

# Backup and Restore Procedures for Various Ultra-M Components - CPS

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## Introduction

This document describes the steps required to Backup and Restore a Virtual Machine (VM) in an Ultra-M setup that hosts Calls CPS Virtual Network Functions (VNFs).

## Background Information

Ultra-M is a pre-packaged and validated virtualized mobile packet core solution designed to simplify the deployment of VNFs. Ultra-M solution consists of these Virtual Machine (VM) types:

- Elastic Services Controller (ESC)
- Cisco Policy Suite (CPS)

The high-level architecture of Ultra-M and the components involved are as shown in this image.



**Note:** Ultra M 5.1.x release is considered in order to define the procedures in this document. This document is intended for the Cisco personnel who are familiar with Cisco Ultra-M platform.

## Abbreviations

VNF	Virtual Network Function
ESC	Elastic Service Controller
MOP	Method of Procedure
OSD	Object Storage Disks
HDD	Hard Disk Drive
SSD	Solid State Drive
VIM	Virtual Infrastructure Manager
VM	Virtual Machine
UUID	Universally Unique Identifier

## Backup Procedure

### OSPD Backup

1. Check the status of OpenStack stack and the node list.

```
[stack@director ~]$ source stackrc
[stack@director ~]$ openstack stack list --nested
[stack@director ~]$ ironic node-list
[stack@director ~]$ nova list
```

## 2. Check if all the undercloud services are in loaded, active and running status from the OSP-D node.

```
[stack@director ~]$ systemctl list-units "openstack*" "neutron*" "openvswitch*"
```

UNIT	LOAD	ACTIVE	SUB	DESCRIPTION
neutron-dhcp-agent.service	loaded	active	running	OpenStack Neutron DHCP Agent
neutron-openvswitch-agent.service	loaded	active	running	OpenStack Neutron Open vSwitch Agent
neutron-ovs-cleanup.service	loaded	active	exited	OpenStack Neutron Open vSwitch Cleanup Utility
neutron-server.service	loaded	active	running	OpenStack Neutron Server
openstack-aodh-evaluator.service	loaded	active	running	OpenStack Alarm evaluator service
openstack-aodh-listener.service	loaded	active	running	OpenStack Alarm listener service
openstack-aodh-notifier.service	loaded	active	running	OpenStack Alarm notifier service
openstack-ceilometer-central.service	loaded	active	running	OpenStack ceilometer central agent
openstack-ceilometer-collector.service	loaded	active	running	OpenStack ceilometer collection service
openstack-ceilometer-notification.service	loaded	active	running	OpenStack ceilometer notification agent
openstack-glance-api.service	loaded	active	running	OpenStack Image Service (code-named Glance) API server
openstack-glance-registry.service	loaded	active	running	OpenStack Image Service (code-named Glance) Registry server
openstack-heat-api-cfn.service	loaded	active	running	Openstack Heat CFN-compatible API Service
openstack-heat-api.service	loaded	active	running	OpenStack Heat API Service
openstack-heat-engine.service	loaded	active	running	Openstack Heat Engine Service
openstack-ironic-api.service	loaded	active	running	OpenStack Ironic API service
openstack-ironic-conductor.service	loaded	active	running	OpenStack Ironic Conductor service
openstack-ironic-inspector-dnsmasq.service	loaded	active	running	PXE boot dnsmasq service for Ironic Inspector
openstack-ironic-inspector.service	loaded	active	running	Hardware introspection service for OpenStack Ironic
openstack-mistral-api.service	loaded	active	running	Mistral API Server
openstack-mistral-engine.service	loaded	active	running	Mistral Engine Server
openstack-mistral-executor.service	loaded	active	running	Mistral Executor Server
openstack-nova-api.service	loaded	active	running	OpenStack Nova API Server
openstack-nova-cert.service	loaded	active	running	OpenStack Nova Cert Server
openstack-nova-compute.service	loaded	active	running	OpenStack Nova Compute Server
openstack-nova-conductor.service	loaded	active	running	OpenStack Nova Conductor Server
openstack-nova-scheduler.service	loaded	active	running	OpenStack Nova Scheduler Server
openstack-swift-account-reaper.service	loaded	active	running	OpenStack Object Storage (swift) - Account Reaper
openstack-swift-account.service	loaded	active	running	OpenStack Object Storage (swift) - Account Server
openstack-swift-container-updater.service	loaded	active	running	OpenStack Object Storage (swift) - Container Updater
openstack-swift-container.service	loaded	active	running	OpenStack Object Storage (swift) - Container Server
openstack-swift-object-updater.service	loaded	active	running	OpenStack Object Storage

```
(swift) - Object Updater
openstack-swift-object.service          loaded active running OpenStack Object Storage
(swift) - Object Server
openstack-swift-proxy.service          loaded active running OpenStack Object Storage
(swift) - Proxy Server
openstack-zaqar.service                 loaded active running OpenStack Message Queuing
Service (code-named Zaqar) Server
openstack-zaqar@1.service              loaded active running OpenStack Message Queuing
Service (code-named Zaqar) Server Instance 1
openvswitch.service                    loaded active exited Open vSwitch
```

LOAD = Reflects whether the unit definition was properly loaded.

ACTIVE = The high-level unit activation state, i.e. generalization of SUB.

SUB = The low-level unit activation state, values depend on unit type.

37 loaded units listed. Pass --all to see loaded but inactive units, too.

To show all installed unit files use 'systemctl list-unit-files'.

3. Confirm that you have sufficient disk space available before you perform the backup process. This tarball is expected to be at least 3.5 GB.

```
[stack@director ~]$df -h
```

4. Execute these commands as the root user to backup the data from the undercloud node to a file named **undercloud-backup-[timestamp].tar.gz** and transfer it to the backup server.

```
[root@director ~]# mysqldump --opt --all-databases > /root/undercloud-all-databases.sql
[root@director ~]# tar --xattrs -czf undercloud-backup-`date +%F`.tar.gz /root/undercloud-all-
databases.sql
/etc/my.cnf.d/server.cnf /var/lib/glance/images /srv/node /home/stack
tar: Removing leading `/' from member names
```

## ESC Backup

1. ESC, in turn, brings up Virtual Network Function (VNF) by interacting to VIM.

2. ESC has 1:1 redundancy in Ultra-M Solution. There are 2 ESC VMs deployed and support single failure in Ultra-M. i.e. recover the system if there is a single failure in the system.

**Note:** If there is more than single failure, it is not supported and may require redeployment of the system.

ESC backup details:

- Running configuration
- ConfD CDB DB
- ESC Logs
- Syslog configuration

3. The frequency of ESC DB backup is tricky and needs to be handled carefully as ESC monitors and maintains the various state machines for various VNF VMs deployed. It is advised that these backups are performed after following activities in given VNF/POD/Site

4. Verify the health of ESC is good using health.sh script.

```
[root@auto-test-vnfm1-esc-0 admin]# escadm status
0 ESC status=0 ESC Master Healthy
```

```
[root@auto-test-vnfm1-esc-0 admin]# health.sh
esc ui is disabled -- skipping status check
esc_monitor start/running, process 836
esc_mona is up and running ...
vimmanager start/running, process 2741
vimmanager start/running, process 2741
esc_confd is started
tomcat6 (pid 2907) is running... [ OK ]
postgresql-9.4 (pid 2660) is running...
ESC service is running...
Active VIM = OPENSTACK
ESC Operation Mode=OPERATION
```

```
/opt/cisco/esc/esc_database is a mountpoint
```

```
===== ESC HA (MASTER) with DRBD =====
```

```
DRBD_ROLE_CHECK=0
MNT_ESC_DATABASE_CHECK=0
VIMMANAGER_RET=0
ESC_CHECK=0
STORAGE_CHECK=0
ESC_SERVICE_RET=0
MONA_RET=0
ESC_MONITOR_RET=0
```

```
=====
```

```
ESC HEALTH PASSED
```

## 5. Take the backup of the Running configuration and transfer the file to the backup server.

```
[root@auto-test-vnfm1-esc-0 admin]# /opt/cisco/esc/confd/bin/confd_cli -u admin -C
```

```
admin connected from 127.0.0.1 using console on auto-test-vnfm1-esc-0.novalocal
auto-test-vnfm1-esc-0# show running-config | save /tmp/running-esc-12202017.cfg
auto-test-vnfm1-esc-0#exit
```

```
[root@auto-test-vnfm1-esc-0 admin]# ll /tmp/running-esc-12202017.cfg
-rw----- . 1 tomcat tomcat 25569 Dec 20 21:37 /tmp/running-esc-12202017.cfg
```

## Backup ESC Database

### 1. Log into ESC VM and execute the following command before you take the backup.

```
[admin@esc ~]# sudo bash
[root@esc ~]# cp /opt/cisco/esc/esc-scripts/esc_dbtool.py /opt/cisco/esc/esc-
scripts/esc_dbtool.py.bkup
[root@esc esc-scripts]# sudo sed -i "s,'pg_dump','/usr/pgsqli-9.4/bin/pg_dump,'"
/opt/cisco/esc/esc-scripts/esc_dbtool.py
```

```
#Set ESC to mainenance mode
```

```
[root@esc esc-scripts]# escadm op_mode set --mode=maintenance
```

### 2. Check ESC mode and ensure it is in maintenance mode.

```
[root@esc esc-scripts]# escadm op_mode show
```

### 3. Backup database using database backup restore tool available in ESC.

```
[root@esc scripts]# sudo /opt/cisco/esc/esc-scripts/esc_dbtool.py backup --file
scp://<username>:<password>@<backup_vm_ip>:<filename>
```

#### 4. Set ESC Back to Operation Mode & confirm the mode.

```
[root@esc scripts]# escadm op_mode set --mode=operation
```

```
[root@esc scripts]# escadm op_mode show
```

#### 5. Navigate to the scripts directory & collect the logs.

```
[root@esc scripts]# /opt/cisco/esc/esc-scripts
```

```
sudo ./collect_esc_log.sh
```

#### 6. To create a snapshot of the ESC first shutdown the ESC.

```
shutdown -r now
```

#### 7. From OSPD create a image snapshot

```
nova image-create --poll esc1 esc_snapshot_27aug2018
```

#### 8. Verify that the snapshot is created

```
openstack image list | grep esc_snapshot_27aug2018
```

#### 9. Start the ESC from OSPD

```
nova start esc1
```

#### 10. Repeat the same procedure on standby ESC VM & transfer the logs to backup server

#### 11. Collect syslog configuration backup on both the ESC VMS and transfer them to backup server

```
[admin@auto-test-vnfm2-esc-1 ~]$ cd /etc/rsyslog.d
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/00-escmanager.conf
00-escmanager.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/01-messages.conf
01-messages.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/02-mona.conf
02-mona.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.conf
rsyslog.conf
```

## CPS Backup

### 1. Create a Backup of CPS Cluster-Manager

Use this command in order to view the nova instances and note the name of the cluster manager

VM instance:

```
nova list
```

Stop the Cluman from ESC

```
/opt/cisco/esc/esc-confd/esc-cli/esc_nc_cli vm-action STOP <vm-name>
```

Step 2. Verify Cluster Manager in SHUTOFF state.

```
admin@esc1 ~]$ /opt/cisco/esc/confd/bin/confd_cli
```

```
admin@esc1> show esc_datamodel opdata tenants tenant Core deployments * state_machine
```

Step 3. Create a nova snapshot image as shown in the following command:

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

**Note:** Ensure that you have enough disk space for the snapshot.

Important - In case if VM becomes unreachable after snapshot creation, check status of VM using nova list command. If it is in "SHUTOFF" state, you need to start the VM manually.

Step 4. View the image list with the following command: nova image-list Figure 1: Example Output

ID	Name	Status	Server
146719e8-d8a0-4d5a-9b15-2a669cfab81f	CPS_10.9.9_20160803_100301_112.iso	ACTIVE	
1955d56e-4ecf-4269-b53d-b30e73ad57f0	base_vm	ACTIVE	
2bbfb51c-cd05-4b7c-ad77-8362d76578db	cluman_snapshot	ACTIVE	4842ae5a-83a3-48fd-915b-6ca6361adb2c

Step 5. When a snapshot is created, the snapshot image is stored in OpenStack Glance. To store the snapshot in a remote data store, download the snapshot and transfer the file in OSPD to ( /home/stack/CPS\_BACKUP )

To download the image, use the following command in OpenStack:

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

Step 6. List the downloaded images as shown in the following command:

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

Step 7. Store the snapshot of the Cluster Manager VM to restore in the future.

2. Backup the configuration and database.

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

Verify from the crontab -l if any other backup is needed

Transfer all the backups to the OSPD /home/stack/CPS\_BACKUP

### 3. Backup yaml file from ESC Master

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

Transfer the file in OSPD /home/stack/CPS\_BACKUP

### 4. Back up crontab -l entries

Create a txt file with crontab -l and ftp it to remote location ( in OSPD /home/stack/CPS\_BACKUP )

### 5. Take a backup of the route files from LB and PCRf client

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

## Restore Procedure

### OSPD Recovery

OSPD recovery procedure is performed based on the following assumptions

1. OSPD backup is available from old OSPD server.
2. OSPD Recovery will be done on the new server which is the replacement of the old OSPD server in the system. .

### ESC Recovery

1. ESC VM is recoverable if the VM is in error or shutdown state do hard reboot to bring up of the impacted VM. Execute these steps to recover ESC.
2. Identify the VM which is in ERROR or Shutdown state, once identified hard-reboot the ESC VM. In this example, you are rebooting auto-test-vnfm1-ESC-0.

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

3. If ESC VM is deleted and needs to be brought up again. Follow below sequence of steps

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

4. If ESC VM is unrecoverable and requires the restore of the database, please restore the database from the previously taken backup.

5. For ESC database restore, we have to ensure the esc service is stopped before restoring the database; For ESC HA, execute in secondary VM first and then the primary VM.



```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

6. Check ESC service status and ensure everything is stopped in both Primary and Secondary VMs for HA.

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

7. Execute the script to restore the database. As part of the restoration of the DB to the newly created ESC instance, the tool will also promote one of the instances to be a primary ESC, mount its DB folder to the drbd device and will start the PostgreSQL database.

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

8. Restart ESC service to complete the database restore. For HA execute in both VMs, restart the keepalived service.

```
nova image-create --poll <cluman-vm-name> <snapshot-name>
```

9. Once the VM is successfully restored and running; ensure all the syslog specific configuration is restored from the previous successful known backup. ensure it is restored in all the ESC VMs.

```
[admin@auto-test-vnfm2-esc-1 ~]$  
[admin@auto-test-vnfm2-esc-1 ~]$ cd /etc/rsyslog.d  
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/00-escmanager.conf  
00-escmanager.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/01-messages.conf  
01-messages.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/02-mona.conf  
02-mona.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.conf  
rsyslog.conf
```

10. If the ESC needs to be rebuilt from OSPD snapshot use this command with the use of snapshot taken during backup.

```
[admin@auto-test-vnfm2-esc-1 ~]$  
[admin@auto-test-vnfm2-esc-1 ~]$ cd /etc/rsyslog.d  
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/00-escmanager.conf  
00-escmanager.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/01-messages.conf  
01-messages.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/02-mona.conf  
02-mona.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.conf  
rsyslog.conf
```

11. Check the status of the ESC after rebuild is complete

```
[admin@auto-test-vnfm2-esc-1 ~]$  
[admin@auto-test-vnfm2-esc-1 ~]$ cd /etc/rsyslog.d  
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/00-escmanager.conf
```

```
00-escmanager.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/01-messages.conf  
01-messages.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/02-mona.conf  
02-mona.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.conf  
rsyslog.conf
```

## 12. Check ESC health with below command

```
[admin@auto-test-vnfm2-esc-1 ~]$  
[admin@auto-test-vnfm2-esc-1 ~]$ cd /etc/rsyslog.d  
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/00-escmanager.conf  
00-escmanager.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/01-messages.conf  
01-messages.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.d/02-mona.conf  
02-mona.conf
```

```
[admin@auto-test-vnfm2-esc-1 rsyslog.d]$ls /etc/rsyslog.conf  
rsyslog.conf
```

## When ESC Fails to Start VM

- In some cases, ESC will fail to start the VM due to an unexpected state. A workaround is to perform an ESC switchover by rebooting the Master ESC. The ESC switchover will take about a minute. Execute health.sh on the new Master ESC to verify it is up. When the ESC becomes Master, ESC may fix the VM state and start the VM. Since this operation is scheduled, you must wait 5-7 minutes for it to complete.
- You can monitor /var/log/esc/yangesc.log and /var/log/esc/escmanager.log. If you do NOT see VM getting recovered after 5-7 minutes, user would need to go and do the manual recovery of the impacted VM(s).
- Once the VM is successfully restored and running; ensure all the syslog specific configuration is restored from the previous successful known backup. Ensure it is restored in all the ESC VMs

```
root@abautotestvnfm1em-0:/etc/rsyslog.d# pwd  
/etc/rsyslog.d
```

```
root@abautotestvnfm1em-0:/etc/rsyslog.d# ll
```

```
total 28  
drwxr-xr-x  2 root root 4096 Jun  7 18:38 ./  
drwxr-xr-x 86 root root 4096 Jun  6 20:33 ../  
-rw-r--r--  1 root root  319 Jun  7 18:36 00-vnmf-proxy.conf  
-rw-r--r--  1 root root  317 Jun  7 18:38 01-ncs-java.conf  
-rw-r--r--  1 root root  311 Mar 17  2012 20-ufw.conf  
-rw-r--r--  1 root root  252 Nov 23  2015 21-cloudinit.conf  
-rw-r--r--  1 root root 1655 Apr 18  2013 50-default.conf
```

```
root@abautotestvnfm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf  
rsyslog.conf
```

# CPS Recovery

## Restore Cluster Manager VM in OpenStack

Step 1 Copy the cluster manager VM snapshot to the controller blade as shown in the following command:

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d

root@abautotestvnm1em-0:/etc/rsyslog.d# ll

total 28
drwxr-xr-x  2 root root 4096 Jun  7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun  6 20:33 ../
-rw-r--r--  1 root root  319 Jun  7 18:36 00-vnmf-proxy.conf
-rw-r--r--  1 root root  317 Jun  7 18:38 01-ncs-java.conf
-rw-r--r--  1 root root  311 Mar 17  2012 20-ufw.conf
-rw-r--r--  1 root root  252 Nov 23  2015 21-cloudinit.conf
-rw-r--r--  1 root root 1655 Apr 18  2013 50-default.conf

root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf

root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d

root@abautotestvnm1em-0:/etc/rsyslog.d# ll

total 28
drwxr-xr-x  2 root root 4096 Jun  7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun  6 20:33 ../
-rw-r--r--  1 root root  319 Jun  7 18:36 00-vnmf-proxy.conf
-rw-r--r--  1 root root  317 Jun  7 18:38 01-ncs-java.conf
-rw-r--r--  1 root root  311 Mar 17  2012 20-ufw.conf
-rw-r--r--  1 root root  252 Nov 23  2015 21-cloudinit.conf
-rw-r--r--  1 root root 1655 Apr 18  2013 50-default.conf

root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

Step 2 Upload the snapshot image to OpenStack from Datastore:

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d

root@abautotestvnm1em-0:/etc/rsyslog.d# ll

total 28
drwxr-xr-x  2 root root 4096 Jun  7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun  6 20:33 ../
-rw-r--r--  1 root root  319 Jun  7 18:36 00-vnmf-proxy.conf
-rw-r--r--  1 root root  317 Jun  7 18:38 01-ncs-java.conf
-rw-r--r--  1 root root  311 Mar 17  2012 20-ufw.conf
-rw-r--r--  1 root root  252 Nov 23  2015 21-cloudinit.conf
-rw-r--r--  1 root root 1655 Apr 18  2013 50-default.conf
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

Step 3 Verify whether the snapshot is uploaded with a Nova command as shown in the following example:

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ll
```

```
total 28
drwxr-xr-x  2 root root 4096 Jun  7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun  6 20:33 ../]
-rw-r--r--  1 root root  319 Jun  7 18:36 00-vnmf-proxy.conf
-rw-r--r--  1 root root  317 Jun  7 18:38 01-ncs-java.conf
-rw-r--r--  1 root root  311 Mar 17  2012 20-ufw.conf
-rw-r--r--  1 root root  252 Nov 23  2015 21-cloudinit.conf
-rw-r--r--  1 root root 1655 Apr 18  2013 50-default.conf
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

Figure 2: Example Output

ID	Name	Status	Server
146719e8-d8a0-4d5a-9b15-2a669cfab81f	CPS_10.9.9_20160803_100301_112.iso	ACTIVE	
1955d56e-4ecf-4269-b53d-b30e73ad57f0	base_vm	ACTIVE	
2bbfb51c-cd05-4b7c-ad77-8362d76578db	cluman_snapshot	ACTIVE	4842ae5a-83a3-48fd-915b-6ca6361adb2c
5eebff44-658a-49a5-a170-1978f6276d18	imported_image	ACTIVE	

Step 4 Depending on whether the cluster manager VM exists or not, you can choose to create the cluman or rebuild the cluman:

- If the Cluster Manager VM instance does not exist, create the Cluman VM with an Heat or Nova command as shown in the following example:

Create the Cluman VM with ESC

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ll
```

```
total 28
drwxr-xr-x  2 root root 4096 Jun  7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun  6 20:33 ../]
-rw-r--r--  1 root root  319 Jun  7 18:36 00-vnmf-proxy.conf
-rw-r--r--  1 root root  317 Jun  7 18:38 01-ncs-java.conf
-rw-r--r--  1 root root  311 Mar 17  2012 20-ufw.conf
-rw-r--r--  1 root root  252 Nov 23  2015 21-cloudinit.conf
-rw-r--r--  1 root root 1655 Apr 18  2013 50-default.conf
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

The PCRf cluster will spawn with the help of above command, and then restore the cluster manager configurations from the backups taken with config\_br.py restore, mongorestore from dump taken in backup

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ll
```

```
total 28
drwxr-xr-x  2 root root 4096 Jun  7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun  6 20:33 ../
-rw-r--r--  1 root root  319 Jun  7 18:36 00-vnmf-proxy.conf
-rw-r--r--  1 root root  317 Jun  7 18:38 01-ncs-java.conf
-rw-r--r--  1 root root  311 Mar 17  2012 20-ufw.conf
-rw-r--r--  1 root root  252 Nov 23  2015 21-cloudinit.conf
-rw-r--r--  1 root root 1655 Apr 18  2013 50-default.conf
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

• If the Cluster Manager VM instance exists, use a nova rebuild command to rebuild the Cluman VM instance with the uploaded snapshot as shown:

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ll
```

```
total 28
drwxr-xr-x  2 root root 4096 Jun  7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun  6 20:33 ../
-rw-r--r--  1 root root  319 Jun  7 18:36 00-vnmf-proxy.conf
-rw-r--r--  1 root root  317 Jun  7 18:38 01-ncs-java.conf
-rw-r--r--  1 root root  311 Mar 17  2012 20-ufw.conf
-rw-r--r--  1 root root  252 Nov 23  2015 21-cloudinit.conf
-rw-r--r--  1 root root 1655 Apr 18  2013 50-default.conf
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

For example:

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ll
```

```
total 28
drwxr-xr-x  2 root root 4096 Jun  7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun  6 20:33 ../
-rw-r--r--  1 root root  319 Jun  7 18:36 00-vnmf-proxy.conf
-rw-r--r--  1 root root  317 Jun  7 18:38 01-ncs-java.conf
-rw-r--r--  1 root root  311 Mar 17  2012 20-ufw.conf
-rw-r--r--  1 root root  252 Nov 23  2015 21-cloudinit.conf
-rw-r--r--  1 root root 1655 Apr 18  2013 50-default.conf
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

Step 5 List all the instances as shown and verify that the new cluster manager instance is created and running:

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
```

```
/etc/rsyslog.d
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ll
```

```
total 28
```

```
drwxr-xr-x 2 root root 4096 Jun 7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun 6 20:33 ../]
-rw-r--r-- 1 root root 319 Jun 7 18:36 00-vnmf-proxy.conf
-rw-r--r-- 1 root root 317 Jun 7 18:38 01-ncs-java.conf
-rw-r--r-- 1 root root 311 Mar 17 2012 20-ufw.conf
-rw-r--r-- 1 root root 252 Nov 23 2015 21-cloudinit.conf
-rw-r--r-- 1 root root 1655 Apr 18 2013 50-default.conf
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

Figure 3. Example Output

ID	Name	Status	Task State	Power State	Networks
ac3d2dbc-7b0e-4df4-a690-7f84ca3032bd	cluman	ACTIVE	-	Running	management=172.20.67.34; internal=172.20.70.34

## Restore the latest patches on the system

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ll
```

```
total 28
```

```
drwxr-xr-x 2 root root 4096 Jun 7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun 6 20:33 ../]
-rw-r--r-- 1 root root 319 Jun 7 18:36 00-vnmf-proxy.conf
-rw-r--r-- 1 root root 317 Jun 7 18:38 01-ncs-java.conf
-rw-r--r-- 1 root root 311 Mar 17 2012 20-ufw.conf
-rw-r--r-- 1 root root 252 Nov 23 2015 21-cloudinit.conf
-rw-r--r-- 1 root root 1655 Apr 18 2013 50-default.conf
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

**Note:** The software components must all display Not Monitored as the current status.

```
root@abautotestvnm1em-0:/etc/rsyslog.d# pwd
/etc/rsyslog.d
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ll
```

```
total 28
```

```
drwxr-xr-x 2 root root 4096 Jun 7 18:38 ./
drwxr-xr-x 86 root root 4096 Jun 6 20:33 ../]
-rw-r--r-- 1 root root 319 Jun 7 18:36 00-vnmf-proxy.conf
-rw-r--r-- 1 root root 317 Jun 7 18:38 01-ncs-java.conf
-rw-r--r-- 1 root root 311 Mar 17 2012 20-ufw.conf
-rw-r--r-- 1 root root 252 Nov 23 2015 21-cloudinit.conf
-rw-r--r-- 1 root root 1655 Apr 18 2013 50-default.conf
```

```
root@abautotestvnm1em-0:/etc/rsyslog.d# ls /etc/rsyslog.conf
rsyslog.conf
```

## Restore the Cronjobs

1. Move the backed-up file from OSPD to the Cluman/Pcrfclient01.

2. Run the command to activate the cronjob from backup.

```
#crontab Cron-backup
```

3. Check if the cronjobs have been activated by below command.

```
#crontab Cron-backup
```

## Restore Individual VMs in the Cluster

### To redeploy the pcrfclient01 VM:

Step 1 Log in to the Cluster Manager VM as the root user.

Step 2 Note the UUID of SVN repository using the following command:

```
svn info http://pcrfclient02/repos | grep UUID
```

The command will output the UUID of the repository.

For example: Repository UUID: ea50bbd2-5726-46b8-b807-10f4a7424f0e

Step 3 Import the backup Policy Builder configuration data on the Cluster Manager, as shown in the following example:

```
config_br.py -a import --etc-oam --svn --stats --grafanadb --auth-htpasswd --users  
/mnt/backup/oam_backup_27102016.tar.gz
```

**Note:** Many deployments run a cron job that backs up configuration data regularly. See Subversion Repository Backup, for more details.

Step 4 To generate the VM archive files on the Cluster Manager using the latest configurations, execute the following command:

```
/var/qps/install/current/scripts/build/build_svn.sh
```

Step 5 To deploy the pcrfclient01 VM, perform one of the following:

In OpenStack, use the HEAT template or the Nova command to re-create the VM. For more information, see CPS Installation Guide for OpenStack.

Step 6 Re-establish SVN master/slave synchronization between the pcrfclient01 and pcrfclient02

with pcrfclient01 as the master by executing the following series of commands.

If SVN is already synchronized, do not issue these commands.

To check if SVN is in sync, run the following command from pcrfclient02.

If a value is returned, then SVN is already in sync:

```
/usr/bin/svn propget svn:sync-from-url --revprop -r0 http://pcrfclient01/repos
```

Execute the following commands from pcrfclient01:

```
/bin/rm -fr /var/www/svn/repos
```

```
/usr/bin/svnadmin create /var/www/svn/repos
```

```
/usr/bin/svn propset --revprop -r0 svn:sync-last-merged-rev 0 http://pcrfclient02/repos-proxy-sync
```

```
/usr/bin/svnadmin setuuid /var/www/svn/repos/ "Enter the UUID captured in step 2"
```

```
/etc/init.d/vm-init-client /
```

```
var/qps/bin/support/recover_svn_sync.sh
```

Step 7 If pcrfclient01 is also the arbiter VM, then execute the following steps:

a) Create the mongod start/stop scripts based on the system configuration. Not all deployments have all these databases configured.

**Note:** Refer to /etc/broadhop/mongoConfig.cfg to determine which databases need to be set up.

```
cd /var/qps/bin/support/mongo
```

```
build_set.sh --session --create-scripts
```

```
build_set.sh --admin --create-scripts
```

```
build_set.sh --spr --create-scripts
```

```
build_set.sh --balance --create-scripts
```

```
build_set.sh --audit --create-scripts
```

```
build_set.sh --report --create-scripts
```

b) Start the mongo process:

```
/usr/bin/systemctl start sessionmgr-XXXXX
```

c) Wait for the arbiter to start, then run diagnostics.sh --get\_replica\_status to check the health of the replica set.

## To redeploy the pcrfclient02 VM:

Step 1 Log in to the Cluster Manager VM as the root user

Step 2 To generate the VM archive files on the Cluster Manager using the latest configurations, execute the following command:



```
/var/qps/install/current/scripts/build/build_svn.sh
```

Step 3 To deploy the pcrfclient02 VM, perform one of the following:

In OpenStack, use the HEAT template or the Nova command to re-create the VM. For more information, see CPS Installation Guide for OpenStack.

Step 4 Secure shell to the pcrfclient01:

```
ssh pcrfclient01
```

Step 5 Run the following script to recover the SVN repos from pcrfclient01:

```
/var/qps/bin/support/recover_svn_sync.sh
```

**To redeploy a sessionmgr VM:**

Step 1 Log in to the Cluster Manager VM as the root user

Step 2 To deploy the sessionmgr VM and replace the failed or corrupt VM, perform one of the following:

In OpenStack, use the HEAT template or the Nova command to re-create the VM. For more information, see CPS Installation Guide for OpenStack

Step 3 Create the mongodb start/stop scripts based on the system configuration.

Not all deployments have all these databases configured. Refer to /etc/broadhop/mongoConfig.cfg to determine which databases need to be set up

```
cd /var/qps/bin/support/mongo
```

```
build_set.sh --session --create-scripts
```

```
build_set.sh --admin --create-scripts
```

```
build_set.sh --spr --create-scripts
```

```
build_set.sh --balance --create-scripts
```

```
build_set.sh --audit --create-scripts
```

```
build_set.sh --report --create-scripts
```

Step 4 Secure shell to the sessionmgr VM and start the mongo process:

```
ssh sessionmgrXX
```

```
/usr/bin/systemctl start sessionmgr-XXXXX
```

Step 5 Wait for the members to start and for the secondary members to synchronize, then run `diagnostics.sh --get_replica_status` to check the health of the database.

Step 6 To restore Session Manager database, use one of the following example commands depending on whether the backup was performed with `--mongo-all` or `--mongo` option:

- `config_br.py -a import --mongo-all --users /mnt/backup/Name of backup`

or

- `config_br.py -a import --mongo --users /mnt/backup/Name of backup`

### **To redeploy the Policy Director (Load Balancer) VM:**

Step 1 Log in to the Cluster Manager VM as the root user.

Step 2 To import the backup Policy Builder configuration data on the Cluster Manager, execute the following command:

```
config_br.py -a import --network --haproxy --users /mnt/backup/lb_backup_27102016.tar.gz
```

Step 3 To generate the VM archive files on the Cluster Manager using the latest configurations, execute the following command:

```
/var/qps/install/current/scripts/build/build_svn.sh
```

Step 4 To deploy the lb01 VM, perform one of the following:

In OpenStack, use the HEAT template or the Nova command to re-create the VM. For more information, see CPS Installation Guide for OpenStack.

### **To redeploy the Policy Server (QNS) VM:**

Step 1 Log in to the Cluster Manager VM as the root user.

Step 2 Import the backup Policy Builder configuration data on the Cluster Manager, as shown in the following example:

```
config_br.py -a import --users /mnt/backup/qns_backup_27102016.tar.gz
```

Step 3 To generate the VM archive files on the Cluster Manager using the latest configurations, execute the following command:

```
/var/qps/install/current/scripts/build/build_svn.sh
```

Step 4 To deploy the qns VM, perform one of the following:

In OpenStack, use the HEAT template or the Nova command to re-create the VM. For more information, see CPS Installation Guide for OpenStack

### **General Procedure for Database Restore**

Step 1 Execute the following command to restore the database:

```
config_br.py -a import --mongo-all /mnt/backup/backup_$(date +%Y%m%d).tar.gz where $(date +%Y%m%d) is the timestamp when the export was made.
```

For example,

```
config_br.py -a import --mongo-all /mnt/backup/backup_27092016.tgz
```

Step 2 Log in to the database and verify whether it is running and is accessible:

1. Log into session manager:

```
mongo --host sessionmgr01 --port $port
```

where \$port is the port number of the database to check. For example, 27718 is the default Balance port.

2. Display the database by executing the following command:

```
show dbs
```

3. Switch the mongo shell to the database by executing the following command:

```
use $db
```

where \$db is a database name displayed in the previous command.

The 'use' command switches the mongo shell to that database.

For example,

```
use balance_mgmt
```

4. To display the collections, execute the following command:

```
show collections
```

5. To display the number of records in the collection, execute the following command:

```
db.$collection.count()
```

```
For example, db.account.count()
```

The above example will show the number of records in the collection "account" in the Balance database (balance\_mgmt).

## Subversion Repository Restore

To restore the Policy Builder Configuration Data from a backup, execute the following command:

```
config_br.py -a import --svn /mnt/backup/backup_$date.tgz where, $date is the date when the cron created the backup file.
```

## Restore Grafana Dashboard

You can restore Grafana dashboard using the following command:

```
config_br.py -a import --grafanadb /mnt/backup/
```

## **Validating the Restore**

After restoring the data, verify the working system by executing the following command:

```
/var/qps/bin/diag/diagnostics.sh
```