OpenStack Cinder Plugin

Bacula Systems Documentation

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Contents

Important: Remember to read the Best Practices chapter common for all of our hypervisor plugins.

The following article aims at presenting the reader with information about the Bacula Enterprise Openstack Cinder Plugin. Through subchapters, more in-depth information can be found about the following topics:

1 Scope

The **Bacula Enterprise Openstack-VM Plugin** currently supports the following platforms:

- 2024.1 Caraval
- 2023.2 Bobcat
- 2023.1 Antelope

2 Features

The main feature of Bacula Enterprise Openstack Cinder Plugin is to offer Full block level backup and restore of instance volume(s).

3 Architecture

Bacula Enterprise Openstack-VM Plugin is a Bacula File Daemon plugin built over Openstack Cinder-Backup service.

All information is obtained using a custom implementation of a Cinder-Backup driver feeding data from Openstack to Bacula or the other way around.

Below, there is a simplified vision of the architecture of this plugin within a generic **Bacula Enterprise** deployment:

3.1 Cinder Bacula Driver Backup

During volume backup operations, for every file to backup, the bacula driver will:

- Keep track of backup file name
- Snapshot volume
- Create a FIFO (named pipe) from Openstack to Bacula
- Send relevant command to Bacula to synchronize the named pipe
- Return opened FIFO for Cinder to write into.

Once all files are backed up, the process must be stopped by:

- Closing the named pipe
- Gathering logs from Bacula
- Checking the list of backup files and job statuses
- Deleting the named pipe.

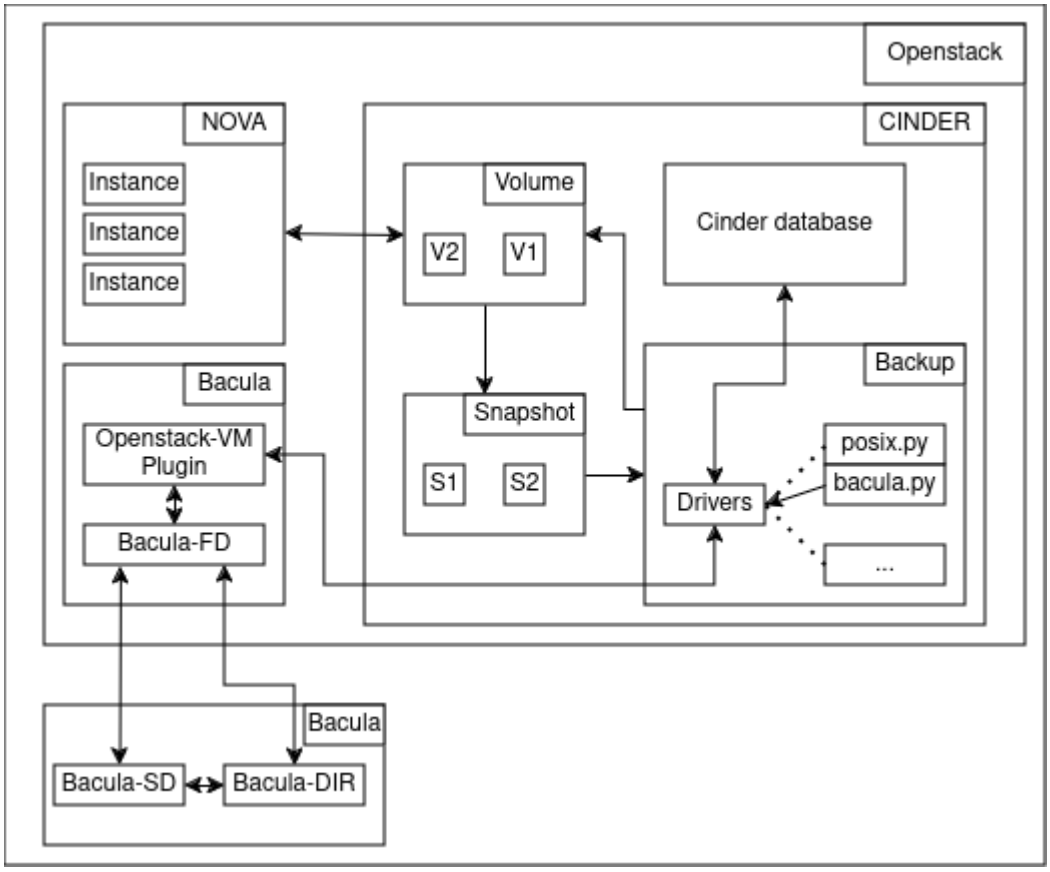

Fig. 1: Openstack-VM Plugin Architecture

3.2 Cinder Bacula Driver Restore

During volume restore operation, the bacula driver will communicate with Bacula through two different channels.

The first instance will handle the restore procedure by performing the process analog to backup apart for the fact the Cinder will read into the named pipe.

The closing process is also analog to the backup process.

The second instance will provide Cinder with the list of restored files to compare with its own file list by:

- Opening the named pipe to Bacula.
- Gathering the backup job file list.
- Returning curated output to Cinder for control.

3.3 Encrypted Volume Support

Volumes encrypted with LUKS are supported by the Cinder driver API. However, the encryption keys usually managed by the Openstack Barbican service should be backed up separately following the Openstack backup procedure.

https://docs.openstack.org/operations-guide/ops-backup-recovery.html

4 Installation

This article describes how to install Bacula Enterprise Openstack Cinder Plugin.

The installation process consists of two parts.

Note: Bacula Enterprise Openstack Cinder Plugin must be installed on Openstack host machine.

First, the installation of the bacula-enterprise-openstack-vm plugin with the BIM tool.

Second, configure the plugin as described in OpenstackVMConfiguration.

Third. by running the install script located at `/opt/bacula/scripts/install-openstack-vm.sh` two times and adjusting the Bacula director configuration.

- First time with the *configure* option `root@user:~# /opt/bacula/scripts/install-openstack-vm.sh configure`
- Second time with the *install* option `root@user:~# /opt/bacula/scripts/install-openstack-vm.sh install`
- At this point a configuration sample located at `/opt/bacula/openstack/bacula-dir.conf.sample` is created. Inside this file, there is a configuration example that should be adjusted and added to the Director configuration, either by editing the Director `/opt/bacula/etc/bacula-dir.conf` configuration file, or using BWeb.
- The install script can be run the third time with the *test* option with `root@user:~# /opt/bacula/scripts/install-openstack-vm.sh test` to check if the installation is correct.

Note: If the Bacula director already has a *Client* resource, the Client in `bacula-dir.conf.sample` should be ignored as the Client resource should not be duplicated.

Note: The OpenStack account name should be the user running the cinder-backup service. Use any of the following commands to check the user running the cinder-backup service:

```
# systemctl status cinder.backup.service
#  ps aux | grep "cinder-backup"
```

4.1 Steps

Here is an example how the install script should be used.

1. Run:

```
root@user:~# /opt/bacula/scripts/install-openstack-vm.sh configure

Enter the unix Openstack account name [stack]:

Enter the Bacula Director Name [stackdev-dir]:

Enter the Bacula Director Address [stackdev]:

Enter the Bacula Director Port [9101]:

Enter the Bacula FileDaemon name [stackdev-fd]:

INFO: Creating configuration template for the Director
      /opt/bacula/openstack/bacula-dir.conf.sample will help you to setup
      a Job with the Bacula Enterprise Openstack Plugin.

      The template can be included in your Director configuration and
      you need to review all items marked as "might need to be adjusted"

root@user:~# /opt/bacula/scripts/install-openstack-vm.sh install

Enter the unix Openstack account name: [stack]


Enter path to cinder drivers folder or automatically search system for it

'/opt/stack/cinder/cinder/backup/drivers/bacula.py' -> '/opt/bacula/share/
↪bacula.py'
```

2. Once the director configuration is updated, run:

```
root@stackdev:/opt/bacula# scripts/install-openstack-vm.sh test

Enter the unix Openstack account name: [stack]
```

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```
1000 OK: 10002 stackdev-dir Version: 18.0.2 (05 March 2024)
INFO: Connection to the Director OK
INFO: Connection from the Director to the Client OK
INFO: Plugin installed correctly
INFO: Job found on the Director
INFO: Fileset configured on the Director
INFO: RestoreJob found on the Director
INFO: Test job finished ok
```

4.2 bacula-dir.conf.sample file

This file contains the OpenStack Job, Fileset, Client and Console configuration required on the Director. Usually, there is no need to do any modification to the resources provided.

It will be located in the OpenStack node, in the `/opt/bacula/openstack` directory, after the installation process has finished.

The Job and the Client resources are configured with `MaximumConcurrentJobs = 10`. It means that you can have up to 10 instances of concurrent jobs running. If more concurrent jobs need to be run, you must increase this value to minimum the amount of instances being backed up at the same time.

4.3 Result

Openstack Cinder Plugin is installed.

5 Configuration

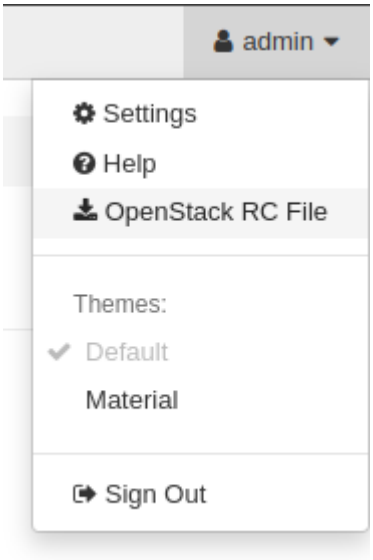
The following article presents the configuration of the plugin.

1. For each Tenant/Project in the OpenStack infrastructure that contains Instances to be backed up, it is required to download the `<tenant/project>-openrc.sh` file in the host where the OpenStack Cinder Plugin is installed. The `<tenant/project>-openrc.sh` file contains variables that enable the plugin to communicate with the cinder-backup service to perform the backup and restore of the instance(s) volume(s).

To backup the Instance(s) volume(s) in the Admin tentant, for example:

a) Download the `admin-openrc.sh` file.

   Downloading `admin_openrc.sh` script can be done through the Openstack dashboard. To do so, the user can click on the `OpenStack RC File` menu item located at the top right of the dashboard.



b) Inside the `admin_openrc.sh` file comment or replace both `echo "Please enter your OpenStack Password for project $OS_PROJECT_NAME as user $OS_USERNAME: "` and `read -sr OS_PASSWORD_INPUT` with `OS_PASSWORD_INPUT=<password>` like in the example below.

```
admin-openrc.sh - Bash
#!/usr/bin/env bash
# To use an OpenStack cloud you need to authenticate against the Identity
# service named keystone, which returns a **Token** and **Service Catalog**.
# The catalog contains the endpoints for all services the user/tenant has
# access to - such as Compute, Image Service, Identity, Object Storage, Block
# Storage, and Networking (code-named nova, glance, keystone, swift,
# cinder, and neutron).
#
# *NOTE*: Using the 3 *Identity API* does not necessarily mean any other
# OpenStack API is version 3. For example, your cloud provider may implement
# Image API v1.1, Block Storage API v2, and Compute API v2.0. OS_AUTH_URL is
# only for the Identity API served through keystone.
export OS_AUTH_URL=http://10.0.255.255/identity
# With the addition of Keystone we have standardized on the term **project**
# as the entity that owns the resources.
export OS_PROJECT_ID=abcdefghijklmnopqrstuvwxyz012345
export OS_PROJECT_NAME="admin"
export OS_USER_DOMAIN_NAME="Default"
if [ -z "$OS_USER_DOMAIN_NAME" ]; then unset OS_USER_DOMAIN_NAME; fi
export OS_PROJECT_DOMAIN_ID="default"
if [ -z "$OS_PROJECT_DOMAIN_ID" ]; then unset OS_PROJECT_DOMAIN_ID; fi
# unset v2.0 items in case set
unset OS_TENANT_ID
unset OS_TENANT_NAME
# In addition to the owning entity (tenant), OpenStack stores the entity
# performing the action as the **user**.
export OS_USERNAME="admin"
# With Keystone you pass the keystone password.
```

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```
# The two next lines are the one that need to be commented out or deleted
# echo "Please enter your OpenStack Password for project $OS_PROJECT_NAME as␣
↪user $OS_USERNAME: "
# read -sr OS_PASSWORD_INPUT

# Add this line with your Openstack password
OS_PASSWORD_INPUT=<password>

export OS_PASSWORD=$OS_PASSWORD_INPUT
# If your configuration has multiple regions, we set that information here.
# OS_REGION_NAME is optional and only valid in certain environments.
export OS_REGION_NAME="RegionOne"
# Don't leave a blank variable, unset it if it was empty
if [ -z "$OS_REGION_NAME" ]; then unset OS_REGION_NAME; fi
export OS_INTERFACE=public
export OS_IDENTITY_API_VERSION=3
```

c) Copy or symlink the file into `/opt/bacula/etc/admin-openrc.sh` or another directory in the OpenStack host where the Bacula OpenStack Cinder Plugin is installed. By default, the plugin uses the `DEFAULT=/opt/bacula/admin-openrc.sh` path. It is possible to store the `admin-openrc.sh` file in a different directory, and provide the relevant value for `admin-openrc.sh` plugin parameter.

2. The second important configuration step is to advise the cinder-backup service to use the Bacula Cinder driver.

   To do so, the Cinder configuration file located by default at `/etc/cinder/cinder.conf` needs to be modified.

   Inside the `[DEFAULT]` group, the line `backup_driver = cinder.backup.drivers.bacula.BaculaBackupDriver` need to be added.

```
[DEFAULT]
...
backup_driver = cinder.backup.drivers.bacula.BaculaBackupDriver
...
```

5.1 Configuring the Backint Parameter File

Backint can be configured with the `/opt/bacula/openstack/os-backint.conf` file.

Note: Usually the configuration file genrated by the install script should fit the current system. The following section is only for user who wish to manually configure `os-backint`.

The keywords presented here are accepted in the backint.conf file.

Parameter	Example	Description	Required	Default
client	`client=opens`	Bacula Client name.	Yes	NULL
restoreclient	`restoreclien`	Bacula Client name used to restore data.	No	NULL
job	`job=OPENSTAC`	Bacula Backup Job name.	Yes	NULL
bconsole	`bconsole="/opt/bacula/bin/bconsole -n -c /opt/bacula/openstack/bconsole.conf"`	Bconsole command with all arguments.	Yes	`bconsole="/opt/bacula/bin/bconsole -n -c /opt/bacula/openstack/bconsole.conf"`
RestoreJob	`restorejob=R`	Bacula Restore Job name. If multiple restore jobs are defined in your configuration and this option is not used, `backint` will automatically choose the first restore Job defined.	No	NULL
WaitJobCompletion	`waitjobcompl`	Indicates to wait for Job completion at the end of the `backint` session. The default is wait at the end of the `backint` session.	Yes	no
JobOpt	`jobopt="spoo`	Allows you to specify additional Job options.	No	NULL
CtrlFile	`ctrlfile=/opt/bacula/openstack/os-backint`	Specifies the base path of control files used to connect with the bacula-fd plugin. You must use the same location on the Plugin command line in the Fileset, and in the backint.conf configuration file.	No	`/opt/bacula/openstack/os-backint`
wait_retry	`wait_retry=3`	Specifies the number of times that `backint` will try to reach the Bacula Enterprise Openstack Cinder Plugin (10s between each try).	No	32
catalog	`catalog="MyC 2"`	Specifies a Bacula Catalog name if your director is using multiple catalogs.	No	NULL
trace	`trace=/tmp/log.txt`	Points to an optional trace file.	No	NULL
debug	`debug=50`	Debug level.	No	0

6 Operations

The following article describes details regarding backup, restore or query operations with Bacula Enterprise Openstack Cinder Plugin.

6.1 Bacula Enterprise Openstack Procedures

The Bacula Enterprise Openstack Cinder Plugin has its own set of procedures to interact with the Openstack environment.

The user should only interact with procedures that contains the keyword `execute` in their name with the exception of the `openstack-vm-query`.

- `openstack-vm-execute-backup` to instance's volume(s) backup.
- `openstack-vm-execute-restore` to instance's volume(s) restore.
- `openstack-vm-execute-interactive-delete` to delete backups, snapshots or volumes.
- `openstack-vm-query` to get more information about Openstack resources.

All these procedures have their own dedicated chapter in this Operation section.

6.2 Backup in Openstack Cinder

Execute the backup of the volume(s) for a specific instance, or a set of instances, by running the `/opt/bacula/bin/openstack-vm-execute-backup` procedure with relevant parameters.

Parameters

- `-b <instance-name>` - If this parameter is set, the procedure will try to backup all volume of an instance named <instance-name>.
- `-c <tenant/project-openrc.rc>` - Path to the `<tenant/project>-openrc.sh` file. Default value is `/opt/bacula/etc/admin-openrc.sh`.
- `-i` - If this parameter is set, the backup will be incremental.
- `-t <tools>` - Path to Openstack procedures. Default value is `/opt/bacula/bin/`.
- `-p <project-id>` - If set backup will target VM in this project only.
- `-v <instance-id>` - ID of the instance to backup.
- `-w <waiting-time>` - Waiting time between two poll operations. Default value is 5.
- `--all-projects` - Backup all volume in all projects
- `-h` - Display help.

Note: Option `-v` has precedence over option `-b`.

Example

Backup of all the volumes attached to a specific instance, using the instance ID:

Note: To get either the ID or the name of a specific instance, the query procedure can be used with `/opt/bacula/bin/openstack-vm-query -l`. The ID can be found under the ID column.

First get the relevant instance id:

```
root@stackdev:/opt/bacula# bin/openstack-vm-query -l
+--------------------------------------+----------------+--------+------------
↪-----------------------------------------------------------------------+-------
↪-------------------+----------+
| ID                                   | Name           | Status | Networks  ␣
↪                                                                      | Image␣
↪                   | Flavor   |
+--------------------------------------+----------------+--------+------------
↪-----------------------------------------------------------------------+-------
↪-------------------+----------+
| instance_ID                          | instance_name  | ACTIVE | private=00.
↪0.0.0, 1111:1111:1111:0:1111:1111:1111:1111; shared=111.111.111.111 | N/A␣
↪(booted from volume) | m1.micro |
+--------------------------------------+-------+--------+--------------------
↪-----------------------------------------------------------+----------------
↪----------+----------+
```

Then issue backup creation operation:

```
root@openstack-bck:~# /opt/bacula/bin/openstack-vm-execute-backup -v instance_
↪ID
Backup of VM=<instance_ID>  INCREMENTAL=False       ADMIN_OPENRC=/opt/bacula/
↪etc/admin-openrc.sh    SCRIPTS=/opt/bacula/bin/
I: Found 2 volumes to backup for <instance_ID>
I: Backing up <volume_ID>
D: Issue snapshot
I: Snapshot done
I: Backup status=creating
[...]
I: Backup status=creating
I: Backup status=creating
I: Backup status=available
I: Done proceeds to next
I: Issue delete command for snapshot=<snapshot_ID>
I: Backing up <volume_ID>
D: Issue snapshot
D: Snapshot creating ...
I: Snapshot done
I: Backup status=creating
[...]
I: Backup status=creating
I: Backup status=creating
I: Backup status=available
```

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```
I: Done proceeds to next
I: Issue delete command for snapshot=<snapshot_ID>
I: No more volumes to process END OF BACKUP
```

Backup of all the volumes attached to a specific instance, using the instance name:

```
root@host:/opt/bacula# /opt/bacula/bin/openstack-vm-execute-backup -b␣
↪instance_name
Backup of VM=<instance_ID>  INCREMENTAL=False       ADMIN_OPENRC=/opt/bacula/
↪etc/admin-openrc.sh    SCRIPTS=/opt/bacula/bin/
I: Found 2 volumes to backup for <instance_ID>
I: Backing up <volume_ID>
D: Issue snapshot
I: Snapshot done
I: Backup status=creating
[...]
I: Backup status=creating
I: Backup status=creating
I: Backup status=available
I: Done proceeds to next
I: Issue delete command for snapshot=<snapshot_ID>
I: Backing up <volume_ID>
D: Issue snapshot
D: Snapshot creating ...
I: Snapshot done
I: Backup status=creating
[...]
I: Backup status=creating
I: Backup status=creating
I: Backup status=available
I: Done proceeds to next
I: Issue delete command for snapshot=<snapshot_ID>
I: No more volumes to process END OF BACKUP
```

When using the -b or -v options, to backup an OpenStack instance, there will be one backup jobid in Bacula for each volume attached to the instance. Also, there will be one backup in the OpenStack server for each volume.

```
root@host:/opt/bacula# /opt/bacula/bin/openstack-vm-query -b
+---------------+----------------------+---------------------------------------
↪----+-----------+------+-------------+
| ID            | Name                 | Description                          ␣
↪    | Status    | Size | Incremental |
+---------------+----------------------+---------------------------------------
↪----+-----------+------+-------------+
| <backup1_ID>> | <backup1_name>       | Backup done by Bacula Enterprise     ␣
↪    | available |   10 | False       |
|               |                      | INSTANCE=<instance_name> DATE=
↪<datetime> |           |      |             |
|               |                      |                                      ␣
↪    |           |      |             |
| <backup2_ID>> | <backup2_name>       | Backup done by Bacula Enterprise     ␣
```

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```
↪    | available |    5 | False       |
|                                       | INSTANCE=<instance_name> DATE=
↪<datetime> |           |      |             |
+---------------+----------------------+-------------------------------------
↪----+-----------+------+-------------+
```

Also, in the Catalog, two jobids are created:

```
|    xx | job.openstack-bck-fd.openstack-vm | 2024-01-01 12:00:00 | B    | I ␣
↪   |        6 | 12,345,678 | T         |
|    XX | job.openstack-bck-fd.openstack-vm | 2024-01-01 12:00:05 | B    | I ␣
↪   |        9 | 90,123,456 | T         |
```

Backup Job Example with a RunScript Block

As mentioned earlier, it is possible to define a backup job to trigger the openstack-vm-execute-backup program to execute the backup in the OpenStack server.

The RunScript block below triggers the openstack-vm-execute-backup program to backup all the volumes attached to the *MyInstance* instance in the OpenStack server, having the *openstack-bck-fd* bacula client installed:

```
Job {
  Name = OpenStack-test-job
  JobDefs = BackupsToDisk
  Fileset = None
  Client = openstack-bck-fd
  RunScript {
    Command = "/opt/bacula/bin/openstack-vm-execute-backup -b MyInstance"
    RunsOnClient = yes
    RunsWhen = Before
  }
}

Fileset {
  Name = None
  EnableVSS = no
}
```

The RunScript block below triggers the openstack-vm-execute-backup program to backup all the volumes attached to any instance whose name begins with *MyInstance* in the OpenStack server, having the *openstack-bck-fd* bacula client installed:

```
Job {
  Name = OpenStack-test-job
  JobDefs = BackupsToDisk
  Fileset = None
  Client = openstack-bck-fd
  RunScript {
    Command = "/opt/bacula/bin/openstack-vm-execute-backup -b MyInstance*"
    RunsOnClient = yes
    RunsWhen = Before
```

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```
  }
}

Fileset {
  Name = None
  EnableVSS = no
}
```

By default, the plugin will use the `/opt/bacula/etc/admin-openrc.sh` tenant OpenStack RC file. To trigger the backup of instance(s) volume(s) in a different tenant/project, it is required to use the `-c <tenant/project-openrc.rc>` option. For example, to backup all the instances whose names begin with `MyInstance` in the `demo` tenant/project:

```
Job {
  Name = OpenStack-test-job
  JobDefs = BackupsToDisk
  Fileset = None
  Client = openstack-bck-fd
  RunScript {
    Command = "/opt/bacula/bin/openstack-vm-execute-backup -c /opt/bacula/etc/
↪demo-openrc.sh -b MyInstance*"
    RunsOnClient = yes
    RunsWhen = Before
  }
}

Fileset {
  Name = None
  EnableVSS = no
}
```

6.3 Restore in Openstack Cinder

Restore volumes attached to a previous backup or a specific volume by running the `/opt/bacula/bin/openstack-vm-execute-restore` procedure with relevant parameters.

The `/opt/bacula/bin/openstack-vm-execute-restore` program available in the OpenStack server must be used for restores. This program can be added to a RunScript block of an Admin job, and this Admin job can be triggered from bconsole or BWeb.

The `/opt/bacula/bin/openstack-vm-execute-restore` program can be used with a few parameters.

Parameters

- `-b <backup_id>` - ID of a specific volume backup to restore.
- `-c <admin-openrc>` - Path to modified admin-openrc.sh Default value is `/opt/bacula/etc/admin-openrc.sh`.
- `-n <backup_name>` - If this parameter is set, the volume with this name will be restored.
- `-t <tools>` - Path to Openstack procedure. Default value is `/opt/bacula/bin/`.
- `-v <instance_id>` - ID of the instance to restore.
- `-p <project-id>` - If set restore will target VM in this project only.
- `-P <project-id>` - If specified the restore operation will restore all volumes related to this project ID.
- `-w <waitingTime>` - Waiting time in seconds between two completion check. Default value is `5`.
- `-h` - Display help.

Examples

Restore Volumes from an Instance Using `openstack-vm-execute-restore`

This example explain how to restore all the volumes, or a specific volume, from an existent instance, using the `/opt/bacula/bin/openstack-vm-execute-restore` procedure in the OpenStack node.

Note: To get the ID of a specific instance, the query procedure can be used with `/opt/bacula/bin/openstack-vm-query -l`. The ID can be found under the ID column.

In case the virtual machine was deleted beforehand Cinder backups created by the plugin will have the original virtual machine ID as a name. To access the list of backup the query procedure can be used with `/opt/bacula/bin/openstack-vm-query -b`.

Restore using the instance ID. Get the instance_ID using the `/opt/bacula/bin/openstack-vm-query -l` command:

```
root@stackdev:/opt/bacula# /opt/bacula/bin/openstack-vm-query -l -c /opt/
↪bacula/etc/demo-openrc.sh
+--------------------------------------+---------------+--------+-------------
↪----------+---------------------------+---------+
| ID                                   | Name          | Status | Networks   ␣
↪          | Image                     | Flavor  |
+--------------------------------------+---------------+--------+-------------
↪----------+---------------------------+---------+
| e20b1863-6a3f-4b09-90b6-66f77441f3ef | demoInstance1 | ACTIVE | shared=192.
↪168.233.32 | N/A (booted from volume) | m1.tiny |
+--------------------------------------+---------------+--------+-------------
↪----------+---------------------------+---------+
```

Or list the backups available, and get the instance ID (e20b1863-6a3f-4b09-90b6-66f77441f3ef):

```
root@stackdev:/opt/bacula# /opt/bacula/bin/openstack-vm-query -b -c /opt/
↪bacula/etc/demo-openrc.sh
+--------------------------------------+--------------------------------------
↪-----------+------------------------------------------------------------+----------
↪-+------+-------------+
| ID                                   | Name                                 ␣
↪           | Description                                                | Status  ␣
↪ | Size | Incremental |
+--------------------------------------+--------------------------------------
↪-----------+------------------------------------------------------------+----------
↪-+------+-------------+
| 4cbd73d0-8c0e-4808-9900-240c280f1f12 | e20b1863-6a3f-4b09-90b6-66f77441f3ef_
↪1728633751 | Backup done by Bacula Enterprise                           |␣
↪available |    1 | False       |
|                                      |                                      ␣
↪           | INSTANCE=demoInstance1 DATE=Fri Oct 11 08:02:31 AM  |         ␣
↪ |      |             |
|                                      |                                      ␣
↪           | UTC 2024                                                   |         ␣
↪ |      |             |
| a8967472-ed67-4cb5-8e45-c8781dffe970 | e20b1863-6a3f-4b09-90b6-66f77441f3ef_
↪1728633751 | Backup done by Bacula Enterprise                           |␣
↪available |    2 | False       |
|                                      |                                      ␣
↪           | INSTANCE=demoInstance1 DATE=Fri Oct 11 08:02:31 AM  |         ␣
↪ |      |             |
|                                      |                                      ␣
↪           | UTC 2024                                                   |         ␣
↪ |      |             |
+--------------------------------------+--------------------------------------
↪-----------+------------------------------------------------------------+----------
↪-+------+-------------+
```

Then issue the restore command using the instance_ID value:

```
root@stackdev:~# /opt/bacula/bin/openstack-vm-execute-restore -v e20b1863-
↪6a3f-4b09-90b6-66f77441f3ef
Restore of INSTANCE_ID=e20b1863-6a3f-4b09-90b6-66f77441f3ef         SCRIPT_
↪PATH=/opt/bacula/bin/    ADMIN_OPENRC=/opt/bacula/etc/admin-openrc.sh
I: 1 backup to restore
I: Restoring 4cbd73d0-8c0e-4808-9900-240c280f1f12
I: Volume restoration in progress=restoring-backup
I: Restored volume found with ID=<restored_volume_ID>
I: Volume restoration in progress=restoring-backup

...

I: Volume restoration in progress=restoring-backup
I: Volume restoration in progress=available
I: Done moving on to next
I: No more backup to restore END
```

Once this procedure is done, the volumes will be in an *available* status, and you will need to either create

a new instance and attach the restored volumes, or to attach the restored volumes to an existent instance using the openstack CLI or with the GUI from the dashboard.

It is also possible to restore a single volume from a backup id by using the `-b` option.

Get the backup_ID for the specific volume using the `/opt/bacula/bin/openstack-vm-query -b` command:

```
root@stackdev:/opt/bacula# /opt/bacula/bin/openstack-vm-query -b -c /opt/
↪bacula/etc/demo-openrc.sh
+--------------------------------------+--------------------------------------
↪-----------+--------------------------------------------------------+----------
↪-+------+-------------+
| ID                                   | Name                                 ␣
↪           | Description                                            | Status   ␣
↪ | Size | Incremental |
+--------------------------------------+--------------------------------------
↪-----------+--------------------------------------------------------+----------
↪-+------+-------------+
| 4cbd73d0-8c0e-4808-9900-240c280f1f12 | e20b1863-6a3f-4b09-90b6-66f77441f3ef_
↪1728633751 | Backup done by Bacula Enterprise                       |␣
↪available |    1 | False       |
|                                      |                                      ␣
↪           | INSTANCE=demoInstance1 DATE=Fri Oct 11 08:02:31 AM  |         ␣
↪ |      |             |
|                                      |                                      ␣
↪           | UTC 2024                                               |         ␣
↪ |      |             |
| a8967472-ed67-4cb5-8e45-c8781dffe970 | e20b1863-6a3f-4b09-90b6-66f77441f3ef_
↪1728633751 | Backup done by Bacula Enterprise                       |␣
↪available |    2 | False       |
|                                      |                                      ␣
↪           | INSTANCE=demoInstance1 DATE=Fri Oct 11 08:02:31 AM  |         ␣
↪ |      |             |
|                                      |                                      ␣
↪           | UTC 2024                                               |         ␣
↪ |      |             |
+--------------------------------------+--------------------------------------
↪-----------+--------------------------------------------------------+----------
↪-+------+-------------+
```

Then issue the restore command using the backup ID value, for example:

```
root@stackdev:~# /opt/bacula/bin/openstack-vm-execute-restore -b 4cbd73d0-
↪8c0e-4808-9900-240c280f1f12
Restore of RESTORE_ID=4cbd73d0-8c0e-4808-9900-240c280f1f12  SCRIPT_PATH=/opt/
↪bacula/bin/    ADMIN_OPENRC=/opt/bacula/etc/demo-openrc.sh
I: 1 backup to restore
I: Restoring backup with ID=4cbd73d0-8c0e-4808-9900-240c280f1f12
I: Found restoration volume in progress ID=efc209d6-11c4-4bf4-8917-
↪c4e6f07d50b1
I: Volume restoration in progress with ID=efc209d6-11c4-4bf4-8917-
↪c4e6f07d50b1      STATUS=restoring-backup
I: Volume restoration in progress with ID=efc209d6-11c4-4bf4-8917-
```

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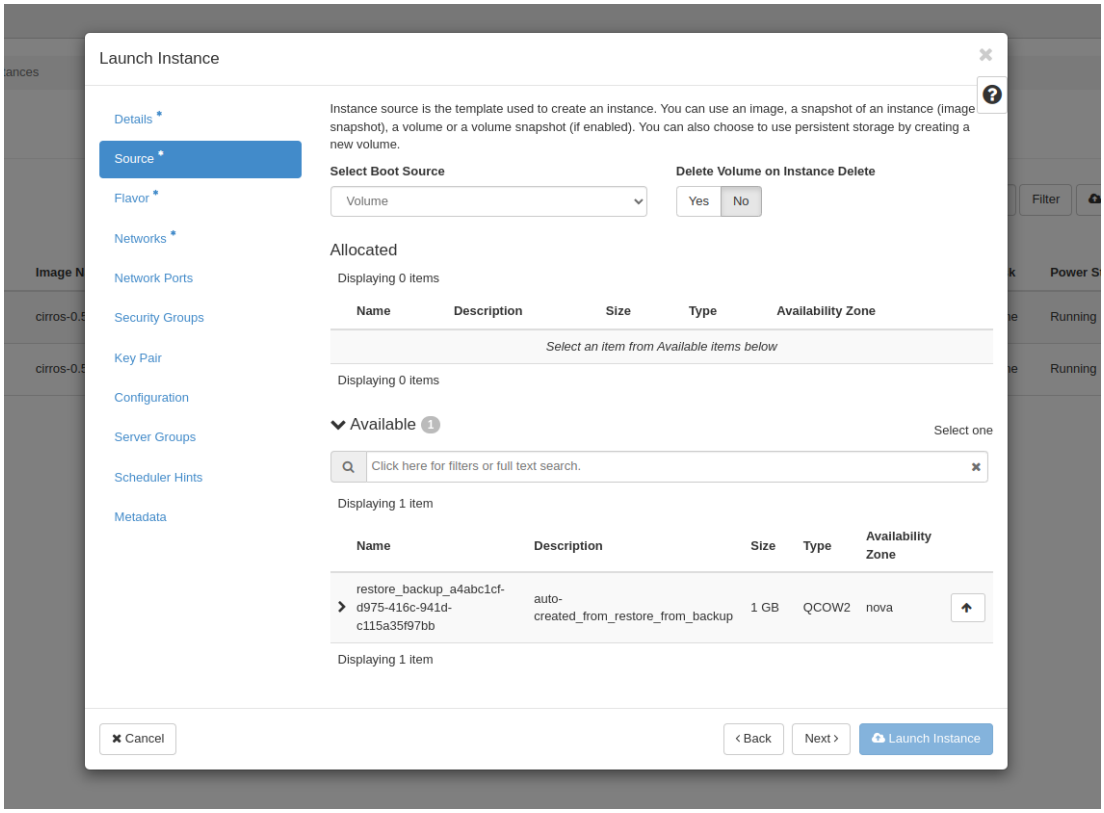
```
↪c4e6f07d50b1      STATUS=restoring-backup
I: Volume restoration in progress with ID=efc209d6-11c4-4bf4-8917-
↪c4e6f07d50b1      STATUS=restoring-backup
I: Volume restoration in progress with ID=efc209d6-11c4-4bf4-8917-
↪c4e6f07d50b1      STATUS=restoring-backup
I: Volume restoration in progress with ID=efc209d6-11c4-4bf4-8917-
↪c4e6f07d50b1      STATUS=restoring-backup
I: Volume restoration in progress with ID=efc209d6-11c4-4bf4-8917-
↪c4e6f07d50b1      STATUS=restoring-backup
I: Volume restoration in progress with ID=efc209d6-11c4-4bf4-8917-
↪c4e6f07d50b1      STATUS=available
I: Done moving on to next
I: No more backup to restore FINISHED
```

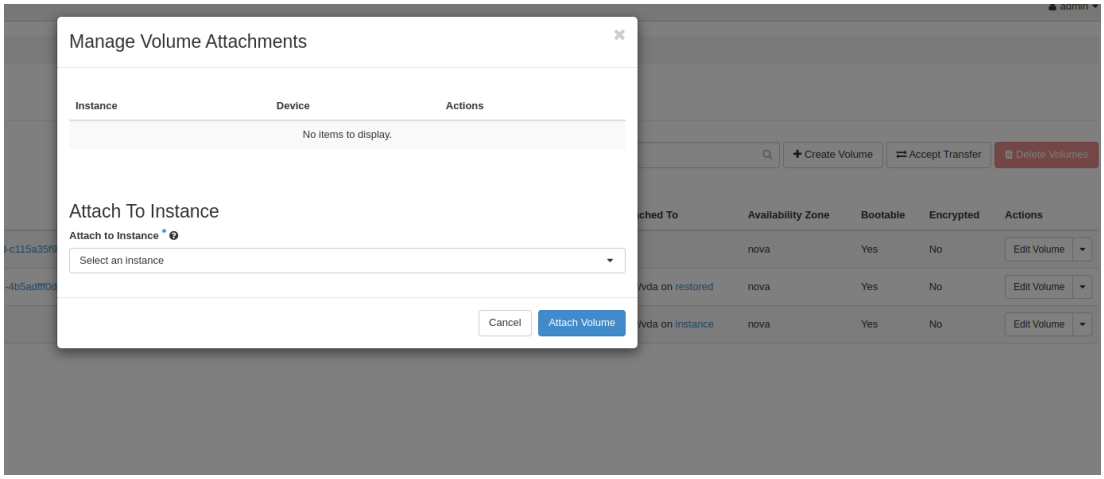
Create instance from GUI with restored disk

- Under the Instances overview select the `Launch Instance` menu.
- In the source menu select `Volume` from `Select Boot Source`
- If the disk containing the operating system has to be restored. Under the `Available` section select the newly restored disk by hitting the up arrow sign on the right



- Setup all other parameters, preferably with the same flavor as the backup instance.
- Launch instance
- Manually attach restored data disks to newly created instance via `Volumes` menu
- On the restored disk the `Edit volume` menu contains a `Manage Volume Attachments` section

- In the `Attach to instance` sub-menu select the relevant instance to attach the disk to



Use an Admin job to be triggered using bconsole or BWeb

The Admin job configuration to be defined in the Director:

```
# cat Job/cinder-01-restore-control-job.cfg
Job {
  Name = "cinder-01-restore-control-job"
  Type = "Admin"
  Client = "cinder-01-fd"
  Fileset = "Fake-fileset"
  Messages = "Default"
  Pool = "DiskBackup365d"
  Priority = 10
  Runscript {
   Command = "ssh root@am-u22-openstack-bck \"/opt/bacula/scripts/restore_
↪instance.sh -n e20b1863-6a3f-4b09-90b6-66f77441f3ef_1728633751 -t demo -c -
↪f 1\""
   RunsOnClient = no
   RunsWhen = Before
  }
  Schedule = "Manual"
  Storage = "DiskAutochanger"
  WriteBootstrap = "/opt/bacula/bsr/%c_%n.bsr"
}
```

The `restore_instance.sh` parameters values:

`-t demo` is the name of the Tenant.

`-f 1` is the flavor of the new instance that will be created. These values you can get from:

```
# openstack flavor list
+----+-----------+-------+------+-----------+-------+-----------+
| ID | Name      |   RAM | Disk | Ephemeral | VCPUs | Is Public |
+----+-----------+-------+------+-----------+-------+-----------+
| 1  | m1.tiny   |   512 |    1 |         0 |     1 | True      |
```

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```
| 2  | m1.small  |  2048 |   20 |         0 |     1 | True      |
| 3  | m1.medium |  4096 |   40 |         0 |     2 | True      |
| 4  | m1.large  |  8192 |   80 |         0 |     4 | True      |
| 42 | m1.nano   |   192 |    1 |         0 |     1 | True      |
| 5  | m1.xlarge | 16384 |  160 |         0 |     8 | True      |
| 84 | m1.micro  |   256 |    1 |         0 |     1 | True      |
| c1 | cirros256 |   256 |    1 |         0 |     1 | True      |
| d1 | ds512M    |   512 |    5 |         0 |     1 | True      |
| d2 | ds1G      |  1024 |   10 |         0 |     1 | True      |
| d3 | ds2G      |  2048 |   10 |         0 |     2 | True      |
| d4 | ds4G      |  4096 |   20 |         0 |     4 | True      |
+----+-----------+-------+------+-----------+-------+-----------+
```

`-n e20b1863-6a3f-4b09-90b6-66f77441f3ef_1728633751` is the backup name for the instance demoInstance1 with instance ID `e20b1863-6a3f-4b09-90b6-66f77441f3ef`. This value can be collected by using the following cinder-01-list-backups-job admin job, or command line in the cinder node:

```
# cat conf.d/Director/am-u24-openstack-dir-tst-dir/Job/cinder-01-list-backups-
↪job.cfg
Job {
  Name = "cinder-01-list-backups-job"
  Type = "Admin"
  Client = "cinder-01-fd"
  Fileset = "Fake-fileset"
  Messages = "Default"
 Pool = "DiskBackup365d"
  Priority = 10
  Runscript {
   Command = "ssh root@am-u22-openstack-bck \"/opt/bacula/scripts/list_
↪backups.sh demo demoInstance1\""
   RunsOnClient = no
   RunsWhen = Before
  }
  Schedule = "Manual"
  Storage = "DiskAutochanger"
  WriteBootstrap = "/opt/bacula/bsr/%c_%n.bsr"
}
```

The `cinder-01-list-backups-job` job log to list all the backups for the `demoInstance1` instance:

```
2024-10-14 11:50:21 am-u24-openstack-dir-tst-dir JobId 451: shell command:␣
↪run BeforeJob "ssh root@am-u22-openstack-bck "/opt/bacula/scripts/list_
↪backups.sh demo demoInstance1""
2024-10-14 11:50:22 am-u24-openstack-dir-tst-dir JobId 451: BeforeJob:␣
↪Listing backups for Instance demoInstance1...
2024-10-14 11:50:22 am-u24-openstack-dir-tst-dir JobId 451: BeforeJob: Use␣
↪the backup `Name` to restore all the instance volumes, or use the backup␣
↪`ID` to restore a single instance volume.
2024-10-14 11:50:25 am-u24-openstack-dir-tst-dir JobId 451: BeforeJob: +------
↪----------------------------------+----------------------------------------
↪------+-----------------------------------------------------------------
↪-------------------------+-----------+------+-------------+
```

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```
2024-10-14 11:50:25 am-u24-openstack-dir-tst-dir JobId 451: BeforeJob: | ID  ␣
↪                                | Name                                      ␣
↪      | Description                                                         ␣
↪                          | Status    | Size | Incremental |
2024-10-14 11:50:25 am-u24-openstack-dir-tst-dir JobId 451: BeforeJob: +------
↪--------------------------------+-------------------------------------------
↪------+-----------------------------------------------------------------------
↪-------------------------+-----------+------+-------------+
2024-10-14 11:50:25 am-u24-openstack-dir-tst-dir JobId 451: BeforeJob: |␣
↪4cbd73d0-8c0e-4808-9900-240c280f1f12 | e20b1863-6a3f-4b09-90b6-66f77441f3ef_
↪1728633751 | Backup done by Bacula Enterprise INSTANCE=demoInstance1␣
↪DATE=Fri Oct 11 08:02:31 AM UTC 2024 | available |    1 | False       |
2024-10-14 11:50:25 am-u24-openstack-dir-tst-dir JobId 451: BeforeJob: |␣
↪a8967472-ed67-4cb5-8e45-c8781dffe970 | e20b1863-6a3f-4b09-90b6-66f77441f3ef_
↪1728633751 | Backup done by Bacula Enterprise INSTANCE=demoInstance1␣
↪DATE=Fri Oct 11 08:02:31 AM UTC 2024 | available |    2 | False       |
2024-10-14 11:50:25 am-u24-openstack-dir-tst-dir JobId 451: BeforeJob: +------
↪--------------------------------+-------------------------------------------
↪------+-----------------------------------------------------------------------
↪-------------------------+-----------+------+-------------+
2024-10-14 11:50:25 am-u24-openstack-dir-tst-dir JobId 451: Start Admin JobId␣
↪451, Job=cinder-01-list-backups-job.2024-10-14_11.50.18_29
2024-10-14 11:50:25 am-u24-openstack-dir-tst-dir JobId 451: Bacula 18.0.4␣
↪(06Sep24): 14-Oct-2024 11:50:25
  JobId:                  451
  Job:                    cinder-01-list-backups-job.2024-10-14_11.50.18_29
  Scheduled time:         14-Oct-2024 11:50:18
  Start time:             14-Oct-2024 11:50:25
  End time:               14-Oct-2024 11:50:25
  Termination:            Admin OK
```

And using the `openstack-vm-query` procedure in the Cinder node:

```
# /opt/bacula/bin/openstack-vm-query -c /opt/bacula/etc/demo-openrc.sh -b |␣
↪grep "^+\|^| ID\|demoInstance1"
+--------------------------------------+-------------------------------------
↪-----------+-----------------------------------------------------------------
↪-------------------------------+-----------+------+-------------+
| ID                                   | Name                                ␣
↪           | Description                                                     ␣
↪                              | Status    | Size | Incremental |
+--------------------------------------+-------------------------------------
↪-----------+-----------------------------------------------------------------
↪-------------------------------+-----------+------+-------------+
| 4cbd73d0-8c0e-4808-9900-240c280f1f12 | e20b1863-6a3f-4b09-90b6-66f77441f3ef_
↪1728633751 | Backup done by Bacula Enterprise INSTANCE=demoInstance1␣
↪DATE=Fri Oct 11 08:02:31 AM UTC 2024 | available |    1 | False       |
| a8967472-ed67-4cb5-8e45-c8781dffe970 | e20b1863-6a3f-4b09-90b6-66f77441f3ef_
↪1728633751 | Backup done by Bacula Enterprise INSTANCE=demoInstance1␣
↪DATE=Fri Oct 11 08:02:31 AM UTC 2024 | available |    2 | False       |
+--------------------------------------+-------------------------------------
↪-----------+-----------------------------------------------------------------
↪-------------------------------+-----------+------+-------------+
```

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```
↪------------------------------+-----------+------+-------------+
```

The `cinder-01-restore-control-job` job log will report the new instance created:

```
2024-10-11 13:44:46 openstack-dir- JobId 285: shell command: run BeforeJob
↪"ssh root@am-u22-openstack-bck "/opt/bacula/scripts/restore_instance.sh -v␣
↪demoInstance1 -n e20b1863-6a3f-4b09-90b6-66f77441f3ef_1728633751 -t demo -c␣
↪-f c1""
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob:
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: +--------------------
↪----------------+------------------------------------------------------------
↪------------------------------------------------------------------------------
↪------------------------------------------------------------------------------
↪-------------+
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | Field              ␣
↪                 | Value                                                    ␣
↪                                                                            ␣
↪                                                                            ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: +--------------------
↪----------------+------------------------------------------------------------
↪------------------------------------------------------------------------------
↪------------------------------------------------------------------------------
↪-------------+
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-DCF:diskConfig     ␣
↪                 | MANUAL                                                   ␣
↪                                                                            ␣
↪                                                                            ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-
↪AZ:availability_zone         | nova                                         ␣
↪                                                                            ␣
↪                                                                            ␣
↪                            |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:host                | am-u22-openstack-bck                             ␣
↪                                                                            ␣
↪                                                                            ␣
↪                       |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:hostname            | demoinstance1-restored                           ␣
↪                                                                            ␣
↪                                                                            ␣
↪                       |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:hypervisor_hostname | am-u22-openstack-bck                             ␣
↪                                                                            ␣
↪                                                                            ␣
↪                       |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:instance_name       | instance-00000014                                ␣
↪                                                                            ␣
```

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```
↪                                                                                ␣
↪                        |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:kernel_id           | None                                                 ␣
↪                                                                                ␣
↪                                                                                ␣
↪                        |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:launch_index        | None                                                 ␣
↪                                                                                ␣
↪                                                                                ␣
↪                        |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:ramdisk_id          | None                                                 ␣
↪                                                                                ␣
↪                                                                                ␣
↪                        |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:reservation_id      | r-5drlfobi                                           ␣
↪                                                                                ␣
↪                                                                                ␣
↪                        |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:root_device_name    | /dev/vda                                             ␣
↪                                                                                ␣
↪                                                                                ␣
↪                        |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-SRV-
↪ATTR:user_data           | None                                                 ␣
↪                                                                                ␣
↪                                                                                ␣
↪                        |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-STS:power_
↪state              | Running                                                    ␣
↪                                                                                ␣
↪                                                                                ␣
↪                  |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-STS:task_
↪state               | None                                                      ␣
↪                                                                                ␣
↪                                                                                ␣
↪                   |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-EXT-STS:vm_state␣
↪                  | active                                                      ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-SRV-USG:launched_
↪at              | 2024-10-11T13:47:56.000000                                    ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
```

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```
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | OS-SRV-
↪USG:terminated_at            | None                                 ␣
↪                                                                    ␣
↪                                                                    ␣
↪                           |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | accessIPv4    ␣
↪                | None                                              ␣
↪                                                                    ␣
↪                                                                    ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | accessIPv6    ␣
↪                | None                                              ␣
↪                                                                    ␣
↪                                                                    ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | addresses     ␣
↪                | N/A                                               ␣
↪                                                                    ␣
↪                                                                    ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | adminPass     ␣
↪                | JiVRLeB59PCG                                      ␣
↪                                                                    ␣
↪                                                                    ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | config_drive  ␣
↪                | None                                              ␣
↪                                                                    ␣
↪                                                                    ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | created       ␣
↪                | 2024-10-11T13:47:23Z                              ␣
↪                                                                    ␣
↪                                                                    ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | description   ␣
↪                | None                                              ␣
↪                                                                    ␣
↪                                                                    ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | flavor        ␣
↪                | description=, disk='1', ephemeral='0', extra_specs.hw_
↪rng:allowed='True', id='cirros256', is_disabled=, is_public='True',␣
↪location=, name='cirros256', original_name='cirros256', ram='256', rxtx_
↪factor=, swap='0', vcpus='1' |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | hostId        ␣
↪                | 321b77de1457d2ad95d696392b037a456230edc2009395d7dd924b6c␣
↪                                                                    ␣
↪                                                                    ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | host_status  ␣
↪                | UP                                                ␣
```

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```
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | id                      ␣
↪                | 5854acee-28d4-4029-944a-ccef9fc88b5d                          ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | image                   ␣
↪                | N/A (booted from volume)                                      ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | key_name                ␣
↪                | None                                                          ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | locked                  ␣
↪                | None                                                          ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | locked_reason           ␣
↪                | None                                                          ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | name                    ␣
↪                | demoInstance1_restored                                        ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | pinned_availability_
↪zone            | None                                                          ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | progress                ␣
↪                | None                                                          ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | project_id              ␣
↪                | 9c8aa25a903346e6af3877a6b4612a46                              ␣
↪                                                                                ␣
↪                                                                                ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | properties              ␣
↪                | None                                                          ␣
↪                                                                                ␣
↪                                                                                ␣
```

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```
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | security_groups    ␣
↪                | name='default'                                          ␣
↪                                                                          ␣
↪                                                                          ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | server_groups      ␣
↪                | None                                                    ␣
↪                                                                          ␣
↪                                                                          ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | status             ␣
↪                | ACTIVE                                                  ␣
↪                                                                          ␣
↪                                                                          ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | tags               ␣
↪                |                                                       ␣
↪                                                                          ␣
↪                                                                          ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | trusted_image_
↪certificates          | None                                            ␣
↪                                                                          ␣
↪                                                                          ␣
↪                |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | updated            ␣
↪                | 2024-10-11T13:47:56Z                                    ␣
↪                                                                          ␣
↪                                                                          ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | user_id            ␣
↪                | 362d7bb6fcc64be3bcdc1c6fc99229d0                        ␣
↪                                                                          ␣
↪                                                                          ␣
↪              |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: | volumes_attached   ␣
↪                | delete_on_termination='False', id='efc209d6-11c4-4bf4-
↪8917-c4e6f07d50b1'                                                       ␣
↪                                                                          ␣
↪                |
2024-10-11 13:48:00 openstack-dir JobId 285: BeforeJob: +-------------------
↪----------------+------------------------------------------------------------
↪----------------------------------------------------------------------------
↪----------------------------------------------------------------------------
↪-------------+
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: +-------------------
↪--+--------------------------------------+
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: | Field              ␣
↪  | Value                                |
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: +-------------------
↪--+--------------------------------------+
```

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```
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: | ID                 ␣
↪  | 83989c2c-7bb0-4c8e-91c7-511a6e7836fb |
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: | Server ID          ␣
↪  | 5854acee-28d4-4029-944a-ccef9fc88b5d |
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: | Volume ID          ␣
↪  | 83989c2c-7bb0-4c8e-91c7-511a6e7836fb |
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: | Device             ␣
↪  | /dev/vdb                             |
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: | Tag                ␣
↪  | None                                 |
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: | Delete On␣
↪Termination | False                                 |
2024-10-11 13:48:08 openstack-dir JobId 285: BeforeJob: +----------------------
↪--+--------------------------------------+
2024-10-11 13:48:08 openstack-dir JobId 285: Start Admin JobId 285,␣
↪Job=cinder-01-restore-control-job.2024-10-11_13.44.44_09
2024-10-11 13:48:08 openstack-dir JobId 285: Bacula 18.0.4 (06Sep24): 11-Oct-
↪2024 13:48:08
  JobId:                  285
  Job:                    cinder-01-restore-control-job.2024-10-11_13.44.44_09
  Scheduled time:         11-Oct-2024 13:44:44
  Start time:             11-Oct-2024 13:48:08
  End time:               11-Oct-2024 13:48:08
  Termination:            Admin OK
```

Note: The scripts `trigger-cinder-backup.sh`, `list_backups`, and `restore_instances.sh` mentioned may not be readily available in the OpenStack Cinder Plugin. However, users have the flexibility to create and customize these scripts according to their specific needs and preferences.

6.4 Query

Display different information about backup, snapshot, instance and/or volumes by running the `/opt/bacula/bin/openstack-vm-query` with relevant parameters.

Parameters

- `-b` Lists backups
- `-c <admin_openrc>` Path to admin-openrc.sh
- `-f <format>` Format the output in one of the following format: json, table, value, yaml
- `-l` Lists instances
- `-L` Lists projects
- `-p` Check if `Cinder-backup` is running
- `-P <project-id>` To target query to a specific project
- `-q` Check if `Cinder` module is installed
- `-s` List snapshots

- `-v` Lists volumes
- `-V` Verbose output for `-p` and `-q` options
- `-h` Display help

Example

The query procedure is used to list different resources in a defined format.

`/opt/bacula/bin/openstack-vm-query` is the base command.

To list the instances available in the OpenStack server:

```
root@stackdev:/opt/bacula# bin/openstack-vm-query -l
+--------------------------------------+----------------+--------+-----------
↪-----------------------------------------------------------------------+-------
↪-------------------+----------+
| ID                                   | Name           | Status | Networks  ␣
↪                                                                      | Image␣
↪                   | Flavor   |
+--------------------------------------+----------------+--------+-----------
↪-----------------------------------------------------------------------+-------
↪-------------------+----------+
| instance_ID                          | instance_name  | ACTIVE | private=00.
↪0.0.0, 1111:1111:1111:0:1111:1111:1111:1111; shared=111.111.111.111 | N/A␣
↪(booted from volume) | m1.micro |
+--------------------------------------+-------+--------+--------+-----------
↪-----------------------------------------------------------------------+-------
↪-------------------+----------+
```

To list the backups performed:

```
root@host:/opt/bacula# /opt/bacula/bin/openstack-vm-query -b
+---------------+----------------------+---------------------------------------
↪----+-----------+------+-------------+
| ID            | Name                 | Description                          ␣
↪    | Status    | Size | Incremental |
+---------------+----------------------+---------------------------------------
↪----+-----------+------+-------------+
| <backup1_ID>> | <backup1_name>       | Backup done by Bacula Enterprise     ␣
↪    | available |   10 | False       |
|                                      | INSTANCE=<instance_name> DATE=
↪<datetime> |           |      |             |
|                                      |                                      ␣
↪    |           |      |             |
| <backup2_ID>> | <backup2_name>       | Backup done by Bacula Enterprise     ␣
↪    | available |    5 | False       |
|                                      | INSTANCE=<instance_name> DATE=
↪<datetime> |           |      |             |
+---------------+----------------------+---------------------------------------
↪----+-----------+------+-------------+
```

Listing volumes and backups in a json format would result in:


```
root@openstack-bck:~# /opt/bacula/bin/openstack-vm-query -b -v -f json
[
  {
    "ID": "021b0a50-2729-4c2a-b8ae-252d76aecf42",
    "Name": "5b5bc409-ec90-4a12-b659-d2b4d04eb419_1711446820",
    "Description": "Backup done by Bacula Enterprise INSTANCE=testAna2␣
↪DATE=Tue Mar 26 09:53:40 UTC 2024",
    "Status": "available",
    "Size": 10,
    "Incremental": false
  },
  {
    "ID": "784b88d7-8262-4efe-9512-9ec483b8cb73",
    "Name": "5b5bc409-ec90-4a12-b659-d2b4d04eb419_1711446820",
    "Description": "Backup done by Bacula Enterprise INSTANCE=testAna2␣
↪DATE=Tue Mar 26 09:53:40 UTC 2024",
    "Status": "available",
    "Size": 5,
    "Incremental": false
  }
]
[
  {
    "ID": "6db88c97-1ddb-4f46-bcf4-06699f3f59f5",
    "Name": "testAna2-vol2",
    "Status": "available",
    "Size": 5,
    "Attached to": []
  },
  {
    "ID": "13a9d708-01c7-4320-9f04-534c8c380a64",
    "Name": "restore_backup_021b0a50-2729-4c2a-b8ae-252d76aecf42_at_1711448194
↪",
    "Status": "available",
    "Size": 10,
    "Attached to": []
  },
  {
    "ID": "c645558e-cdf3-4334-968b-3482bf9a6c18",
    "Name": "testAna2-vol2",
    "Status": "available",
    "Size": 5,
    "Attached to": []
  },
  {
    "ID": "39161ee6-ec34-4f1a-87d0-d08ce71fac80",
    "Name": "restore_backup_f90ad4ec-882f-4071-9ec0-367dd7cc73b5_at_1710855568
↪",
    "Status": "available",
    "Size": 10,
    "Attached to": []
  },
```

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```
{
  "ID": "5c257c96-c0be-4eb6-a751-462b56729e50",
  "Name": "testAna2-vol2",
  "Status": "in-use",
  "Size": 5,
  "Attached to": [
    {
      "id": "5c257c96-c0be-4eb6-a751-462b56729e50",
      "attachment_id": "00765039-5dc2-4bb3-bb95-fa1611b8ba81",
      "volume_id": "5c257c96-c0be-4eb6-a751-462b56729e50",
      "server_id": "5b5bc409-ec90-4a12-b659-d2b4d04eb419",
      "host_name": "openstack-bck",
      "device": "/dev/vdb",
      "attached_at": "2024-03-14T13:17:49.000000"
    }
  ]
},
{
  "ID": "b0412c13-2124-44ac-a11d-058c6146c104",
  "Name": "RestoreTestVolume",
  "Status": "in-use",
  "Size": 1,
  "Attached to": [
    {
      "id": "b0412c13-2124-44ac-a11d-058c6146c104",
      "attachment_id": "ac6c3444-180b-4535-abfc-467057dcad5d",
      "volume_id": "b0412c13-2124-44ac-a11d-058c6146c104",
      "server_id": "1952a2d3-6b0b-417d-a90d-cde7964074d1",
      "host_name": "openstack-bck",
      "device": "/dev/vda",
      "attached_at": "2024-03-08T13:52:40.000000"
    }
  ]
},
{
  "ID": "218b321c-7b7f-4f5b-af4b-9025f9ff4408",
  "Name": "",
  "Status": "in-use",
  "Size": 10,
  "Attached to": [
    {
      "id": "218b321c-7b7f-4f5b-af4b-9025f9ff4408",
      "attachment_id": "6347cad1-5d52-4698-b3f1-b0a746a2920d",
      "volume_id": "218b321c-7b7f-4f5b-af4b-9025f9ff4408",
      "server_id": "5b5bc409-ec90-4a12-b659-d2b4d04eb419",
      "host_name": "openstack-bck",
      "device": "/dev/vda",
      "attached_at": "2024-02-28T21:23:06.000000"
    }
  ]
},
{
```


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```
    "ID": "c231ae83-ef6f-488f-b479-5ab328ea3b52",
    "Name": "c231ae83-ef6f-488f-b479-5ab328ea3b52",
    "Status": "in-use",
    "Size": 1,
    "Attached to": [
      {
        "id": "c231ae83-ef6f-488f-b479-5ab328ea3b52",
        "attachment_id": "289c3223-3a23-4a48-975f-6d2a2600a7e9",
        "volume_id": "c231ae83-ef6f-488f-b479-5ab328ea3b52",
        "server_id": "74364187-d6e7-431d-a80a-6275f88a69ce",
        "host_name": "openstack-bck",
        "device": "/dev/vda",
        "attached_at": "2024-02-23T10:18:19.000000"
      }
    ]
  }
]
```


6.5 Interactive Delete

It is possible to delete backup(s), snapshot(s) or volume(s) by running the `/opt/bacula/bin/openstack-vm-execute-interactive-delete` procedure with relevant parameters

Note: The delete operation is sent through Openstack API, and it has the force flag activated by default.

Parameters

- `-b <backup-ID>`: For interactive backup deletion if no ID is specified the procedure will go through all backups asking for deletion.
- `-c <admin-openrc>` Path to modified admin-openrc.sh DEFAULT=/opt/bacula/admin-openrc.sh.
- `-s <snapshot-ID>` For interactive snapshot deletion if no ID is specified the procedure will go through all snapshots asking for deletion.
- `-t <tools>` Path to openstack-vm-scripts DEFAULT=/opt/bacula/bin/
- `-p <project-id>` - If set restore will target VM in this project only.
- `-v <volume-ID>` For interactive volume deletion if no ID is specified the procedure will go through all volumes asking for deletion.
- `-h` Display help

Example

The options of this procedure are analog to other operations, but used for backup/snapshot/volume deletion instead.

Interactive delete of backups would be `/opt/bacula/bin/openstack-vm-execute-interactive-delete -b`

With an output looking like this:

```
root@openstack-bck:~# /opt/bacula/bin/openstack-vm-execute-interactive-delete␣
↪-b
INTERACTIVE BACKUP DELETE START

Would you like to delete BACKUP
ID=<backup1_ID>
NAME=<backup1_name>
DESCRIPTION=Backup done by Bacula Enterprise INSTANCE=<instance_name>␣
↪DATE=Tue Mar 19 16:34:03 UTC 2024

Start deletion [y]es / [N]o ?y
Delete command sent


Would you like to delete BACKUP
ID=<backup2_ID>
NAME=<backup2_name>
DESCRIPTION=Backup done by Bacula Enterprise INSTANCE=<instance_name>␣
↪DATE=Tue Mar 19 16:34:03 UTC 2024

Start deletion [y]es / [N]o ?y
Delete command sent

...

INTERACTIVE BACKUP DELETE FINISHED
```

7 Backup and Restore Strategies

7.1 Installing Bacula Client on Each Guest

This strategy works by installing a Bacula Enterprise File Daemon on every virtual machine as if they were regular, physical clients. In order to optimize the I/O usage of Openstack, the user will use Bacula's Schedules, Priorities, and Maximum Concurrent Jobs to spread backup jobs over the backup window. Since all VMs could use the same storage on the Openstack hypervisor, running all backup jobs at the same time could create a bottleneck on the disk/network subsystem since Bacula will walk through all filesystems to open/read/close/stat files.

Installing the Bacula Enterprise File Daemon on each virtual machine permits to manage virtual servers like physical servers and also to use all Bacula Enterprise's features such as:

- Quick restores of individual files
- Checksum of individual files for Virus and Spyware detection

- Verify Jobs
- File/Directory exclusion (such as swap or temporary files)
- File level compression
- Accurate backups.

7.2 Cinder Driver Backup with Openstack Plugin

With the Cinder driver strategy, the Bacula Enterprise Openstack-VM will save all Openstack volume`s at the raw level, in the Openstack context.

Bacula's Openstack-VM plugin will read and save the content of Openstack instance using Cinder backup API.

Cinder allows the user to integrate various storage solutions into the Openstack cloud. It does this by providing a stable interface for hardware providers to write drivers that allow the usage of Cinder volumes backup capabilities.

8 Troubleshooting

This article presents recommended solutions for common issues that may arise while using the Openstack Cinder Plugin.

- `D: cannot unpack non-iterable VolumeBackupsRestore object`

At restore time the restore volume command might output the following message `D: cannot unpack non-iterable VolumeBackupsRestore object`. This issue shouldn't impact the restore process and it can be ignored.

- `W: Openstack returned too many values to unpack (expected 2)`

At restore time Openstack might output a warning `W: Openstack returned too many values to unpack (expected 2)`. Restore should go through regardless and not be impacted by the message. This issue also happens when using the OpenStack CLI, and a bug report has been reported to the Openstack team.

9 Limitations

The following article presents limitations of Openstack Cinder Plugin.

- After a restore-procedure only the volumes are restored. The specific restored instance must be manually

restored and by attaching the relevant volumes to a new instance.

- Currently, only full level instance(s) volume(s) backups are possible.
- The `restart` command has limitations with plugins, as it initiates the Job from scratch rather than continuing it. Bacula determines whether a Job is restarted or continued, but using the `restart` command will result in a new Job.

