ESC in Maintenance Mode

This chapter contains the following chapters:

Setting ESC in a Maintenance Mode

ESC must be put to maintenance mode to backup and restore ESC database. To do so, use the escadm tool as specified in the below section.

Before you begin

During maintenance mode,

- Northbound requests are blocked by ESC and ESC responds with maintenance mode notification.

- Only REST requests receive response that ESC is unavailable temporarily. ConfD requests get the maintenance mode rejection message, or an OK message for all idempotent request such as create tenant request when the tenant already exists.

- Monitoring actions are paused.

- All ongoing requests and transactions continue to progress.

Using the escadm Tool

ESC can be put to maintenance mode using the escadm tool.

Step 1 Put ESC to maintenance mode from the VM shell:

```
sudo escadm op_mode set --mode=maintenance

Set mode to MAINTENANCE
Operation Mode = MAINTENANCE
```

Step 2 To query operation mode at any time,

```
sudo escadm op_mode show
```

Example:

```
Operation Mode = OPERATION
```

Step 3   Set maintenance mode when there is no in-flight transaction. Using the ipt_check flag with the escadm tool, you can choose to set ESC in the maintenance mode only if there are no ongoing transactions in ESC. Set the flag to true, if you do not want ESC to set in the maintenance mode, if there are ongoing transactions in ESC.

```
sudo escadm op_mode set --mode=maintenace --ipt_check=true
```

With the **ipt_check** option set to true, escadm tool checks if there is any on going operation, if so, the escadm tool will not set ESC to maintenance mode.

Setting ESC in an Operation Mode

Put ESC in operation mode using the escadm tool:

```
sudo escadm op_mode set --mode=operation
```

Response is as follows:

```
Set mode to OPERATION
Operation Mode = OPERATION
```

Verify ESC's operation mode at any time using the following command:

```
sudo escadm op_mode show
```

Backup the Database from the ESC Standalone Instances

- The following assumptions should be taken into consideration :

  - A third machine is required to store the database and log backups.

  - ESC does not support database schema downgrade. Restoring database to the older ESC version could cause unexpected problems.

- Before you start the backup process, ensure you have an external storage space (could be in the OpenStack controller or any system accessible by ESC). The backup/restore could be expressed in a generic format which will be used by the escadm tool: scp://<username>:<password>@<backup_ip>:<filename> . In this format, the credentials, IP address and file storage path of the third machine are required. You may also use localhost IP as the backup IP to backup database in a location of ESC VM and then copy the files to the external storage

To backup the ESC database from a standalone ESC or a HA (master node):

Step 1   Log in to ESC VM and set it to maintenance mode, run:

```
$ sudo escadm op_mode set --mode=maintenance
```

Step 2   To make sure ESC is in maintenance mode, run:

```
$ sudo escadm op_mode show
```

Step 3   Backup database. Execute the commands below as a root user:

```
# sudo escadm backup --file /tmp/db_file_name.tar.bz2
scp://<username>:<password>@<backup_vm_ip>:<filename>
```

Step 4   To put ESC back to operation mode, run:

```
$ sudo escadm op_mode set --mode=operation
$ sudo escadm op_mode show
```

Step 5   Collect all the logs from the old ESC VM and back it up. Execute the below command as a root user.

```
# sudo escadm log collect
```

A timestamped log file will be generated in: /var/tmp/esc_log <timestamp>.tar.bz2

Note   If a dynamic mapping file is used by ESC service, the dynamic mapping file should be backed up at the same time with ESC logs. The default path of the dynamic mapping file is */opt/cisco/esc/esc-dynamic-mapping/dynamic_mappings.xml.*

Step 6   After a successful database back-up, shut down the old ESC VM using Horizon/Kilo or Nova commands. For ESC VM instances based in VMware vSphere, shutdown the primary instance through VMware client dashboard. An example of shutting down a VM in OpenStack is shown below :

```
$ nova stop OLD_ESC_ID
```

Step 7   Detach the old port from the old VM and rename the old ESC node. Examples of detaching and renaming the VM in OpenStack is shown below:

```
nova interface-detach ESC_NAME port-id-of-ESC_NAME
nova rename ESC_NAME ESC_NAME.old
```

In VMWare, assign a different IP address to the old VM and then rename the old VM.

Backup the Database from the ESC HA Instances

- The following assumptions should be taken into consideration :

    - A third machine is required to store the database and log backups.

    - ESC does not support database schema downgrade. Restoring database to the older ESC version could cause unexpected problems.

- Before you start the backup process, ensure you have an external storage space available (could be in the OpenStack controller or any system accessable by ESC). The backup/restore could be expressed in a generic format which will be used by the escadm tool: scp://<username>:<password>@<backup_ip>:<filename> . In this format, the credentials, IP address and file storage path of the third machine are required. You may also use localhost IP as the backup IP to backup database in a location of ESC VM and then copy the files to the external storage.

To backup the ESC database from a standalone ESC or a HA (master node):

Step 1 **Perform the following steps on the Standby ESC node.**

    a) Connect to the standby ESC instance using SSH:

```
$ ssh <username>@<backup_vm_ip>
```

    b) Verify that the ESC instance is standby and note the name of the standby ESC HA instance :

```
$ sudo escadm status --v
```

If the output value shows "BACKUP", the node is the standby ESC node.

    c) Change access to an admin user.

```
sudo bash
```

    d) Collect all the logs from the standby ESC VM and back it up.

```
$ sudo escadm log collect
```

A timestamped log file will be generated in: /var/tmp/esc_log <timestamp>.tar.bz2

    e) Shutdown the standby ESC instance through OpenStack Kilo/Horizon using Nova command or VMware client. An example of shutting down the VM on OpenStack is shown below:

```
$ nova stop OLD_ESC_STANDBY_ID
```

Step 2 **Perform the following steps on the Master ESC node.**

    a) Connect to the primary ESC instance using SSH:

```
$ ssh <username>@<master_vm_ip>
```

    b) Change access to an admin user.

```
$ sudo bash
```

    c) Verify that the ESC instance is Master and note the name of the Master ESC HA instance

```
$ sudo escadm status --v
```

If the output value shows "MASTER", the node is the Primary ESC node.

    d) Back up the database files from the master node of ESC HA:

```
$ sudo escadm backup --file /tmp/db_file_name.tar.bz2
scp://<username>:<password>@<backup_vm_ip>:<filename>
```

    e) Collect the logs from the master ESC VM and back it up.

```
$ sudo escadm log collect
```

A timestamped log file will be generated in: /var/tmp/esc_log <timestamp>.tar.bz2

Note If a dynamic mapping file is used by ESC service, the dynamic mapping file should be backed up at the same time with ESC logs. The default path of the dynamic mapping file is */opt/cisco/esc/esc-dynamic-mapping/dynamic_mappings.xml* .

Step 3   Shutdown the primary ESC instance through OpenStack Kilo/Horizon using Nova command. For ESC VM instances based in VMware vSphere, shutdown the primary instance through VMware client dashboard. An example of shutting down the VM on OpenStack is shown below:

```
$ nova stop OLD_ESC_MASTER
```

Use the **nova list** command or the **nova show OLD_ESC_STANDBY** command, to verify if the ESC HA instances have been successfully shut down.

Step 4   (Only for OpenStack) Detach the port from the old ESC VM and rename the old VM.

If upgraded ESC VM needs to operate with same IP addresses and same instance names as old instances, detach the ports from each instance, shutdown the old ESC VMs and then rename the old ESC instances.

If you intend to use old VMware primary instance, assign a different IP address and rename the VM name. If not, you can delete the old VM and use the same IP address for the new upgraded VMware primary instance. After deleting the old VM, you can continue with the old instance name and the IP address.

OpenStack commands for detaching the ports and renaming the old VMs are shown below:

```
nova interface-list ESC_NAME
nova interface-detach ESC_NAME port-id-of-ESC_NAME
nova rename ESC_NAME ESC_NAME.old
```

Restoring ESC Database

Before you begin

To restore the database,

- In standalone ESC instance, stop ESC services. Run `# sudo escadm stop`.

- In HA type instances, stop escadm on the Backup first, and later on the Master ESC HA instance. Run `# sudo escadm stop`.

- All the services must be stopped. To check the status, run `# sudo escadm status --v`.

Step 1   Restore the database. Execute the following command from the ESC VM:

```
$ scp <username>@<server_ip>:/path/db.tar.bz2     /tmp/
$ sudo escadm restore –file /tmp/db.tar.bz2
```

Step 2   Enter the ESC password in the URL, or manually enter it after executing the above command.

Step 3   Restart the ESC service to complete the database restore by running the following command:

```
$ sudo escadm restart
```

Note	ESC maintenance mode blocks the northbound request and VNF monitoring. However, if there are some ongoing transactions because of northbound requests before ESC entering maintenance mode, those transactions may have following restriction with backup and restore:

- ESC reports an error for the deployment, network creation, and subnet creation requests, if these transactions are interrupted by backup and restore. Northbound handles these error messages but it may cause network or subnet leakage in some cases (For example, ESC is interrupted before getting the UUID from OpenStack).

- ESC reports an error for service chain upgrade, and requires service chain undeployment and deployment (rather than downgrade and upgrade) to re-create the service.