Dell OpenStack-Powered Cloud Solution EqualLogic Driver Addendum

A Brief Guide

Dell Inc.

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Notes, Cautions, and Warnings

NOTE: A NOTE indicates important information that helps you make better use of your system.

CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

Overview

Goals and Audience

This document is an addendum to the documentation set supporting the Dell Openstack-Powered Cloud Solution. It is intended to provide basic details required to enable the solution to utilize Equlogic SAN hardware present in the customer's environment.

This addendum assumes the reader is familiar with

- Crowbar – the deployment mechanism utilized by the Dell Openstack-Powered Cloud Solution
- Openstack
- EqualLogic array management activities

Please consult the relevant documentation if these assumptions do not hold.

Capabilities and features

Openstack provides two types of persistent block storage to virtual machines:

- **Ephermal Storage –** Temporary storage that persists for the life of a Virtual Machine, created implicitly when a VM is launched.
- **Volumes –** Explicitly created and managed by users which are intended to persist beyond the lifecycle of a virtual machine.

Volumes in Openstack are managed by a dedicated service – nova-volume. The service provides an API that allows users to:

- Create and destroy volumes
- Create and destroy snapshots of volumes

Once a volume is created, it can then be attached to a VM (a volume can only be attached to 1 VM at a time). The backing storage for volumes can be provided by different back-ends; in the reference architecture of the Dell Openstack-Powered Cloud Solution, a RAID10 volume on the nova-volume server is used.

This addendum describes the steps required to enable an EqualLogic array to be utilized for both volume and snapshot management.

The capabilities described in this addendum are available today in the Dell OpenStack-Powered Cloud solution as a "Technical Preview", and intended to be used by customers in PoC environments and adding existing pre-configured EQL arrays to an OpenStack deployment. The management of the EQL arrays themselves is outside the scope of this document It is expected once fully incorporated into the solution, the deployment steps might change.

Operation

When enabled and properly configured, nova-volume API calls will be translated to appropriate commands issued to the array. As an example, the following flow of operations is involved in creating and attaching a volume to a VM (All operations can be performed via the Openstack Dashboard or via other clients)

- The user initiates creating a volume. Nova Volume invokes the appropriate driver to instantiate the underlying storage volume.
- The user boots a VM
- The user attaches the volume to the desired VM. The hypervisor layer orchestrates passing the iSCSI connection information for the created volume to the appropriate VM. To the VM, the newly attached volume appears as a locally attached device.

Installation

Assumptions and required information

This guide assumes that the following is already configured:

- One or more arrays have been racked, powered and configured with all the networking information
- A Group has been configured with the desired member arrays
- A storage pool has been configured
- The server on which the nova-volume service will be deployed has at a minimum SSH access (TCP port 22) to the storage arrays.
- The servers on which Nova will be deployed have iSCSI access to the storage array.
- If the use of Target CHAP is desired, the storage group has been configured with the appropriate user.
- The following information is available:
    - The group's IP address
    - Credentials to access the management interface (ssh) of the array.
    - If Target CHAP is to be used, the required credentials.

Overview

The EqualLogic driver is installed as part of the nova-volume service. When the driver is enabled and properly configured, it will adapt nova-volumes behavior to manage volumes and snapshots on the EqualLogic SAN, rather than the local file system.

Installation steps

The installation process is similar to standard Openstack deployment using crowbar. For full details please refer to the *Dell OpenstackPowered Cloud Solution User's Guide*.
The steps below highlight the modifications to the standard process, which involve editing the nova proposal to enable the EqualLogic driver.

Deploy dependencies

Deploy the nova dependencies as usual, see the *User's Guide.*

Edit the non-volume values

Use the nova proposal editor to configure the values not related to the nova-volume service. Save the proposal

Edit the Nova-Volume values

In the current Technical Preview of the technology, enabling the driver requires advanced editing of the nova proposal, in Raw mode.

Refer to Figure 1 below, and locate at the right hand side, the link titled Raw. Clicking on this link changes the form to appear as shown in Figure 2.

Figure 1: Edit Proposal – Switching to Raw Mode

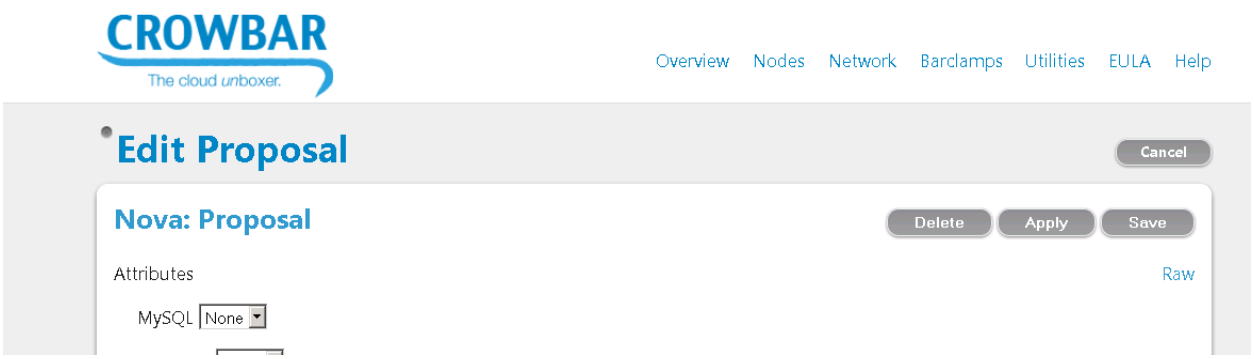
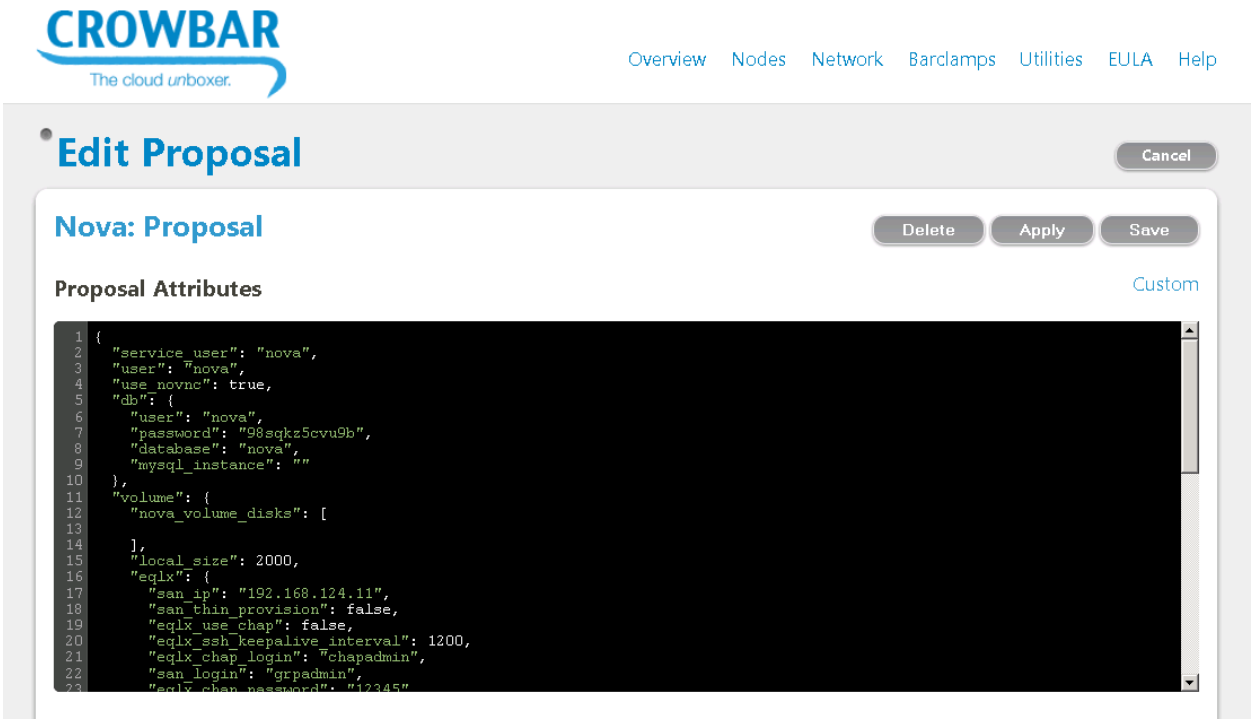


Figure 2: Edit Proposal - Raw Mode



Configure the driver

In JSON editor containing the configuration attributes, locate the section "volume", as show below. Then:

1. Change the value of "volume_type" to read "eqlx", as show below.
2. Update the driver parameters in the "eqlx" section, based on the description in Table 1.
3. Save the proposal.

```
"volume": {
  "nova_volume_disks": [

  ],
  "local_size": 2000,
  "eqlx": {
    "san_ip": "192.168.124.11",
    "san_login": "grpadmin",
    "san_password": "12345",
    "eqlx_group_name": "group-0",
```

```
      "san_thin_provision": false,
      "eqlx_use_chap": false,
      "eqlx_ssh_keepalive_interval": 1200,
      "eqlx_chap_login": "chapadmin",
      "eqlx_chap_password": "12345",
      "eqlx_cli_timeout": 30
    },
    "volume_name": "nova-volumes",
    "volume_type": "eqlx",
    "nova_raw_method": "all",
    "local_file": "/var/lib/nova/volume.raw"
  },
```

Table 1: Parameters

Name	Default	Notes
san_ip	192.168.124.11	The IP address to reach the EqualLogic Group via SSH
san_login	grpadmin	The User name to login to the Group manager with
san_password	12345	The password to login to the Group manager with
eqlx_group_name	group-0	The default group name. Must match that configured in Group Manager
eqlx_use_chap	false	Should CHAP authentication be used for iSCSI connections? If set to true, the next 2 values must be set appropriately as well.
eqlx_chap_login	chapadmin	The CHAP login for iSCSI connections
eqlx_chap_password	12345	The CHAP password for iSCSI connections
eqlx_ssh_keepalive_interval	1200	The number of seconds in between keep-alive SSH packets
eqlx_cli_timeout	30	The number of seconds to wait for replies from the Group manager after issuing commands.
san_thin_provision	false	Should volumes be created as thin-provisioned volumes.

Apply the proposal

Once the parameters are set, apply the proposal.

Note that viewing the proposal in the Custom view (rather than Raw mode) will not correctly present the configured values. Make sure to always switch to Raw mode when inspecting or modifying the EQLX parameters.

Complete the installation

Deploy any additional barclamps as required for your deployment.

Basic Troubleshooting

Verify SSH connectivity

To ensure that the driver will operate correctly, or if problems are encountered, ensure that an SSH connection can be established from the nova-volume node to the Group management IP address can be established.

Logs and additional information

Nova and nova-volume maintain log files on the nodes they're executing on, in addition to the general system logs (e.g. /var/log/syslog).

Type of problem	Log files
Create/Delete volume/snapshot	/var/log/nova/nova-volume.log on the nova-volume node (the nova controller node).
Attach volume to VM	/var/log/nova/nova.log, /var/log/syslog on the node on which the VM is executing. Use the Dashboard to identify on which nova-compute the VM was created on.

Ensure services are running

As a general statement, most operations require all the key nova services to be correctly functioning and registering successfully into the nova management plain. To verify that is the case:

- Log in to the nova-multi-controller node as root
- Issue the following command:

```
# nova-manage service list
```

The output should appear like the example below. Note the :-) state, and "enabled" status. If any of the services are reported with different values for either of these columns, investigate and fix those issues first.

```
Binary           Host                                 Zone             Status     State Updated_At
nova-cert        d60-eb-69-d2-67-52                   nova             enabled    :-)   2012-12-05 06:24:35
nova-network     d60-eb-69-d2-67-52                   nova             enabled    :-)   2012-12-05 06:24:26
nova-scheduler   d60-eb-69-d2-67-52                   nova             enabled    :-)   2012-12-05 06:24:26
nova-console     d60-eb-69-d2-67-52                   nova             enabled    :-)   2012-12-05 06:24:33
nova-consoleauth d60-eb-69-d2-67-52                   nova             enabled    :-)   2012-12-05 06:24:31
nova-volume      d60-eb-69-d2-67-52                   nova             enabled    :-)   2012-12-05 06:24:26
nova-compute     d00-26-6c-f9-7e-78                   nova             enabled    :-)   2012-12-05 06:24:27
nova-network     d00-26-6c-f9-7e-78                   nova             enabled    :-)   2012-12-05 06:24:32
```

References

Additional information can be obtained at www.dell.com/openstack or by e-mailing openstack@dell.com.

If you need additional services or implementation help, please contact your Dell sales representative.

To Learn More

For more information on the Dell | Openstack Powered Solution, visit:
www.dell.com/Openstack