an OpenStack Nova driver, for handling compute and instance volume related operations. The ScaleIO driver executes the volume operations by communicating with the backend ScaleIO MDM through the ScaleIO REST Gateway.

Requirements

Requirement	Version/Comment

| Mirantis OpenStack | 6.1 |

- This plugin will deploy an EMC ScaleIO 1.32 cluster on the available nodes and replace the default OpenStack volume backend by ScaleIO.

- A minimum of 3 Controller nodes and 1 Compute node are required.

Limitations

Currently, this plugin is **only** compatible with Mirantis OpenStack 6.1 and CentOS 6.5 as the base OS.

Installation Guide

Install the Plugin

To install the ScaleIO Fuel plugin:

1. Download it from the Fuel Plugins Catalog

2. Copy the *rpm* file to the Fuel Master node:

```
[root@home ~]# scp fuel-plugin-scaleio-0.3-0.3.0-1.noarch.rpm root@fuel-master:/tmp
```

3. Log into Fuel Master node and install the plugin using the Fuel CLI:

```
[root@fuel-master ~]# fuel plugins --install /tmp/fuel-plugin-scaleio-0.3-0.3.0-1.no
```

4. Verify that the plugin is installed correctly:

```
[root@fuel-master ~]# fuel plugins
id | name                  | version | package_version
---|-----------------------|---------|----------------
9  | fuel-plugin-scaleio   | 0.3.0   | 2.0.0
```

ScaleIO Fuel Plugin User Guide

Once the Fuel ScaleIO plugin has been installed (following Installation Guide), you can create an *OpenStack* environments that uses ScaleIO as the block storage backend.

Prepare infrastructure

At least 5 nodes are required to successfully deploy Mirantis OpenStack with ScaleIO.

1. Fuel master node (w/ 50GB Disk, 2 Network interfaces [Mgmt, PXE])

2. OpenStack Controller #1 node

3. OpenStack Controller #2 node

4. OpenStack Controller #3 node

5. OpenStack Compute node

Each node shall have at least 2 CPUs, 4GB RAM, 200GB disk, 4 Network interfaces. The 4 networks are:

1. PXE Network

2. Public Network

3. Private Network

4. Management Network

Select Environment

1. Create a new environment with the Fuel UI wizard. Select "Juno on CentOS 6.5" from OpenStack Release dropdown list and continue until you finish with the wizard.

2. Add VMs to the new environment according to Fuel User Guide and configure them properly.

Plugin configuration

1. Go to the Settings tab and scroll down to "ScaleIO Fuel Plugin" section. You need to fill all fields with your preferred ScaleIO configuration. If you don't know the purpose of a field you can leave it with its default value.
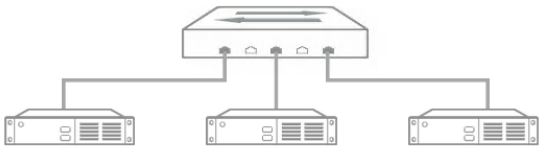
2. Take the time to review and configure other environment settings such as the DNS and NTP servers, URLs for the repositories, etc.

Finish environment configuration

1. Go to the Network tab and configure the network according to your environment.

2. Run network verification check

Network verification performs the following checks:

1. L2 connectivity checks between every node in the environment.
2. DHCP discover check on all nodes.
3. Packages repo connectivity check from master node.
4. Packages repo connectivity check from slave nodes via public & admin (PXE) networks.

Verification succeeded. Your network is configured correctly.

| Verify Networks | Cancel Changes | Save Settings |

3. Press Deploy button to once you are done with environment configuration.

Deploy Changes   ✕

⚠ Please note that environment settings and node configuration will be locked after deployment.

⚠ By default, packages and package updates will be fetched from repositories. Please make sure your Fuel node has internet access.
To specify alternate repositories, or to create a local mirror, please check the Settings tab before deployment.

Added 6 nodes.

Cancel   Deploy

4. After deployment is done, you will see a message indicating the result of the deployment.

ScaleIO verification

Once the OpenStack cluster is setup, we can make use of ScaleIO volumes. This is an example about how to attach a volume to a running VM.
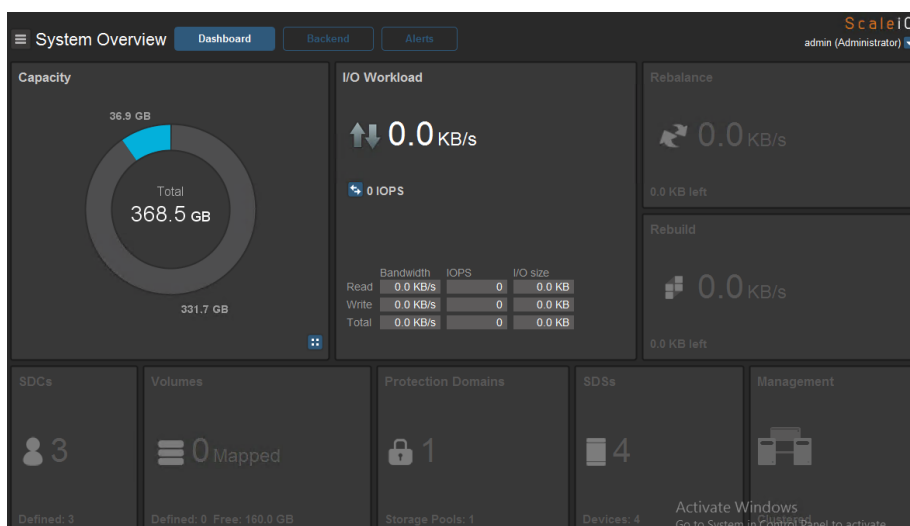
1. Login into the OpenStack Cluster:

2. Review the block storage services by navigating to the "Admin -> System -> System Information" section. You should see the ScaleIO volume.

3. Review the System Volumes by navigating to "Admin -> System -> Volumes". You should see the ScaleIO volume type:

4. Open the ScaleIO Control Panel and verify that it successfully reflects the ScaleIO resources:

5. Click on the "Backend" tab and verify all SDS nodes:

6. Create a new OpenStack volume using the ScaleIO volume type.

7. Review the newly created volume.

8. In the ScaleIO Control Panel, you will see that there is one volume defined but none have been mapped yet.

9. Once the volume is attached to a VM, the ScaleIO Control Panel will reflect the mapping.

Appendix