OpenStack Cinder Volume Backups
- Store and Restore Using Object Storage
Using Object Storage like OpenStack Swift, Ceph, Google Cloud Storage (GCS), etc to store OpenStack Cinder volume backups
Object Storage

Object ID: 12345
File Type: XYZ
Patient Name: CK Thomas
Patient ID: 45054
Exam Date: 01-01-2015
Physician Name: MJ Singh
Physician Note: XYZ
Gender: M
Height: XX
Weight: XX
Object Storage - Swift

Reference: OpenStack
Object Storage - Ceph
Object Storage - Google Cloud Support

- Projects
- Buckets
- Objects
- Objects Immutability
- Data Opacity
- Hierarchy
- Namespace
Cinder Service - Provisioning and attaching Volumes to Instances

Block Storage - Volume Provisioning - Cinder

MySQL DB

Cinder-Scheduler

Cinder-API

Cinder-Volume Driver

Cinder-Backup Driver

Storage

Storage

REST

AMQP

AMQP

AMQP
Cinder Backup Service - Backup and Restore

REST API

Cinder API Node

Messaging Bus (AMQP)

MySQL

Cinder Volume Node

Volume Driver

Backup Driver

Swift
CEPH
GCS

Volume backend

Backup backend
Configure Cinder Backup Driver - GCS

➔ Setup Google Service Account

- Login to Google developer console with Google account
  
  https://console.cloud.google.com

- The Google Developers Console uses projects to manage resources.
Create a Google Project

Create a project

The Google Developers Console uses projects to manage resources. To get started, create your first project.

**Project name**

- gcscinder

**Project ID**

- gcscinder-322

Show advanced options...

Please email me updates regarding feature announcements, performance suggestions, feedback surveys and special offers.

- [ ] Yes  [ ] No

I agree that my use of any services and related APIs is subject to my compliance with the applicable Terms of Service.

- [ ] Yes  [ ] No

Create
- Goto Credentials
- Click on "Create credentials"
- Next Click on "Service account key"
Create a Google Service Account Key

API Manager

Credentials

Create service account key

Service account

New service account

Service account name

gcscinder

Service account ID

gcscinder @groovy-works-132123.iam.gserviceaccount.com

Key type

Downloads a file that contains the private key. Store the file securely because this key can't be recovered if lost.

- JSON
  - Recommended
- P12
  - For backward compatibility with code using the P12 format

Create  Cancel
● Save the JSON file on the Cinder Backup Server Node:
Edit the cinder.conf file for Google Cloud Storage Backup Driver

---

```
[DEFAULT]
backup_gcs_credential_file = '/home/vedams/gcscinder-c406cfde1717.json'
backup_gcs_bucket = gcscinderbucket
backup_driver = cinder.backup.drivers.google
backup_gcs_project_id = 'gcscinder-322'
backup_gcs_user_agent = biarca
```

---

Restart the Cinder backup service to make the changes take effect
Backup Cinder Volumes to GCS

→ **Create a Cinder volume**
  
  ```bash
  $ cinder create --name snia1
  --image-id 54199c6a-1ae4-4eb1-a959-fc5b796e5fc2 1
  ```

→ **List Cinder volumes**
  
  ```bash
  $ cinder list
  ```

<table>
<thead>
<tr>
<th>ID</th>
<th>Status</th>
<th>Name</th>
<th>Size</th>
<th>Volume Type</th>
<th>Bootable</th>
<th>Attached to</th>
</tr>
</thead>
<tbody>
<tr>
<td>90e829aa-e410-4305-b529-d5e141c0e90f</td>
<td>available</td>
<td>snia1</td>
<td>1</td>
<td>lvmdriver-1</td>
<td>true</td>
<td></td>
</tr>
</tbody>
</table>

→ **Create Cinder volume backup**
  
  ```bash
  $ cinder backup-create --name bak1
  90e829aa-e410-4305-b529-d5e141c0e90f
  ```

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>d6c4a96b-9a9b-4ebf-aad7-2c142f65800c</td>
</tr>
<tr>
<td>name</td>
<td>back1</td>
</tr>
<tr>
<td>volume_id</td>
<td>90e829aa-e410-4305-b529-d5e141c0e90f</td>
</tr>
</tbody>
</table>
→ List Cinder volume backups

$ cinder backup-list

<table>
<thead>
<tr>
<th>ID</th>
<th>Volume ID</th>
<th>Status</th>
<th>Name</th>
<th>Size</th>
<th>Object Count</th>
<th>Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>d6c4a96b-9a9b-4ebf-aad7-2c142f65800c</td>
<td>90e829aa-e410-4305-b529-d5e4d1c0e90f</td>
<td>creating</td>
<td>back1</td>
<td>1</td>
<td>0</td>
<td>gcscinderbucket</td>
</tr>
</tbody>
</table>
Verify Created Backups in GCS

➔ Login to Google developer console
➔ Select the project “gcscinder”
➔ Select the “Products & Services” tab
➔ Click on “Storage”
Select and Open “gcscinderbucket” from listed buckets
• Backup of a Cinder volume is stored as objects having prefix:
  \texttt{volume\_volid/timestamp/az\_saz\_backup\_bakid}, where
  \begin{itemize}
  \item \texttt{volid} is volume id.
  \item \texttt{timestamp} is time in UTC with format of YearMonthDateHourMinuteSecond.
  \item \texttt{saz} is storage\_availability\_zone.
  \item \texttt{bakid} is backup id for \texttt{volid}.
  \end{itemize}
Restore Cinder Backups from GCS

→ Restore Cinder volume backup

```
vedams@nikesh:~/devstack$ cinder backup-restore d6c4a96b-9a9b-4ebf-aad7-2c142f65800c
```

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>backup_id</td>
<td>d6c4a96b-9a9b-4ebf-aad7-2c142f65800c</td>
</tr>
<tr>
<td>volume_id</td>
<td>a9c5dc86-a8c3-4bc5-9333-4764cf35b7f7</td>
</tr>
<tr>
<td>volume_name</td>
<td>restore_backup_d6c4a96b-9a9b-4ebf-aad7-2c142f65800c</td>
</tr>
</tbody>
</table>

→ Check for restored backup volume

```
vedams@nikesh:~/devstack$ cinder list
```

<table>
<thead>
<tr>
<th>ID</th>
<th>Status</th>
<th>Name</th>
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<th>Volume Type</th>
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<th>Attached to</th>
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<td>1</td>
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<tr>
<td>a9c5dc86-a8c3-4bc5-9333-4764cf35b7f7</td>
<td>available</td>
<td>restore_backup_d6c4a96b-9a9b-4ebf-aad7-2c142f65800c</td>
<td>1</td>
<td>lvmdriver-1</td>
<td>true</td>
<td></td>
</tr>
</tbody>
</table>
To enable the Ceph backup driver, include the following option in the cinder.conf file:

```
[DEFAULT]
backup_driver = cinder.backup.drivers.swift
```

Configuration options available for the swift backup driver:

```
[DEFAULT]
backup_swift_container = volumebackups
backup_swift_object_size = 52428800
backup_swift_url = http://localhost:8080/v1/AUTH
backup_swift_auth = per_user
backup_swift_retry_attempts = 3
backup_swift_retry_backoff = 2
backup_swift_user = None
backup_swift_key = None
backup_compression_algorithm = zlib
```

Restart Cinder backup service
→ List available Containers inside the Swift Storage
   $ swift list

   volumebackups

→ List volume backups stored inside Ceph Storage Pools
   $ swift list volumebackups
Configure Cinder Backup Driver - Ceph

➔ To enable the Ceph backup driver, include the following option in the cinder.conf file:

```plaintext
[DEFAULT]
backup_driver = cinder.backup.drivers.ceph
```

➔ Configuration options available for the Ceph backup driver:

```plaintext
[DEFAULT]
backup_ceph_pool = backup
backup_ceph_conf = /etc/ceph/ceph.conf
backup_ceph_strike_count = 0
backup_ceph_strike_unit = 0
backup_ceph_chunk_size = 134217728
backup_ceph_user = cinder-bak
restore_discard_excess_bytes = True
```

➔ Restart Cinder backup service
List available pools inside Ceph Object storage

$ rados lspools

rbd
backup
images
vms
volumes

List available volumes

$ rados -p volumes ls -

rbd_data.5a6c74b0dc51.000000000000000000000000
rbd_id.volume-360740af-2414-4b26-8f13-8ealbfee0582
rbd_data.5a6c74b0dc51.000000000000000000000002
rbd_header.5a6c74b0dc51
rbd_directory
rbd_data.5a6c74b0dc51.000000000000000000000004

List volume backups stored inside Ceph Object Storage Pools

$rados -p backup ls -

backup.0ca2c43f-93f4-4f74-a435-653ca4e7e453.meta
References

http://gorka.equine.com/tag/backup/
http://gorka.equine.com/inside-cinders-incremental-backup/
http://docs.openstack.org/juno/config-reference/content/section_backup-drivers.html
http://www.esds.co.in/kb/category/cloud-computing/
http://docs.openstack.org/openstack-ops/content/storage_decision.html
http://www.sparkmycloud.com/blog/cinder-block-storage-as-a-service/
https://github.com/openstack/cinder/blob/master/cinder/backup/drivers/google.py
Thank You!

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Q & A