

Dell OpenStack™-Powered Cloud Solution Barclamps User's Guide

OpenStack Version Grizzly

Version 1.6.1

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Notes, Cautions, and Warnings



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



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



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



The OPENSTACK LOGO indicates additional OpenStack information.



The DELL LOGO indicates additional Dell-specific information.

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October 21, 2013

Introduction

This document provides instructions to use when deploying OpenStack™ components using Crowbar 1.6.1. This guide is for use with the *Dell Crowbar Software Framework Users Guide*, it is not a stand-alone document.

Other suggested materials:

- Dell OpenStack™-Powered Cloud Solution Reference Architecture (Dell Internal, RA, July 2013)
- Dell Crowbar Framework Users Guide (July 2013)
- Dell OpenStack™-Powered Cloud Solution Deployment Guide (July 2013)
- Bootstrapping Open Source Clouds (Dell Tech White Paper, updated Dec 2011)
- CloudOps White Paper (Dell Tech White Paper, Oct 2011)

Concepts

The purpose of this guide is to explain the special aspects of OpenStack on Crowbar. Please consult the *Dell Crowbar Framework Users Guide* and *Dell OpenStack™-Powered Cloud Solution Deployment Guide* for assistance with installing and using Crowbar.



Concepts beyond the scope of this guide will be introduced as needed in notes and references to other documentation.

OpenStack

The focus of this guide is the use of Crowbar, *not* OpenStack. While Crowbar includes substantial components to assist in the deployment of OpenStack, its operational aspects are independent of OpenStack.



For detailed operational support for OpenStack, visit the OpenStack documentation web site at <http://docs.openstack.org/>.

Dell Specific Options

The Dell End User License Agreement (EULA) version of Crowbar provides additional functionality beyond that in the open source version. It also uses a color palette that is different from the open source version.



Crowbar is not limited to managing Dell servers and components.

Architecture

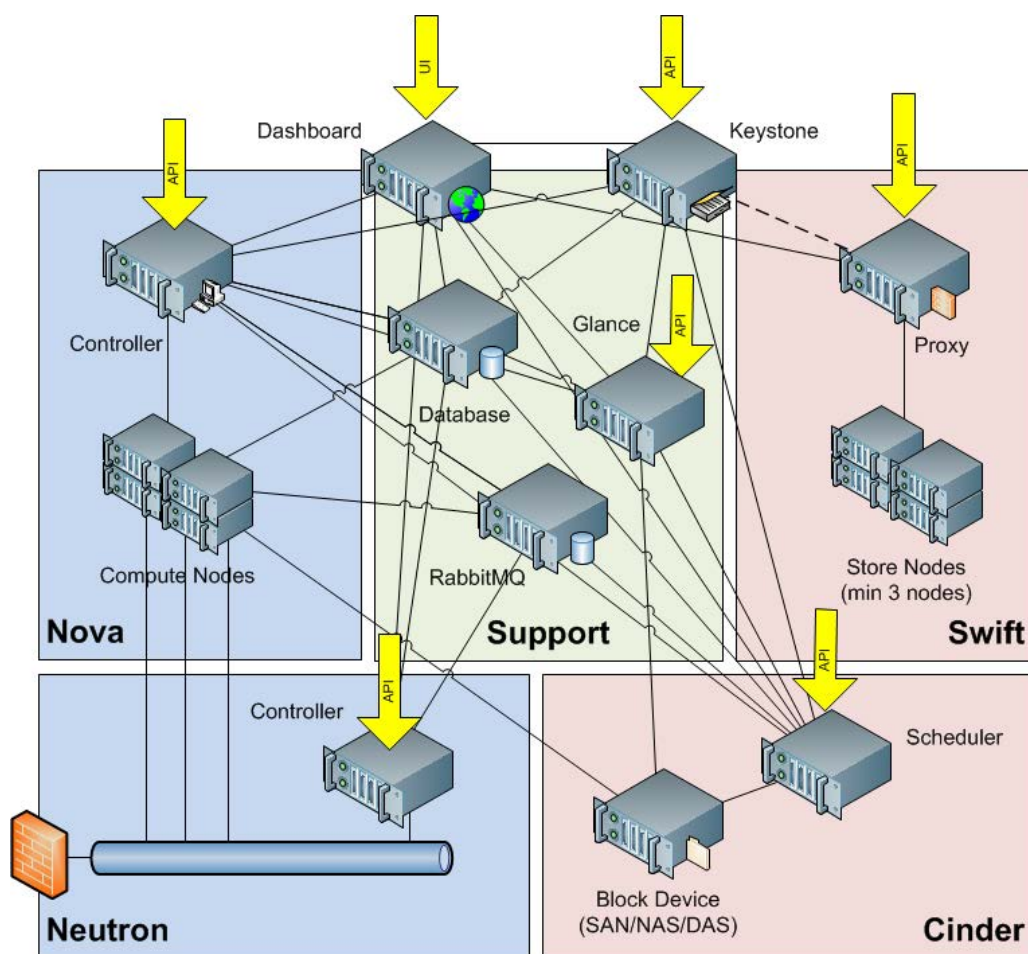
The Crowbar OpenStack deployment includes both core and incubated OpenStack components. Crowbar deploys each component as a module, known as a barclamp. All shared components are broken out as independent barclamps. Crowbar automatically detects and integrates connections between barclamps as they are deployed.



It is important to deploy the barclamps in the correct order because of the dependencies between barclamps! See Table 2: OpenStack Barclamps for the correct order.

The figure below shows Crowbar's target OpenStack deployment with both shared and stand-alone components. Crowbar both installs the components and integrates them together as needed.

Figure 1 : Crowbar Target for OpenStack Deployment



Community Features

Dell Crowbar incorporates significant Open Source community-developed features. Dell cannot certify 100% of these as part of the Dell OpenStack™-Powered Solution. These features are considered to be self-supported and/or community-supported. They are not verified as part of the Dell solution and may cause unexpected behaviors when activated.

Current Community Features

Table 1: Community Features **Error! Reference source not found.** lists the community features included in the current version of the Dell OpenStack™-Powered Solution.

Table 1: Community Features

Feature	Description	Barclamp	Notes
Pull From Source	Enables deployment scripts to pull directly from source code. Requires the Crowbar Git barclamp to be installed.	Keystone Swift Glance Cinder Quantum (Neutron) Nova Horizon Tempest	Dell-supported selection is <i>false</i> .
PostgreSQL Database	Enables usage of a PostgreSQL database engine.	Database	Dell-supported database engine is <i>MySQL</i> .
UUID Authentication Token Algorithm	Enables usage of a Universally-unique Identifier algorithm for authentication token generation.	Keystone	Dell-supported authentication token generation algorithm is <i>PKI</i> (Public-key Infrastructure).
Deploy Multiple Roles to Swift-storage Nodes	Enables deployment of Nova-multi-controller roles to Swift-storage nodes.	N/A	Community-supported, in Raw mode only.
First disk selection method for raw disk types.	Enables the use of the first available raw disk on each selected block storage node.	Cinder	Community-supported, in Raw mode only. Note: Single-node deployments should use the <i>First</i> option and not <i>All</i> , in order to use remaining disks for Swift.

Community Features Support

To receive Dell support, users may be asked to deactivate self-support or community support features identified above.

Support may be obtained for these features from the Crowbar email list, at <https://lists.us.dell.com/mailman/listinfo/crowbar>.

OpenStack Barclamp Suite

The **Barclamps > OpenStack** page shows only the barclamps that pertain to the OpenStack deployments.

The barclamps on that page are listed in deploy order from top (deploy first) to bottom (deploy last). This ordering is intended to aid users in performing the installation in the correct order. Not all barclamps are required; the next section explores each barclamp in detail.



Please review the barclamp use and life cycle information in the *Dell Crowbar Software Framework User's Guide* to learn about the status and management process for barclamps

The table below shows the barclamps that are available with the Crowbar v1.6.1 OpenStack deployment.

From each barclamp, you can create a single new proposal for the system.



Crowbar supports one proposal only per barclamp.

The following OpenStack barclamps are included with Crowbar.

Table 2: OpenStack Barclamps

Barclamp	Function	Comments	Deploy Order
Database	Database Server	Defines a database server for the OpenStack cluster.	1
Keystone (OpenStack Identity Service)	Centralized Authentication & Authorization	Provides a centralized authentication and authorization service identity service; automatically leveraged by all other components.	2
Rabbitmq	Messaging system for Nova, Cinder, and Quantum	Based upon the amqp standard.	3
Swift (OpenStack Object Storage)	Object Store	Provides distributed object storage.	4
Glance (OpenStack Image Service)	Image Cache	Glance service (Nova image management) for the cloud. Used by Nova.	5
Cinder (OpenStack Block Storage)	Block Storage	Provides block storage for Nova nodes.	6
Quantum (OpenStack Networking)¹	Networking	API-enabled, pluggable virtual network service for OpenStack. Will be renamed to <i>Neutron</i> .	7
Nova (OpenStack Compute)	Compute	Provisions and manages large networks of virtual machines.	8

¹ The former code name for OpenStack Networking, *Quantum*, has been replaced by *Neutron*. Future releases of the Dell OpenStack™-Powered Cloud Solution will reflect the new code name.

Barclamp	Function	Comments	Deploy Order
Horizon (OpenStack Dashboard) Horizon (OpenStack Dashboard)	User Interface	Not core, but strongly recommended. Provides a web user interface and configuration capabilities for other OpenStack components.	9
Tempest (OpenStack Integration Test Suite)	Integration Test Automation	Optional. Provides a set of automated integration tests that you can run against a live OpenStack cluster.	10

Database

Please see <https://github.com/crowbar/barclamp-database> for the latest updates.

Background

The Database barclamp provides a mechanism for accessing database servers. Currently, MySQL and PostgreSQL database servers are supported.

This barclamp includes the following proposals.

Table 3: Database Barclamp Parameters

Name	Default	Description
Attributes		
SQL Engine	MySQL	Options include: <ul style="list-style-type: none">MySQLPostgreSQL
MySQL Attributes		
Datadir	/var/lib/mysql	Read-only field. Indicates the directory to which the MySQL server writes data.
.PostgreSQL Attributes		
Global Connection Limit (max_connections)	1000	The maximum number of simultaneous connections to the PostgreSQL server

Roles

The Database barclamp has one role:

- database-server** – the database server to use for the cluster

The default recommended allocation for this barclamp is the database-server node. This usually resides on the Controller node, but you can select another node.

Keystone (OpenStack Identity Service)

Please see <https://github.com/crowbar/crowbar/wiki/Keystone-barclamp> for the latest updates.

Background

The Keystone Identity Service (<http://keystone.openstack.org/>) provides unified authentication and authorization across all OpenStack projects, and integrates with existing authentication systems.

Table 4: Keystone Barclamp Parameters

Name	Default	Description
Database Instance	[generated]	Displays the database instance to use.
Frontend	apache	Options include: <ul style="list-style-type: none"> <i>native</i> <i>apache</i>
Algorithm for Token Generation	PKI	Options include: <ul style="list-style-type: none"> public-key infrastructure (<i>PKI</i>) universally-unique identifier (<i>UUID</i>)
Default Tenant	openstack	Default tenant
Administrator Username	admin	Administrator user name
Administrator Password	crowbar	Administrator password (masked)
Regular Username	crowbar	Default user name
Regular Password	crowbar	Default password (masked)
Use pull from source	false	Enables deployment scripts to pull directly from source code; requires Crowbar Git barclamp. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>

Barclamp Roles

The Keystone barclamp has one role:

- **Keystone-server** – OpenStack authentication server

Select which server should be the Keystone server. The default recommended node allocation is **the same node that is assigned the Database barclamp's database-server** role. This usually resides on the Controller node, but you can select another node.

Rabbitmq

Please see <https://github.com/rabbitmq> for the latest updates.

Background



RabbitMQ is based upon the emerging *ampq* messaging standard.

From <http://www.rabbitmq.com/features.html>:

RabbitMQ Messaging enables software applications to connect and scale. Applications can connect to each other, as components of a larger application, or to user devices and data. Messaging is asynchronous, decoupling applications by separating sending and receiving data.

RabbitMQ is a messaging broker - an intermediary for messaging. It gives OpenStack a common platform to send and receive messages, and your messages a safe place to live until received.

Table 5: Rabbitmq Barclamp Parameters

Name	Default	Description
Virtual host	/nova	The virtual RabbitMQ messaging server
Port	5672	The port number upon which RabbitMQ communicates
User	nova	The user RabbitMQ uses when authenticating with Nova, Quantum and Cinder

Barclamp Roles

The RabbitMQ barclamp has one role:

- **rabbitmq-server** – OpenStack messaging server

Select which server should be the RabbitMQ server. The default recommended node allocation is **the same node that is assigned the Database barclamp's database-server** role. This usually resides on the Controller node, but you can select another node.

Swift (OpenStack Object Storage)

Please see <https://github.com/crowbar/crowbar/wiki/Swift--barclamp> for the latest updates.

Background

From <http://openstack.org/projects/storage>:

OpenStack Object Storage (code-named Swift) is open source software for creating redundant, scalable object storage using clusters of standardized servers to store petabytes of accessible data. It is not a file system or real-time data storage system, but rather a long-term storage system for a more permanent type of static data that can be retrieved, leveraged, and then updated if necessary. Primary examples of data that best fit this type of storage model are virtual machine images, photo storage, email storage and backup archiving. Having no central "brain" or master point of control provides greater scalability, redundancy and permanence.

Objects are written to multiple hardware devices in the data center, with the OpenStack software responsible for ensuring data replication and integrity across the cluster. Storage clusters can scale horizontally by adding new nodes. All data is stored in structures called partitions, which are replicated a minimum of three times, ensuring data permanence. Should a node fail, OpenStack works to serve its content from other active nodes and create new replicas of the objects. Because OpenStack uses software logic to ensure data replication and distribution across different devices, inexpensive commodity hard drives and servers can be used in lieu of more expensive equipment.

The Swift barclamp includes the following components:

- **Proxy node** - provides the API to the cluster, including authentication.
- **Storage nodes** - provide storage for cluster.
- **Ring file** – generated on a node with the *swift-ring-compute* role. It is distributed to all nodes, to provide the logical lookup information to determine where objects are stored in the cluster.

Swift Middleware Support

- **S3**: supports some of Amazon's S3 protocol, translating it to Swift, returning S3 formatted responses.
- **Static Web**: serves container data as a static web site with index file and error file resolution, as well as optional file listings.
- **TempURL**: allows the creation of URLs to provide temporary access to objects.
- **FormPost**: translates a browser form post into a regular Swift object PUT.
- **Domain Remap**: this middleware will do a best-effort attempt to derive account and container names from elements in the domain name, and put those derived values into the URL path (leaving the Host header unchanged).



Using container sync with remapped domain names is not advised. With container sync, you should use the true storage end points as sync destinations.

- **Non-Swift format sent to proxy from client** - Middleware translates it to what the Swift-proxy understands
 - **container.account.storageurl/** -
container.account.storageurl/path_root/account/container/object
 - **account.storageurl/path_root/container/object** -
account.storageurl/path_root/account/container/object
- **HTTP_HOST**: User wants to present smarty.com on their swift cluster, but cannot remap domains inside Swift:

- **Requested domain:** smarty.com
 - **Storage_domain:** dell.com
 - **Finds:** smarty.com.dell.com CNAME
- **RateLimit:** limits request rates on both Account and Container levels. Limits are configurable. For more information, see <http://docs.openstack.org/grizzly/openstack-object-storage/admin/content/configuration-for-rate-limiting.html>.

Table 6: Swift Barclamp Parameters

Name	Default	Description
Keystone instance	[generated]	The Keystone proposal to use
Keystone Service User	swift	The user that Swift uses when authenticating with Keystone
Keystone Service Password	[generated]	The password for the Swift Keystone authentication user
Allow Public Containers (performance penalty)	false	Controls whether or not containers are publicly accessible via ACLs. Allowing public containers slows performance. Options include: <ul style="list-style-type: none"> • <i>true</i> • <i>false</i>
Frontend	apache	Options include <i>native</i> and <i>apache</i>
Zones	2	The number of zones in this cluster (should be >= the number of replicas)
Partitions	18	The number of bits to represent the partition count
Minimum Partitions per Hour	1	The minimum amount of time a partition should stay put, in hours
Replicas	1	The number of replicas that should be made for each object
Cluster Hash	[generated]	Shared among all nodes in a swift cluster. Can be generated using <code>od -t x8 -N 8 -A n </dev/random</code>
Cluster Admin Password	swauth	Super user password - used for general operations
User	swift	The UID to be used for swift processes
Group	swift	The GID to be used for swift processes
Debug	false	Indicates the service should run in debug mode. Options include: <ul style="list-style-type: none"> • <i>true</i> • <i>false</i>
Use pull from source	false	Enables deployment scripts to pull directly from source code; requires Crowbar Git barclamp. Options include: <ul style="list-style-type: none"> • <i>true</i> • <i>false</i>

Table 7: Additional Middlewares

Name	Default	Description
S3 Parameters		
Enabled	false	Controls access to OpenStack Swift via the Amazon S3 (Simple Storage Service) API. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Git repo url	[generated]	The URL of the S3 middleware GitHub repository
Git ref_spec	[generated]	Indicates the mapping from remote branches to local references
Use pull from source	false	Enables S3 middleware to pull its code directly from source code; requires Crowbar Git barclamp. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Use barclamp-git to checkout	true	Controls usage of the Crowbar Git barclamp for S3 code checkouts. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
StaticWeb Parameters		
Enabled	false	Controls usage of StaticWeb for content management. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
TempURL Parameters		
Enabled	false	Controls usage of TempURL for granting limited-time access for file downloads/uploads. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
FormPOST Parameters		
Enabled	false	Controls usage of FormPOST for granting file uploads via Web browser form requests. <i>File size is limited to 5 GB.</i> Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Domain Remap Parameters		
Enabled	false	Controls whether to use Domain Remap to translate domains to path parameters for proxy servers. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Path root	[generated]	The root path that Domain Remap will use
Storage Domain	[generated]	The FQDN of the cluster's storage domain

Name	Default	Description
Ratelimit Parameters		
Enabled	false	Controls whether or not rate limiting is used. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Clock accuracy	[generated]	Indicates the accuracy of the proxy servers' system clocks. An accuracy of 1000 means that the proxy server clocks are accurate to within one millisecond of each other.
Max sleep time seconds	[generated]	The maximum number of seconds that the application will wait before returning a 498 response.
Log sleep time seconds	[generated]	Displays the number of log sleeps after which log sleeps will be logged. For example, 0 means that no log sleeps will be logged; 1 means that sleeps greater than 1 will be logged.
Rate buffer seconds	[generated]	Indicates the number of seconds that the rate counter can drop and catch up.
Account ratelimit	[generated]	Indicates the limited number of requests per second to <i>/account_name</i> , and PUTs to <i>/account_name/container_name</i>
Account whitelist	[generated]	Indicates the accounts that are not rate-limited, in a comma-separated list
Account blacklist	[generated]	Indicates the accounts that are disallowed, in a comma-separated list
Container ratelimit	[generated]	Indicates the limited number of GET/HEAD requests per second to <i>/account_name/container_name</i> , and PUT/DELETE requests per second to <i>/account_name/container_name/object_name</i>



For Swift, parameters should not be changed after applying the proposal. Addition or removal of devices from the proposal will be dynamically reconfigured in the Swift configuration after the initial proposal has been applied.

Barclamp Roles

The Swift barclamp offers four roles for configuration:

Primary role:

- **Swift-storage** - identifies the nodes that store the data; Dell recommends a minimum of three (3) nodes, not on infrastructure nodes



Dell recommends that nodes assigned the Swift-storage role not have any other OpenStack components deployed upon them. However, if the Swift-storage nodes are not used as high-volume object stores you can deploy Nova-multi-compute roles to those nodes.

This can be advantageous in minimal POC deployments, or in a single-node OpenStack deployment. Please note, however, that in these types of deployments the performance of both Nova and Swift will be affected. In addition, these configurations are not currently supported by Dell; but are supported by the OpenStack community.

Infrastructure roles:

- **Swift-ring-compute** - configures a node to provide ring file generation services
- **Swift-proxy** - provides the external access and control functions for a Swift cluster

The default recommended node allocation for Infrastructure roles is to use the same node that is assigned the Database **barclamp's database**-server role. This usually resides on the Controller node, but you can select another node.

Reports server role:

- **Swift-dispersion** - a reporting tool to measure the overall health of a cluster

The default recommended node allocation for the Swift-dispersion role is to use the same node as the Swift-proxy node. This usually resides on the Controller node, but you can select another node.

Glance (OpenStack Image Service)

Please see <https://github.com/crowbar/crowbar/wiki/Glance--barclamp> for the latest updates.

Background

From <http://openstack.org/projects/image-service>:

OpenStack Image Service (code-named Glance) provides discovery, registration, and delivery services for virtual disk images. The Image Service API server provides a standard REST interface for querying information about virtual disk images stored in a variety of back-end stores, including OpenStack Object Storage. Clients can register new virtual disk images with the Image Service, query for information on publicly available disk images, and use the Image Service's client library for streaming virtual disk images.

Table 8: Glance Barclamp Parameters

Name	Default	Description
Notification Strategy	Noop	The only option is "No Operation"
Backing Type	File	Location of images. Options include: <ul style="list-style-type: none"> File – stores images in the Image Store Directory. You can assign the glance-server role to the Controller node. Swift – stores images in Swift. You can assign the glance-server role to either the Controller or Swift storage nodes.
Image Store Directory	/var/lib/glance/images	Location of images when the backing type is <i>File</i>
Glance Swift Container	glance	The image store's container string name
Verbose	false	Controls whether or not the API runs in verbose mode. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Use pull from source	false	Enables deployment scripts to pull directly from source code; requires Crowbar Git barclamp. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
API Parameters		
Bind to All Addresses	true	Controls if the API will bind to all addresses or the public address only. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Registry Parameters		

Name	Default	Description
Bind to All Addresses	true	Controls if the registry will bind to all addresses or the public address only. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Caching Parameters		
Enable Caching	false	Indicates if caching should be on. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Turn On Cache Management	false	Enables the use of glance-cache-manage CLI & the corresponding API. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Directory	/var/lib/glance/image-cache	The location where images are cached
Grace Period	3600	The timeout for accessing the image
Stall Timeout	86400	The timeout to wait for a stalled GET request
Database Parameters		
SQL Idle Timeout	SQL Idle Timeout	SQL Idle Timeout
Database Instance	Database Instance	Indicates the database instance to use
Keystone Parameters		
Use Keystone	true	Indicates to Crowbar if Keystone is to be used for authentication. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>
Keystone Instance	[generated]	Indicates the Keystone proposal to use
Syslog Parameters		
Use Syslog	false	Indicates to Glance to not log to syslog. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>

Barclamp Roles

The Glance barclamp provides one role:

- **glance-server** – OpenStack image store

Select a node as the glance server. This node should have adequate disk space to cache images.

The default recommended node allocation is the same node that is assigned the Database **barclamp's database-server** role. This usually resides on the Controller node, but you can select another node.

Cinder (OpenStack Block Storage)

Please see <https://github.com/openstack/cinder> for the latest updates.

Background

From <http://www.openstack.org/software/openstack-storage/>

Block Storage allows block volumes to be exposed and connected to compute instances for expanded storage, better performance and integration with enterprise storage platforms. The Dell OpenStack™-Powered Solution supports multiple volume nodes.

Table 9: Cinder Barclamp Parameters

Name	Default	Description
Database Instance	[generated]	Indicates the Database proposal to use
RabbitMQ	[generated]	Indicates the RabbitMQ proposal to use
Keystone	[generated]	Indicates the Keystone proposal to use
Glance	[generated]	Indicates the Glance proposal to use
Service user (for Keystone)	cinder	The user that Cinder uses when authenticating with Keystone
Service password	[generated]	The password for the Cinder Keystone authentication user
Use pull from source	false	Enables deployment scripts to pull directly from source code; requires Crowbar Git barclamp. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>

Volume Options

Name of Volume	cinder-volumes	Indicates the name of the Block Storage volume
Type of Volume	raw	Options include: <ul style="list-style-type: none"> <i>raw</i> <i>local</i> <i>eq/x</i> <p>If you select <i>raw</i>, the system uses available local disks on the selected nodes, based upon configured disk-based parameters.</p> <p>If you select <i>local</i>, the system uses a local file in the existing filesystem, based upon other parameters.</p> <p>If you select <i>eq/x</i>, the system allows only one (1) EqualLogic group.</p> <p>Note: You can use one (1) volume type per barclamp proposal.</p>



Raw mode uses local disks for the volume on a single node. That node should **not** be allocated the Swift-storage role.

Table 10: EQLX (EqualLogic) Parameters

Name	Default	Description
EQLX SAN IP	192.168.124.11	EqualLogic SAN IP address
EQLX SAN login	grpadmin	EqualLogic SAN login ID
EQLX SAN password	12345	EqualLogic SAN login password
EQLX group name (prompt)	group-0	EqualLogic group name (prompt)
EQLX pool name	default	EqualLogic SAN pool name
Use thin provision for volumes	no	Controls whether or not to use thin provision for EqualLogic volumes. Options include: <ul style="list-style-type: none"> • <i>yes</i> • <i>no</i>
Use chap auth for targets	no	Controls whether or not to use Challenge-Handshake Authentication Protocol (CHAP) provision for targets. Options include: <ul style="list-style-type: none"> • <i>yes</i> • <i>no</i>
EQLX chap login for targets	chapadmin	EqualLogic CHAP login ID
EQLX chap password for targets	12345	EqualLogic CHAP login password
EQLX SSH keepalive interval	1200	EqualLogic internal SSH keepalive timer
EQLX CLI command execution timeout	30	EqualLogic CLI command execution timeout timer

Table 11: File and Disk-based Parameters (raw & local only)

Name	Default	Description
File-based Parameters		
Volume File Name	/var/lib/cinder/volume.raw (raw only) /var/lib/cinder/volume.local (local only)	Indicates the name of the volume file
Maximum File Size (GB)	2000	Maximum volume size, in gigabytes
Disk-based Parameters		
Disk selection method	all	Options include: <ul style="list-style-type: none"> • <i>all</i> – All available disks on each selected node will be used <p>Note: If a selected node has no available disks, then deployment will fail with the following message logged to <code>/opt/dell/crowbar_framework/log/<node_FQDN>.chef_client.log</code>:</p> <p>There are no suitable disks for cinder.</p>

Barclamp Roles

The Cinder barclamp provides the following roles:

- **cinder-api** – Manages API service requests and places them in the RabbitMQ message queue. The default node allocation is to use the same node that is assigned to the Controller role, but you can select another node.
- **cinder-scheduler** – Schedules tasks from the queue and determines the provisioning server to which they are sent. The default node allocation is to use the same node that is assigned to the Controller role, but you can select another node.
- **cinder-volume** – OpenStack block store; can be run on one or more nodes. The default node allocation is to use the same node that is assigned to Controller role. Dell recommends that you select one or more volume nodes instead.



The cinder-api and cinder-scheduler roles must be applied to the same node. This is the default behavior.

Do not assign nodes designated for Swift storage to the cinder-volume role. All available storage node disks are utilized by Swift.

Quantum (OpenStack Networking)

Please see <https://github.com/openstack/neutron> for the latest updates.



The former code name for OpenStack Networking, **Quantum**, has been replaced by **Neutron**. Future releases of the Dell OpenStack™-Powered Cloud Solution will reflect the new code name.

Background

From <http://www.openstack.org/software/openstack-networking/>:

OpenStack Networking manages IP addresses, allowing for dedicated static IPs or DHCP. Floating IPs are used to NAT a public IP to a private IP, making a VM instance available on the public network.

Table 12: Quantum Barclamp Parameters

Name	Default	Description
Database Instance	[generated]	Indicates the Database proposal to use
Keystone	[generated]	Indicates the Keystone proposal to use
RabbitMQ	[generated]	Indicates the RabbitMQ proposal to use
Plugin	openvswitch	Enables the use of alternate Software-Defined Networking (SDN) plugins. Options include: <ul style="list-style-type: none"> • openvswitch • linuxbridge
Mode	gre	Available only when the OpenvSwitch plugin is selected. Enables you to select DHCP networking with either a flat or GRE-based topography
Keystone Service User	quantum	The user that Quantum uses when authenticating with Keystone
Keystone Service Password	[generated]	The password for the Quantum Keystone authentication user
Use pull from source	false	Enables deployment scripts to pull directly from source code; requires Crowbar Git barclamp. Options include: <ul style="list-style-type: none"> • <i>true</i> • <i>false</i>

Barclamp Roles

Quantum provides one role

- **quantum-server** – OpenStack networking host

Select a node as the Quantum server. The default recommended node allocation is the same node that is assigned the **Nova barclamp's** Nova-multi-controller node. This usually resides on the Controller node, but you can select another node.

Quantum Networking

This section is called out separately because of its complexity and scope. It is not a complete reference. Please refer to the Crowbar wiki (<https://github.com/crowbar/crowbar/wiki/Openstack-Networking-in-Pebbles>) for complete networking details.

The Quantum barclamp assumes that the Networking barclamp is running and handling the networks. It uses the information about the network topology from the networking barclamp. Quantum assumes that the following networks are available:

- **admin - used for service communication**
- **public - used for outward facing public services**
- **nova_fixed - used for the VMs**
- **nova_floating - used to define a pool of floating IPs in OpenStack Networking**
- **os_sdn – required for GRE networking only**

It is assumed that nova_fixed network is a completely owned subnet. In all cases, the quantum-server node will act as the router between public and nova_fixed network. In a standard Crowbar Quantum deployment, the quantum-server node is the same as the Nova-multi-controller node.

Plugins

OpenStack Networking plugins enable the use of new and advanced networking capabilities, from many different hardware and software vendors. The Dell OpenStack™-Powered Cloud Solution currently-supports the following SDN plugins:

- **OpenvSwitch**– See <http://www.openvswitch.org> for more information.
- **Linux Bridge**– See <http://www.linuxfoundation.org/collaborate/workgroups/networking/bridge> for more information.

OpenvSwitch

The OpenvSwitch plugin has two networking modes available:

- **Flat DHCP Network**
- **GRE DHCP Network**

They are integrated with the networking barclamp modes. While the two modes are different, they use a consistent underlying networking mode.

Flat DHCP Network

In this mode, the nova-compute node does not modify the VM image or allocate an address. The VM is assumed to run DHCP to get its address, and then talk to the nova-api for custom configuration. The quantum-server node runs dnsmasq to provide DHCP to the nova_fixed network.



Flat mode does not allow tenant segregation at the network level.

This mode will use the interfaces specified by the network barclamp. By default, it will use eth0.500 for the nova_fixed network, eth0.300 for the public network, and eth0 for the admin network. Bridges will be created as appropriate. If the network mode is changed in the network barclamp, it will switch to using the teamed network or dual NIC for the fixed and public networks.

GRE DHCP Network

The General Routing Encapsulation (GRE) tunneling protocol is more flexible than either Flat or vLAN networking, because it enables several different types of network layer protocols (i.e., various L2 and L3 networking protocols) to coexist inside IP tunnels. GRE is stateless; successive request-response pairs have no relations to each other.

The Dell OpenStack™-Powered Cloud Solution's implementation of GRE connects Open vSwitch (OVS) bridges on separate hosts. This ensures that switch configurations and physical network topologies are completely independent, offering per-tenant segregation with no reliance upon vLAN mappings.

Linux Bridge

The Linux Bridge plugin configures a Linux bridge that interconnects Neutron networks, which in turn map to independent vLANs that are managed by the plugin. Similar to the OpenvSwitch plugin, each Neutron network node runs a daemon that creates the networks, ports, and attachment resources.

Plugin Operation

In summary, the Linux Bridge plugin operates as follows:

1. The tenant requests creation of a Neutron network, and a port on that network.
2. The plugin creates a network resource, and assigns a vLAN to that network.
3. The plugin creates a Port resource and associates it with the same network.
4. The tenant requests instantiation of a VM. Nova-compute invokes the Linux-bridge virtual interface (VIF) driver, which creates a tap device.
5. Nova-compute associates the VM's VIF with the tap device.
6. The tenant requests plugging the VIF into the Neutron port.
7. The plugin associates the VIF and the port in the database.
8. The daemon on each network node discovers the association in created in Step 6 above.
9. If a tap device exists on a host corresponding to that VIF, the daemon creates a vLAN and a Linux Bridge on that host.
10. The daemon associates the tap device to the Linux Bridge.

The VM is now connected to the Neutron network.

Nova Interaction

The Linux Bridge plugin interacts with Nova by creating a nova-compute VIF driver that runs on each Nova compute node. A Linux network driver (*linux_net.py*) creates a tap device for plugging into the gateway interface.

For More Information

You can read more information about OpenStack Networking at <https://wiki.openstack.org/wiki/Neutron>.

Nova (OpenStack Compute)

Please see <https://github.com/crowbar/crowbar/wiki/Nova--barclamp> for the latest updates.

Background

From <http://openstack.org/projects/compute/>:

OpenStack Compute is open source software designed to provision and manage large networks of virtual machines, creating a redundant and scalable cloud computing platform. It gives you the software, control panels, and APIs required for orchestrating a cloud, including: running instances; managing networks; and controlling access through users and projects. OpenStack Compute strives to be both hardware and hypervisor-agnostic, currently supporting a variety of standard hardware configurations and seven major hypervisors.

Table 13: Nova Barclamp Parameters

Name	Default	Description
RabbitMQ	[generated]	Indicates the RabbitMQ proposal to use
Database Instance	[generated]	Indicates the Database proposal to use
Keystone	[generated]	Indicates the Keystone proposal to use
Keystone Service User	nova	The user that Nova uses when authenticating with Keystone
Keystone Service Password	[generated]	The password for the Nova Keystone authentication user
Glance	[generated]	Indicates the Glance proposal to use
Verbose	true	Indicates if Nova will run in verbose mode
Use NoVNC (otherwise VPN-VNC)	true	Indicates what VNC package to use
Hypervisor	kvm	Indicates what hypervisor Nova should use when spinning up virtual machines (select qemu if running Nova on virtual machines). The default is kvm, but will be switched to qemu if virtual machines are detected.
Quantum	[generated]	Indicates the Quantum networking proposal to use
Cinder	[generated]	Indicates the Cinder proposal to use
Use pull from source	false	Enables deployment scripts to pull directly from source code; requires Crowbar Git barclamp Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>

Barclamp Roles

The Nova barclamp provides two roles:

- **Nova-multi-controller** - determines which node(s) perform the infrastructure management and API functions. **The default node allocation is the same node that is assigned the Database barclamp's database-server role.** This usually resides on the Controller node, but you can select another node.
- The **Nova-multi-compute** role identifies nodes that act as virtualization hosts. The majority of the nodes in the nova deployment will perform this role.

Horizon (OpenStack Dashboard)

Please see <https://github.com/crowbar/crowbar/wiki/Nova-dashboard-barclamps> for the latest updates.

Background

From <http://openstack.org/projects/compute/>:

OpenStack Dashboard enables administrators and users to access and provision cloud-based resources through a self-service portal.

Table 14: Nova Dashboard Barclamp Parameters

Name	Default	Description
Database Instance	[generated]	Indicates the Database proposal to use
Keystone Instance	[generated]	Select the Keystone proposal to use
Nova Instance	[generated]	Indicates the Nova proposal to use
Use pull from source	false	Enables deployment scripts to pull directly from source code; requires Crowbar Git barclamp. Options include: <ul style="list-style-type: none"><i>true</i><i>false</i>

Barclamp Roles

The Horizon OpenStack Dashboard barclamp provides one role:

- **Nova-dashboard-server** – OpenStack Dashboard web server

Select a node as the Dashboard server. The default node allocation is the same node that is assigned the Database **barclamp's database-server** role. This usually resides on the Controller node, but you can select another node.

Tempest (OpenStack Integration Test Suite)

Please see <https://github.com/openstack/tempest/> for the latest updates.

Background

From <https://github.com/openstack/tempest/>:

An optional barclamp, Tempest enables a set of automated integration tests that you can run against a live OpenStack cluster.

Table 15: Tempest Barclamp Parameters

Name	Default	Description
Nova	[generated]	Indicates the Nova proposal to use
Choose username	tempest-usr-[generated]	The Tempest user username
Choose tenant	tempest-tenant-[generated]	The Tempest tenant username
Choose Tempest admin username	tempest-adm-[generated]	The Tempest administrator username
Choose Tempest admin password	[generated]	The Tempest administrator user password
Use Pull From Source	false	Enables deployment scripts to pull directly from source code; requires Crowbar Git barclamp. Options include: <ul style="list-style-type: none"> <i>true</i> <i>false</i>

Barclamp Roles

The Tempest barclamp provides one role:

- **Tempest** – OpenStack integration test platform

The default recommended node is the Nova-multi-controller node. This usually resides on the Controller node, but you can select another node.

Appendix A: References

- OpenStack™: <http://www.openstack.org>
- RabbitMQ™: <http://www.rabbitmq.com>
- MySQL™: <http://www.oracle.com/us/products/mysql/overview/index.html>
- PostgreSQL: <http://www.postgresql.org>

To Learn More

For more information on the Dell OpenStack™-Powered Cloud Solution, visit:
www.dell.com/openstack

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