

# CUDB VNF Lifecycle Management

## User Guide

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# 1 Introduction

This document describes system administration tasks performed in the Virtualized Network Function (VNF) Lifecycle Manager (VNF-LCM). The VNF-LCM provides a workflow execution environment and a web-based application for managing VNF lifecycle procedures.

The workflows are ordered sequences of steps for automating common use cases of the VNFs. A workflow provides a means to orchestrate simple and complex sequences of manual or automated tasks.

## 1.1 Purpose and Scope

This document covers the following workflow-based lifecycle management procedures:

- Instantiate vCUDB system.
- Terminate vCUDB system.
- vCUDB Upgrade Preparation.
- Upgrade vCUDB system.

**Note:** Application Schema update is not included.

All manual preparation steps that must be executed by Ericsson personnel are out of the scope of this document. See [Prerequisites](#) on page 6 for more information.

The Instantiate vCUDB system is not applicable for vCUDB system expansions.

**Note:** A Virtualized CUDB node is referred to as a vCUDB VNF instance throughout the document.



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## Attention!

If any step fails during workflow execution, refer to [Troubleshooting](#) on page 30 section and contact CUDB Administrator as Ericsson support to follow the VNF-LCM Admin Guide or the corresponding manual procedures (for example installation, upgrade, and so on) for a deeper troubleshooting. The troubleshooting of those manual procedures is out of the scope of this document.

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## 1.2 Revision Information

### Rev. A

Initial release.

### Rev. B

Other than editorial changes, this document has been updated as follows:

- Updated vCUDB terminology throughout the document.
- [Hardware and Software](#) on page 6: Updated description.
- [Procedures](#) on page 12: Updated [Figure 1](#).
- [Instantiate vCUDB System](#) on page 12: Updated note.
- [Instantiate vCUDB System Prerequisites](#) on page 12: Updated license file name, directory structure, and description. Updated [Figure 2](#).
- Start a New Instance: Removed Substep 8. Updated Step 2.
- [Terminate vCUDB VNF](#) on page 18: Updated [Step 3 in Section 3.2.1](#).

### Rev. C

Other than editorial changes, this document has been updated as follows:

- [Purpose and Scope](#) on page 1: Updated description.
- [Prerequisites](#) on page 6: Updated description.
- [Hardware and Software](#) on page 6: Updated the list of virtual and physical hardware and software.
- [Configuration Files](#) on page 7: Added as a new section.
- [Instantiate Configuration Files](#) on page 7: Added as a new section.



- [Other Requirements](#) on page 8: Added as a new section.
- [Onboard](#) on page 10: Updated the CUDB Workflow pack installation step list with /home/cloud-user folder name.
- [Procedures](#) on page 12: Added note.
- [Instantiate vCUDB System Prerequisites](#) on page 12: Removed reference and added note.

## Rev. D

Other than editorial changes, this document has been updated as follows:

- [Purpose and Scope](#) on page 1: Updated the list of procedures.
- [Prerequisites](#) on page 6: Updated description.
- [Hardware and Software](#) on page 6: Updated the list of virtual and physical hardware and software.
- [Upgrade Configuration Files](#) on page 7: Added as new section.
- [Other Requirements](#) on page 8: Updated the list of aspects.
- [Onboard](#) on page 10: Updated section title.
- [Procedures](#) on page 12: Updated [Figure 1](#) showing the example of VNF Lifecycle Management. Removed note.
- [Instantiate vCUDB System Prerequisites](#) on page 12: Updated section title. Updated [Figure 2](#) caption to Final Structure Directory for Instantiate vCUDB System.
- Start a New Instance: Updated figure in Step 2.
- [Workflow Log in GUI](#) on page 17: Removed step list. Added figure.
- [vCUDB Upgrade Preparation](#) on page 21: Added as new section.
- [vCUDB Upgrade Preparation Prerequisites](#) on page 22: Added as new section. Added [Figure 3](#).
- [vCUDB Upgrade Preparation Steps](#) on page 23: Added as new section.
- [vCUDB Upgrade System](#) on page 26: Added as new section.
- [vCUDB Upgrade System Prerequisites](#) on page 26: Added as new section.
- [vCUDB Upgrade VNF Steps](#) on page 26: Added as new section.



- [Troubleshooting](#) on page 30: Updated the list of options in the case of failure.
- [Appendix: General Considerations when Upgrading](#) on page 31: Added as new section.

## Rev. E

Other than editorial changes, this document has been updated as follows:

- [Hardware and Software](#) on page 6: Updated the list of required virtual and physical hardware and software.
- [Instantiate Configuration Files](#) on page 7: Updated the list of configuration files.
- [vCUDB Upgrade Preparation](#) on page 21: Updated image and description in Step 6.
- [Instantiate vCUDB System Prerequisites](#) on page 12: Removed notes, updated description, [Figure 2](#), and the list of configuration files for one vCUDB system.
- [Workflow Log in GUI](#) on page 17: Updated Figure.
- [vCUDB System Completion Steps](#) on page 17, [vCUDB System Integration](#) on page 18: Added sections.
- [Troubleshooting](#) on page 30: Updated commands and description.
- [Terminate vCUDB System](#) on page 18: Added VNF termination options.
- [Terminate vCUDB VNF](#) on page 18: Updated Step 6. Added Step 7.
- [Workflow Log in GUI](#) on page 21: Added section.
- [Prerequisites](#) on page 6: Updated description.
- [Instantiate vCUDB System](#) on page 12: Added content form Start a New Instance. Updated Figures.
- [Start a New Instance](#): Removed section.
- [Workflow Log in GUI](#) on page 25: Added section.
- [Workflow Log in GUI](#) on page 29: Added section.
- [Appendix: General Considerations when Upgrading](#) on page 31: Updated structure.
- [General](#): Removed section.



- Recommendations: Removed section.
- [Hardening](#) on page 31: Added section.
- [Deviations from Standard Configuration](#) on page 31: Added section.
- [Prerequisites](#) on page 31: Added section.
- [Network Impacts](#) on page 32: Added section.
- [System Downtime and Service Disturbances](#) on page 32: Added section.

## Rev. F

Other than editorial changes, this document has been updated as follows:

- [Other Requirements](#) on page 8: Updated list [page 8](#).
- [Instantiate Configuration Files](#) on page 7: Updated list.
- [Instantiate vCUDB System Prerequisites](#) on page 12: Updated list and figure [Final Structure Directory for Instantiate vCUDB System](#).
- [Instantiate vCUDB VNF](#) on page 14: Updated [Step 4 in Section 3.1.2](#) and [Step 5 in Section 3.1.2](#).
- [Terminate vCUDB System](#) on page 18: Added note.
- [Terminate vCUDB VNF](#) on page 18: Updated description of Step 6 and added note.
- [Restrictions](#) on page 33: Added new restriction regarding subscription reallocation and updated the list of restrictions and feature restrictions.

## 1.3 Target Groups

This document is intended for CUDB Operator.

For some of the actions described in the document, Ericsson personnel must be contacted as:

### CUDB Administrator

The CUDB Administrator prepares configuration files, execute needed preparation steps and can run certain troubleshooting tasks.

### Cloud Administration

The Cloud Administrator is the cloud service provider who executes required actions on the cloud infrastructure.



## 1.4 Typographic Conventions

Typographic Conventions can be found in the following document:

- [Typographic Conventions](#)

## 1.5 Prerequisites

This section describes the prerequisites that must be fulfilled before executing any of the workflows.

CUDB Administrator or Cloud Administrator, or both, must execute all initial steps included in the manual installation instruction for vCUDB to provide system preparation and configuration files needed to run the workflow-based lifecycle management procedures and, in case of upgrade, to be able to have all preparations ready from upgrade documentation.

CUDB Administrator must check if there is any limitation to execute graceful termination workflow according to the node decommissioning procedure.

### 1.5.1 Hardware and Software

The following virtual and physical hardware and software are required:

- Software delivery package (CUDB Workflow pack).
- VNF-LCM release is Media build version 4.4.18 or higher.
- VNF-LCM up and running using Ericsson Network Management System (NMS), either Operations Support System for Radio and Core (OSS-RC) or Ericsson Network Manager (ENM).

For example, in case of OSS-RC, to check the correct functioning of VNF-LCM, follow the steps defined in the Post Installation Verification section of VNF-LCM CEE/Openstack Installation Instructions, , in the OSS-RC documentation.

**Note:** The Virtualized Infrastructure Manager (VIM) connection information in VNF-LCM framework has to be configured. This information is used by the workflows to connect to VIM and perform operations. Add as many VIMs as needed to VNF-LCM framework and add as many tenants as needed to the previously added VIM. Refer to the VNF-LCM CLI Admin section of VNF-Lifecycle Manager System Administration Guide, in the OSS-RC documentation.

- Check the size of the workflow package and make sure the VNF-LCM disk available size is enough.



- Any extra file not mentioned in that document must be stored in VNF-LCM under `/vnflcm-ext/` directory to prevent the disk from getting full where workflows are executed.
- Virtual infrastructure must be prepared for vCUDB deployment, according to the manual installation instruction.

## 1.5.2 Configuration Files

### 1.5.2.1 Instantiate Configuration Files

Contact CUDB Administrator to obtain the following files. CUDB Administrator will get the files after executing all initial steps included in the installation instruction for vCUDB.

vCUDB system-specific files:

- `cudb_hot_<heat_template_version>_<cudb_release>.zip` containing:
  - `cudb_hot_<heat_template_version>_<cudb_release>_base.yaml`
  - `DS_scaling.yaml`
  - placeholders for VNF instance-specific files

vCUDB VNF instance-specific files:

- `ovf_env_template`
- `input_files`
- `cudb_hot_<heat_template_version>_<cudb_release>_base.env`

vCUDB external networks files:

- `cudb_<heat_template_version>_external_network.yaml`
- `cudb_<heat_template_version>_external_network.env`

### 1.5.2.2 Upgrade Configuration Files

Contact CUDB Administrator to obtain the following files. CUDB Administrator will get the files after all manual preparation tasks from upgrade documentation are finished.

- License files named `CUDB_LKF_<cudb_node_id>` and fingerprint file named `lm_fingerprint_<cudb_node_id>` in case the vCUDB software version is previous to 1.10.



**Note:** `_<cudb_node_id>` corresponds to the `cudbLocalNodeId/`  
`cudbRemoteNodeId` defined in the CUDB configuration model for  
each CUDB node of the system.

- Upgrade package named `CUDB_PACKAGE_x86_64-CXP`.
- `preventive_Was.tar`, if available.

### 1.5.3 Other Requirements

Contact Cloud Administrator regarding the following aspects:

- If vCUDBs are already installed, ensure that property tags included in the stacks are "vCUDB". If not, update them as the following:

Select the appropriate stack for updating and update the "vCUDB" tag, if needed.

For example:

```
source <openrc>
heat stack-list
heat stack-update -x --tags "vCUDB" <stack_name>
```

Contact CUDB Administrator regarding the following aspects:

- In the case of instantiate:
  - To add multiple `SITE_VIP` IPs in a live vCUDB VNF (according to the network configuration of the vCUDB), if the vCUDB system consists of more than 10 vCUDB VNFs.
  - To change the image in System Controllers (according to the installation instruction for vCUDB), when instantiation is finished.
  - Creation of external networks must be done before VNF Instantiation. To help the Cloud Administrator, CUDB provides optional external network configuration files that automatically create the external networks required by the CUDB application. Instantiation workflow can be used to define these external networks, but support is offered only in case the optional external network configuration files provided by CUDB are used.

In case these optional files are not used, external networks must be defined following manual Virtual CUDB Infrastructure Deployment documentation.

- In the case of upgrade:
  - If upgrade is not performed again after executing an automatic fallback and the system needs to be fully restored to previous CUDB software version.



- If vCUDb base software version is previous to 1.12, to enable VM evacuation support in Cloud Execution Environment (CEE).



## 2 Onboard

This section describes how to prepare for workflow-based VNF operations using VNF-LCM. Performing this procedure is a prerequisite for lifecycle operations.

For more information on installing workflows, refer to the Workflow Bundle Administration section of *VNF-Lifecycle Manager System Administration Guide* document in the OSS-RC documentation.

Execute the following commands on the VNF-LCM Services Virtual Machine (VM):

### Steps

1. Connect to VNF-LCM:

```
ssh cloud-user@<VNFLAF-services_ip>
```

2. Copy the CUDB Workflow pack CUDB\_VNFLCM\_WORKFLOWS-CXP9040847.tar file into /home/cloud-user directory.
3. Decompress the CUDB Workflow pack CUDB\_VNFLCM\_WORKFLOWS-CXP9040847.tar

```
[cloud-user@vnflaf-services ~]$ tar -xvf  
CUDB_VNFLCM_WORKFLOWS-CXP9040847.tar
```

4. Install the CUDB Workflow pack:

- a. Switch to root user on vnflaf-services VM:

```
[cloud-user@vnflaf-services ~]$ su - root  
[root@vnflaf-services ~]#
```

- b. Verify that the pack is not installed, by running the list command:

```
rpm -qa |grep ERICvCUDb
```

- c. Uninstall the previous version, if there is one, and take the input data from the previous printout:

```
# wfmgr bundle uninstall --package=<Name> --  
version=<Version>
```

- d. To install the Workflow pack, run the **install** command. The rpm file is located in the /home/cloud-user folder by default.

```
# wfmgr bundle install --package=/home/cloud-user/  
<workflow_bundle_rpm_file>
```



The expected output must be similar to the below example:

#### Example

```

----->
-----
package_name          | pre_install  | install    | post_install  |      →
  message |
----->
-----
| ERICvCUDb_CXP9035445-1.9.20-1.noarch.rpm |  success  |  success  |  success  | package →
installation successful |
----->
-----

```

For more information on the output of the command, go  
to `/var/log/wfmgr-cli-log/logfile.log`.

## 3 Procedures

This section describes how to perform LCM operations. VNF-LCM procedures use workflow instances.

Launch VNF-LCM from GUI web browser:

**http://<vnflaf-services\_ip>/index.html#workflows**

Figure 1 shows the example of VNF Lifecycle Management, where the workflow is shown.

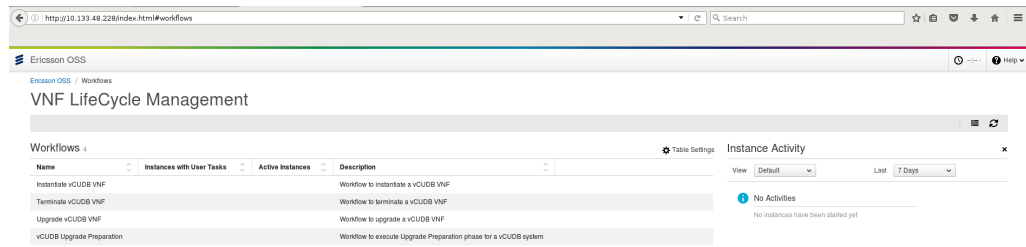


Figure 1 Workflow Overview

### 3.1 Instantiate vCUDB System

This section describes how to instantiate a VNF using VNF-LCM.

This workflow is used to install a vCUDB node in a CUDB system.

**Note:** To have an installed a vCUDB system replicating among its vCUDB nodes, this workflow must be executed several times and it has to be launched consecutively without waiting for one VNF to finish before launching the next one (one workflow per each VNF comprising the vCUDB system running in parallel).

If a vCUDB system consists of more than 10 vCUDB VNFs, once the instantiations are finished, add multiple SITE\_VIP IPs in a live CUDB node.

#### 3.1.1 Instantiate vCUDB System Prerequisites

Check that all general [Prerequisites](#) on page 6 have been fulfilled at this point.

Besides, the following configuration files for one vCUDB system must be available:

— Per vCUDB VNF:



- ovf\_env\_template
  - input\_files
  - cudb\_hot\_<heat\_template\_version>\_<cudb\_release>\_base.env
  - cudb\_hot\_<heat\_template\_version>\_<cudb\_release>\_base.yaml
  - DS\_scaling.yaml.
- Per external networks stack:
    - cudb\_<heat\_template\_version>\_external\_network.yaml
    - cudb\_<heat\_template\_version>\_external\_network.env

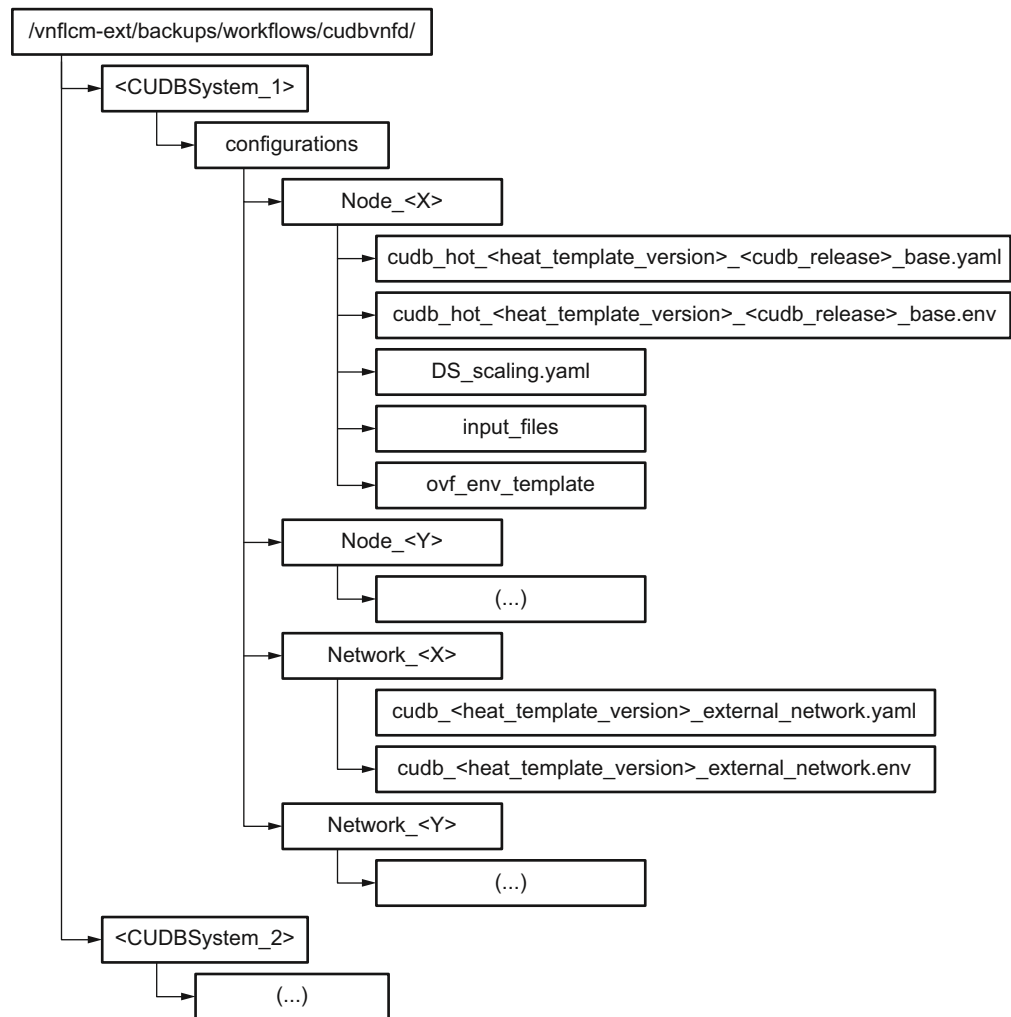
**Note:** If an external network stack needs to be deployed, it must be deployed before VNF.

The above mentioned files are generated by the CUDB Installation Files Generator Tool under the structure <CUDB System>/configurations. vCUDb system specific files are inside HOT Package, and VNF specific files are inside the <node\_id> folder. All files must go under the /vnflcm-ext/backups/workflows/cudbvnf directory.

**Note:** Remember that all files must have permission to be executed by jboss at least. If it is not the case, change it as follows:

```
cd /vnflcm-ext/backups/workflows/cudbvnf
chown -R jboss_user:jboss *
```

The final structure directory is created manually as shown in [Figure 2](#).



... - Structure is repeated both in <Node\_Y> and in <CUDBSystem\_2>

Figure 2 Final Structure Directory for Instantiate vCUDB System

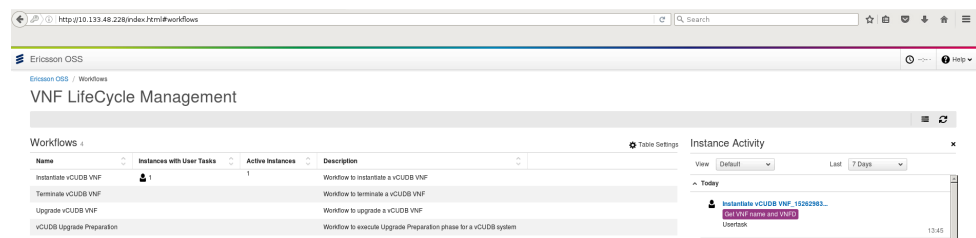
**Note:** Different vCUDB systems can be defined. Select one during instantiation of a VNF. Moreover, one vCUDB system consists of one or several VNFs, that is, CUDB nodes.

All configuration files must be placed manually in the corresponding directories.

### 3.1.2

#### Instantiate vCUDB VNF

1. In the VNF-LCM Workflows screen, select **Instantiate vCUDB VNF** and click **Start a New Instance**.
2. **Instance Name** field is filled out, click **Submit**.



3. Select the newly-created workflow from the **Instance with User Tasks** panel, and click on the man icon.
4. On the **Workflow Instance** screen, add VNF Name/External Networks Stack Name, select CUDB System ID to instantiate, and click **Submit**.



Get VNF name and VNFD

## Instantiate VNF

VNF Name \*

VNF03

Select CUDB System Id \*

PODH\_03-13\_CUDBSYSTEM

Submit

Reset

The Select CUDB System ID field displays system configurations available for instantiation in the /vnflcm-ext/backups/workflows/cudbvnf/ directory.

5. On the **Get Instance Configuration** screen, select a configuration to instantiate, and click **Submit**.



Task

---

Get Instance Configuration Data

---

Get Instance Configuration

---

Select Configuration for the VNF instance \*

Node\_35

Node\_45

Submit

Reset

The **Select Configuration for the VNF instance** field displays VNF and external networks configurations available for instantiation in the /vnflcmext/backups/workflows/cudbvnf/vCUDB\_1/configurations directory.

Refresh the web page.

6. On the **Select VIM** screen, select a VIM, and click **Submit**.

Task

---

Select VIM

---

Select VIM: \*

CEE\_POD\_H

Submit

Reset

7. On the **Select Tenant** screen, select a Tenant, and click **Submit**.

Task

---

Select Tenant

---

Select Tenant \*

CUDB-VNF03

CUDB-VNF13

Submit

Reset

Result: On the **Workflow Instance** screen, click on **Workflow Diagram** and **Workflow Log** to see the progress.

**Note:** Refresh the web page from time to time.



8. When instantiation is finished, change the image in the System Controllers, contact CUDB Administrator.

### 3.1.2.1

## Workflow Log in GUI

The workflow log shows the ongoing execution steps. The expected progress information output must be similar to the following example:

>	2018-07-12 13:10:09.552	INFO	LCM Script Execution	Step AutomatedInstall.Steps.SystemCompletion executed successfully (55/56)
>	2018-07-12 13:08:58.620	INFO	LCM Script Execution	Step AutomatedInstall.Steps.RunCudbSwBackup executed successfully (54/56)
>	2018-07-12 13:06:31.631	INFO	LCM Script Execution	Step AutomatedInstall.Steps.InitDbStep.RestartLdapFes executed successfully (53/56)
>	2018-07-12 13:05:47.116	INFO	LCM Script Execution	Step AutomatedInstall.Steps.InitDbStep.ApplyInitialConfig executed successfully (50/56)
>	2018-07-12 13:05:26.998	INFO	LCM Script Execution	Step AutomatedInstall.Steps.InitDbStep.PrepareStores executed successfully (48/56)
>	2018-07-12 13:04:31.023	INFO	LCM Script Execution	Step AutomatedInstall.Steps.InitDbStep.OrderStoresInitialize executed successfully (46/56)
>	2018-07-12 13:00:28.889	INFO	LCM Script Execution	Step AutomatedInstall.Steps.EnableAndStartKeepaliveClusterWide executed successfully (43/56)
>	2018-07-12 12:59:18.411	INFO	LCM Script Execution	Step AutomatedInstall.Steps.StorePerBladePpmList executed successfully (42/56)
>	2018-07-12 12:58:47.981	INFO	LCM Script Execution	Step AutomatedInstall.Steps.InvokeAmfConfScalingPlugin executed successfully (35/56)
>	2018-07-12 12:53:37.924	INFO	LCM Script Execution	Step AutomatedInstall.Steps.ReconfigureEvipmxCUDB executed successfully (34/56)
>	2018-07-12 12:53:17.486	INFO	LCM Script Execution	Step AutomatedInstall.Steps.GenerateSchemaZSQLConfigFile executed successfully (29/56)
>	2018-07-12 12:53:00.565	INFO	LCM Script Execution	Step AutomatedInstall.Steps.InvokeClusterConfScalingPlugin executed successfully (23/56)
>	2018-07-12 12:52:43.630	INFO	LCM Script Execution	Step AutomatedInstall.Steps.WaitForLdeNodes executed successfully (18/56)
>	2018-07-12 12:44:14.003	INFO	LCM Script Execution	Step AutomatedInstall.Steps.InstallLicenseKeyFile executed successfully (17/56)
>	2018-07-12 12:43:57.040	INFO	LCM Script Execution	Step AutomatedInstall.Steps.GenerateImmAppServicesFile executed successfully (15/56)
>	2018-07-12 12:43:39.456	INFO	LCM Script Execution	Step AutomatedInstall.Steps.WaitForCmwCampaignInRepository executed successfully (6/56)

### 3.1.2.2

## vCUDB System Completion Steps

The workflow log contains the system completions step results, that must be executed once per CUDB system.

All the vCUDB nodes but the last will report a WARNING message like the following:

Workflow Diagram		Workflow Log		
	Time	Level	Workflow Name	Message
>	2018-07-13 10:33:18.241	INFO	Post-Instantiation	Post-Instantiation Phase Execution Successful.
>	2018-07-13 10:33:18.241	WARN	Post-Instantiation	System completion steps not executed yet

The last vCUDB node handles the system completion steps, and it is reported as completed in the log:

Workflow Diagram		Workflow Log		
	Time	Level	Workflow Name	Message
>	2018-07-13 11:15:16.118	INFO	Post-Instantiation	System completion steps executed
>	2018-07-13 11:15:16.118	INFO	Post-Instantiation	Post-Instantiation Phase Execution Successful.



---

---

## Do!

When the system completion steps have been executed successfully, the `input_files` must be removed from the VNF-LCM server by the Cloud Administrator.

---

---

If the system completion is not executed, vCUDB installation is not finished and new instantiation of the VNFs or manual intervention is needed. See [Troubleshooting](#) on page 30 for further details.

### 3.1.2.3 vCUDB System Integration

After the successful execution of the vCUDB instantiation, contact the CUDB Administrator to run manual installation instructions for vCUDB to complete the VNF initial configuration. CUDB Administrator has to complete the integration of the newly deployed vCUDB system with the surrounding nodes too.

## 3.2 Terminate vCUDB System

This section describes how to terminate a VNF using VNF-LCM.

This workflow can be used to decommission a vCUDB system and free the resources by executing it consecutively on each VNF comprising the vCUDB system.

Terminate the VNF by executing either of the following options:

- Forceful: delete the VNF instance where data loss can occur while executing.
- Graceful: disabling and deleting VNF instance in proper order to minimize data loss.

---

---

## Stop!

Decommissioning of a CUDB Site, by removing the last node in the site, is not allowed in the CUDB system with only two CUDB Sites.

---

---

### 3.2.1 Terminate vCUDB VNF

#### Steps

1. In the **VNF-LCM Workflows** screen, select **Terminate vCUDB VNF**, and click **Start a New Instance**.



2. **Instance Name** field is filled out, click **Submit**.
3. Select the newly-created workflow from the **Active Instances** panel and click on the man icon.

The screenshot shows the 'Workflow' page in the Ericsson OSS interface. The workflow name is 'Terminate vCUDB VNF' and its description is 'Workflow to terminate a vCUDB VNF'. The 'Active Instances' panel shows 1 instance, 1 task, 0 incidents, and 0 completed instances. Below this, the 'Workflow Instances' tab is active, showing a table with one instance: 'Terminate vCUDB VNF\_1'. The instance is in 'In Progress' status, started on '2018-03-19 14:43:05', and has a 'Not Available' progress.

Instance Name	Active Tasks	Progress	Status	Start Date	End Date
Terminate vCUDB VNF_1	1	Not Available	In Progress	2018-03-19 14:43:05	

Result: Traffic stops after VNF is terminated. On the **Workflow Instances** screen, click on **Workflow Diagram** and **Workflow Log** to see the progress.

**Note:** Refresh the web page.

4. On the **Select VIM** screen, select a VIM, and click **Submit**.

The screenshot shows the 'Task' screen for 'Select VIM'. It features a purple header bar with the text 'Select VIM'. Below the header, there is a label 'Select VIM:' followed by a dropdown menu. At the bottom right, there are two buttons: 'Submit' (blue) and 'Reset' (grey).

5. On the **Select Tenant** screen, select a Tenant, and click **Submit**.

The screenshot shows the 'Task' screen for 'Select Tenant'. It features a purple header bar with the text 'Select Tenant'. Below the header, there is a label 'Select Tenant' followed by a dropdown menu. The dropdown menu is open, showing two options: 'CUDB-VNF22' and 'CUDB-VNF21'. At the bottom right, there are two buttons: 'Submit' (blue) and 'Reset' (grey).



- On the **Workflow Instances** screen, select the VNF to terminate and the termination option to be executed, either Graceful or Forceful. In case of graceful termination, Remove site option should also be considered. After that, click **Submit**.

---

Task

---

Collect user data for Terminate

---

Terminate VNF instance

---

Termination Data

---

Select VNF instance\*

Termination type:

☒ Graceful ☐

Remove site:

☐ No ☐

Graceful termination: If VNF is gracefully terminated, there will be no data loss in the ongoing traffic.

---

## Do!

The Remove site option must be selected in case of graceful termination if the VNF to terminate is the only VNF in the CUDB Site and the CUDB System consists of more than two sites. Otherwise, the termination will fail.

---

Forceful termination: If VNF is forcefully terminated, all ongoing traffic will be lost.

- The chosen option must be confirmed on the next screen.



Task

---

Confirm termination

---

Are you sure you want to terminate the VNF instance?

---

Yes

---

Ok

Reset

## Results

The VNF instance is terminated. On the **Workflow Instances** screen, click on **Workflow Diagram** and **Workflow Log** to see the progress.

### 3.2.1.1

#### Workflow Log in GUI

The workflow log shows the ongoing execution steps. The expected progress information output must be similar to the following example:

>	2018-08-01 14:10:33.216	INFO	Pre-Termination	Pre-Termination Phase Execution Successful.
>	2018-08-01 14:10:31.233	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:29.401	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:27.491	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:25.654	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:23.764	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:21.926	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:20.109	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:18.270	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:16.449	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:14.605	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:12.745	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:10.959	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).
>	2018-08-01 14:10:09.120	INFO	Script and monitoring execution	CUDB node termination running (removing node from system).

**Note:** Refresh the web page.

## 3.3

### vCUDB Upgrade Preparation

This section describes how to execute upgrade preparation for a vCUDB system using VNF-LCM. This workflow is used to prepare vCUDB system for upgrade execution and execute different health checks to verify that the system is working properly before executing upgrade. To execute upgrade preparation phase on a



vCUDb system, this workflow must be executed only once for the system on chosen VNF. Operations executed in this workflow are system-level operations.

Before starting the upgrade preparation workflow execution, see [Appendix: General Considerations when Upgrading](#) on page 31 for more information about the upgrade procedure.

**Note:** The troubleshooting of the upgrade workflow is out of the scope of this document. In case of failure, please contact CUDB Administrator.

### 3.3.1 vCUDb Upgrade Preparation Prerequisites

Check that all general [Prerequisites](#) on page 6 have been fulfilled at this point.

Besides, the following configuration files for one vCUDb system must be available:

— Per vCUDb system:

- upgrade package named `CUDB_PACKAGE_x86_64-CXP`
- `preventive_WAs.tar`, if available.

— Per vCUDb node:

- licenses file named `CUDB_LKF_<cudb_node_id>.xml`

Example:

`CUDB_LKF_10.xml`

- fingerprint file named `lm_fingerprint_<cudb_node_id>`

Example:

`lm_fingerprint_10`

**Note:** Licenses and fingerprint files are required if the CUDB system version is previous to 1.10.

All the previous files must go under `/vnflcm-ext/backups/workflows/cudbvnf/upgrade` directory. The final structure directory is created manually as shown in [Figure 3](#).

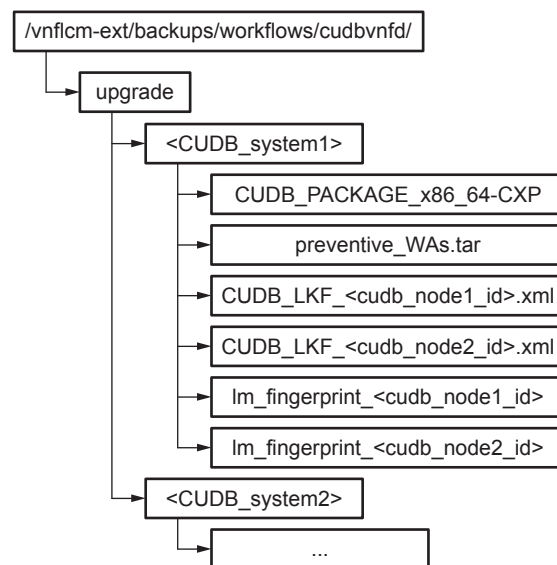


Figure 3 Final Structure Directory for vCUDB Upgrade Preparation

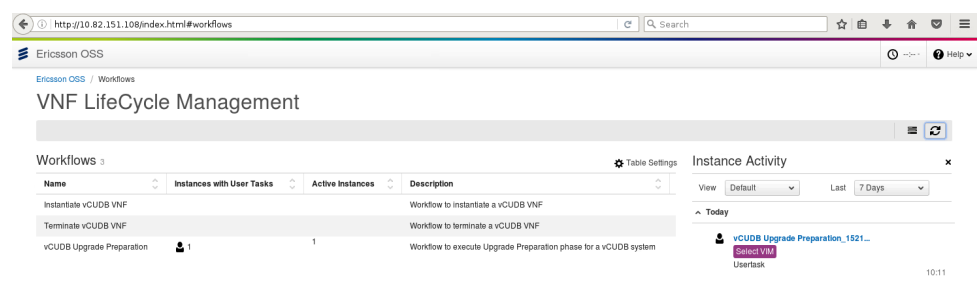
All configuration files must be placed manually in the corresponding directories.

### 3.3.2

### vCUDB Upgrade Preparation Steps


#### Steps

1. In the VNF-LCM Workflows screen, select vCUDB Upgrade Preparation, and click **Start a New Instance**.
2. Instance Name field is filled out, click **Submit**.



3. Select the newly-created workflow from the Instance with User Tasks panel, and click on the man icon.
4. On the Select VIM screen, select a VIM, and click **Submit**.




 Task

---

**Select VIM**

Select VIM:

5. On the Select Tenant screen, select a Tenant, and click **Submit**.

 Task

---

**Select Tenant**

Select Tenant

6. On the Collect User Data for Upgrade Preparation screen, select a folder with upgrade input files, VNF instance and root password for selected VNF instance, and click **Submit**.



## Task

### Collect user data for Upgrade Preparation

#### Upgrade preparation data

Select folder containing input files for upgrade of the vCUDb system \*

Select VNF instance \*

Root password for selected VNF instance \*

☐ Restart Upgrade Preparation

The Select folder containing input files for upgrade of the vCUDb system field displays VNF configurations available for upgrade preparation in the /vnflcm-ext/backups/workflows/cudbvnf/upgrade directory.

If the upgrade preparation workflow execution fails only due to wrongly prepared input files, choose the Restart Upgrade Preparation option to execute workflow execution from the start.

### 3.3.2.1 Workflow Log in GUI

The workflow log shows the executed procedures and the progress in percentage. The expected progress information output must be similar to the following example:



Level	Workflow Name	Message
INFO	Upgrade Preparation	All procedures executed successfully (100%)
INFO	Upgrade Preparation	Upgrade Preparation Phase Execution Successful.
INFO	Upgrade Preparation Execution	Procedure SV_PROC_IBU_ADAPT_CONFIGURATION executed successfully (80%)
INFO	Upgrade Preparation Execution	Procedure SV_PROC_ROUTER_CONFIGURATION_GENERATION executed successfully (60%)
INFO	Upgrade Preparation Execution	Procedure SV_PROC_SYSTEM_AUDIT executed successfully (50%)
INFO	Upgrade Preparation Execution	Procedure SV_PROC_IBU_SAVE_CONFIGURATION executed successfully (40%)
INFO	Upgrade Preparation Execution	Procedure SV_PROC_CHECK_IF_MIGRATION_NEEDED executed successfully (17%)
INFO	Upgrade Preparation Execution	Procedure SV_PROC_SYSTEM_UPGRADE_PREPARATION executed successfully (5%)
INFO	Upgrade Preparation Execution	Upgrade not started, wait ...
INFO	Upgrade Preparation Execution	Upgrade not started, wait ...
INFO	Upgrade Preparation Execution	Upgrade not started, wait ...
INFO	Upgrade Preparation	Deploying files for upgrade. It may take a while...
INFO	Upgrade Preparation	Starting Upgrade Preparation Phase Execution.
INFO	Collect Stack Details	VNFD id: PODA_CUDB-VNF18_VNF23, Stack id in Openstack: 2e93f2f1-1a79-40ee-a2ec-e3930271cc6f
INFO	Collect user data for Upgrade ...	Selected VNF Instance: CUDB-VNF18

The number of executed procedures and the total number of procedures in this phase depend on the upgrade path. The duration of each procedure is different. It takes more time for some procedures to be executed on all the nodes of the system.

## 3.4 vCUDB Upgrade System

This section describes how to execute upgrade of CUDB SW for a vCUDB system using VNF-LCM. To execute upgrade on a vCUDB system, this workflow must be executed once for every VNF in the system. Upgrade workflow execution should be performed one by one. Some operations done in this workflow are system wide.

**Note:** The troubleshooting of the upgrade workflow is out of the scope of this document. In case of failure, please contact CUDB Administrator.

### 3.4.1 vCUDB Upgrade System Prerequisites

Check that all general [Prerequisites](#) on page 6 have been fulfilled at this point.

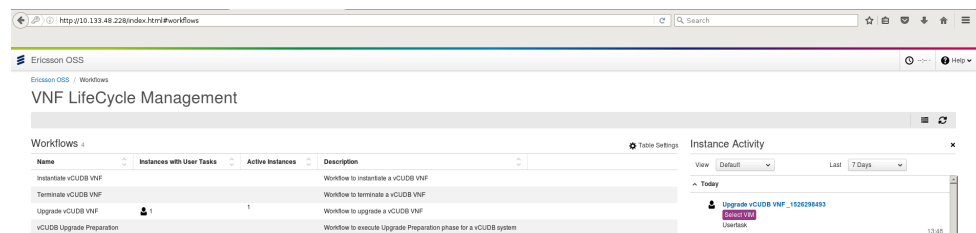
Besides, vCUDB Upgrade preparation workflow must be executed previously as described in [vCUDB Upgrade Preparation](#) on page 21, without any error. See also [Appendix: General Considerations when Upgrading](#) on page 31.

### 3.4.2 vCUDB Upgrade VNF Steps



## Steps

1. In the VNF-LCM Workflows screen, select vCUDB Upgrade, and click **Start a New Instance**.
2. Instance Name field is filled out, click **Submit**.



3. Select the newly-created workflow from the Instance with User Tasks panel, and click on the man icon.
4. On the Select VIM screen, select a VIM, and click **Submit**.

Task

### Select VIM

Select VIM:

[Dropdown arrow]

CEE\_POD\_M

Submit
Reset

5. On the Select Tenant screen, select a Tenant, and click **Submit**.

Task

### Select Tenant

Select Tenant

[Dropdown arrow]

CUDB-VNF10  
CUDB-VNF28

Submit
Reset



- On the Collect User data for Upgrade screen, select VNF instance, check Automatic Fallback to restore the previous CUDB software version in case the upgrade fails, and root password for the selected VNF instances, and click **Submit**.

#### Task

### Collect user data for Upgrade

#### Upgrade data

Select VNF instance \*

Root password for selected VNF instance \*

☐ Automatic Fallback

Submit

Reset

**Note:** When Automatic Fallback option is chosen, if the upgrade fails, the fallback is executed without stopping. If it is not selected and the upgrade fails, the execution is stopped and manual intervention is needed. Contact CUDB Administrator.

- On the Collect user data for Orchestrator Node screen, insert the password for the specified VNF instance that is used as an orchestrator from which the upgrade will be started for the selected VNF, and click **Submit**.

#### Task

### Collect user data for Orchestrator Node

#### Orchestrator node data

Orchestrator node is CUDB node 23

Root password for the orchestrator node: \*

Submit

Reset



### 3.4.2.1

## Workflow Log in GUI

The workflow log shows the executed procedures and the progress in percentage. The expected progress information output must be similar to the following example:

Time	Level	Workflow Name	Message
> 2018-05-14 12:29:18.938	INFO	Upgrade	All procedures executed successfully (100%)
> 2018-05-14 12:29:18.938	INFO	Upgrade	Upgrade Phase Execution Successful.
> 2018-05-14 12:29:29.755	INFO	Upgrade execution	Procedure NI_PROC_FB_MST_TAKE_NODE_BACK executed successfully (96%)
> 2018-05-14 12:29:05.601	INFO	Upgrade execution	Procedure NI_PROC_FB_MST_NODE_FINAL_ACTIONS executed successfully (94%)
> 2018-05-14 12:29:47.963	INFO	Upgrade execution	Procedure NI_PROC_RESTORE_DATA executed successfully (88%)
> 2018-05-14 12:19:11.757	INFO	Upgrade execution	Procedure NI_PROC_SMC_DEGRADED_FLAG_AFTER_AUTOMATED_INSTALL executed successfully (84%)
> 2018-05-14 12:18:52.639	INFO	Upgrade execution	Procedure NI_PROC_FB_MST_IBU_EXECUTE_CUDB_AUTOMATED_INSTALL executed successfully (82%)
> 2018-05-14 11:51:54.528	INFO	Upgrade execution	Procedure NI_PROC_IBU_DEPLOY_CONFIG executed successfully (72%)
> 2018-05-14 11:51:36.829	INFO	Upgrade execution	Procedure NI_PROC_IBU_WAIT_AIT executed successfully (58%)
> 2018-05-14 11:25:26.240	INFO	Upgrade execution	Procedure NI_PROC_IBU_START_AIT executed successfully (56%)
> 2018-05-14 11:25:08.118	INFO	Upgrade execution	Procedure NI_PROC_IBU_INSTALL_AIT executed successfully (52%)
> 2018-05-14 11:24:32.209	INFO	Upgrade	Starting Upgrade Execution.
> 2018-05-14 11:24:22.233	INFO	Get orchestrator node	Node 23(10.0.37.100) is orchestrator node.
> 2018-05-14 11:24:20.879	INFO	Get orchestrator node	Getting orchestrator node for upgrade execution.
> 2018-05-14 11:24:20.657	INFO	Collect Stack Details	VNFD id: PODA_CUDB-VNF18_VNF23, Stack id in Openstack: ac712b57-6c78-4200-a03f-a42e96ed9f92
> 2018-05-14 11:24:20.242	INFO	Collect user data for Upgrade	Selected VNF Instance: CUDB-VNF18, Automatic fallback: false
> 2018-05-14 11:24:07.169	INFO	authenticateCloud	Authentication towards cloud type - CEE is successful
> 2018-05-14 11:24:06.859	INFO	selectVnfInfo	Vnf details vnfId= 320d4811-3db1-11e8-8385-1a163ebaf693, vnfHostAddress= 10.0.59.56, vnfHostName= cdpoda.satl.gic.ericsson.se, vnfAuthURL= https://cdpoda.satl.gic.ericsson.se:5000/v2.0, vnfName= CEE_POD_A_tena...
> 2018-05-14 11:23:46.702	INFO	authenticateCloud	Starting cloud authentication.

The number of executed procedures and the total number of procedures in this phase depends on the upgrade path. The duration of each procedure is different. It takes more time for some procedures to be executed, for example NI\_PROC\_IBU\_WAIT\_AIT and NI\_PROC\_RESTORE\_DATA.

## Do!

If vCUDb base software version is previous to 1.12, after the CUDB VNF, deployed on CEE is upgraded, all VMs must be configured with ha-offline High Availability (HA) policy, as stated in the Other Requirements section of CUDB Virtual Infrastructure Requirements. For more information, see [Other Requirements](#) on page 8.



## 4 Troubleshooting

If the workflow execution is unsuccessful, see the following options for more information on the cause of failure:

- Workflow Log view. Check the progress information output on VNF-LCM GUI web browser.
- Jboss Server log on VNF-LCM. During execution, log information is saved in this file:

```
# tail -f /ericsson/3pp/jboss/standalone/log/server.log
```

Contact Ericsson personnel if support is needed.

- If Instantiate VNF workflow was failing during CUDB installation, connect through either sysmgmt or oam vip.

```
ssh <cudb_user>@<vip>
```

```
cd /home/coremw_appdata/incoming/cudb-install-temp/
```

```
./cudbAutomatedInstallProgressTracker.py -c
```

Check the `automatedInstall.log` file in SC\_2\_1 for further details.

- If vCUDB Upgrade Preparation workflow was failing in a procedure, more information about the error can be found in the `/var/tmp/upgradeMonitor.log` file on VNF-LCM GUI.

For further help, contact a CUDB Administrator as Ericsson support to follow the *VNF-LCM Admin Guide* or the corresponding manual procedures (for example installation, upgrade and so on) for a deeper troubleshooting.



## 5 Appendix: General Considerations when Upgrading

During the CUDB upgrade:

- The software is upgraded to the same software used in a maiden installation. Therefore, the same behavior and performance is expected.
- All previous configuration is preserved, except some hardening parameters.

### 5.1 Hardening

Contact the CUDB Administrator to follow the hardening instructions of the manual upgrade for vCUDB.

### 5.2 Deviations from Standard Configuration

Upgrade is aimed to run on standard CUDB environments. The existence of any deviation, meaning any customization present in the target system, could affect the Upgrade execution, so contacting the next level of support in advance to analyze the case is recommended. Deviations can include:

- Software Delivery Packages (SDPs) or Red Hat Package Manager (RPM) software files
- System configuration: administrators, sudoers, and so on
- Network configuration: for example, QoS, VLAN IDs and subnets

### 5.3 Prerequisites

Before running the upgrade workflows, ensure that the following requirements are fulfilled:

- The upgrade must be performed during a low system traffic period (maintenance window) and scheduled according to the estimated times. Both the upgrade and fallback times must be considered during the planning activities.
- In case the system memory usage is above 85% in any node, contact Ericsson personnel to evaluate a Data Store (DS) expansion procedure before the upgrade.



- The system is up and running with no relevant alarms issued.  
Examples of alarms not relevant for upgrade:
  - Logchecker found minor error(s), Preventive Maintenance
  - Root Login Failed, Security
  - Fault retrieving subscriber statistics, Application Counters
  - Deleted data due to reconciliation, Storage Engine
  - Memory usage at Warning level
- During upgrade execution, mastership movements are expected. To avoid mastership movements in some specific cases, move them manually.
- For information on the estimated times, consult with Ericsson personnel.
- Both the upgrade and fallback times must be considered during the planning activities.
- Enough space is available in `/cluster` to store the data, the software, the configuration backups and the files related to the upgrade. If not, free up storage space by removing existing backups or not needed information, otherwise an external storage is needed:

```
available space at /cluster > SW and Configuration backup(1
GB) + Upgrade-created stuff(1GB) + Data backup (250MB (GEP3),
750MB (GEP5), 25MB (small vCUDB)) * number of ndb blades
```

## 5.4 Network Impacts

The CUDB system upgrade can include changes in the interfaces at network level that may require further actions external to the CUDB nodes. For more information, refer to [CUDB 1.14 Network Impact Report](#).

## 5.5 System Downtime and Service Disturbances

When a node is being disabled in the system, provisioning traffic is stopped while the masters are moved away of the upgrading node. In case there are no masters, provisioning does not stop.

No system downtime is expected during the whole procedure.

Minor traffic loss and dropped connections can be experienced in the following cases:

- while the CUDB nodes are disabled in the system.



- during the LDAP servers restart performed in the Node upgrade and Fallback phases needed due to the modification of database tables structure.

## 5.6 Restrictions

Consider the following restrictions before performing a software update on the CUDB system:

- No configuration changes are allowed until the system upgrade is started, for example the system validation phase, until the system upgrade is completed, for example the last node upgrade.
- Current upgrade/fallback procedure does not support the handling of faulty blades, such as ignoring or skipping them. If any blade is faulty, it must be immediately replaced before continuing with the upgrade/fallback.
- The upgrade phases must not be executed in different nodes at the same time.

In addition, consider the following feature restrictions since the system upgrade is started until its completion:

- Any base release: CUDB restore commands are restricted.
- Any base release: No system task scheduling changes are allowed. Avoid the execution of any command modifying the crontab, for example, `cudbConsistencyMgr`.
- Base release 1.2 or previous: `cudbCheckReplication` command is restricted.
- Base release 1.7 or previous: Subscriber reallocation is restricted.
- Base release 1.10 or previous: Additional high-throughput write requests are restricted.



## Glossary

For the terms, definitions, acronyms and abbreviations used in this document, refer to CUDB Glossary of Terms and Acronyms



# Reference List

## CUDB Documents

1. CUDB Glossary of Terms and Acronyms 0033-HDA 104 03/10
2. CUDB Virtual Infrastructure Requirements 15/1553-HDA 104 03/10

## ENM CPI Library References

1. VNF-LCM Installation Instructions 1/1531-CNA 403 3313
2. ENM Configuration System Administration Guide 1/1543-AOM 901 151-1

## OSS-RC CPI Library References

1. VNF-LCM CEE/Openstack Installation Instructions 1/153 72-APR 901 0578
2. VNF-Lifecycle Manager System Administration Guide 1543-APR 901 0578