

Server Platform, Blade Replacement

OPERATING INSTRUCTION

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1 Introduction

This document describes how to replace a blade in an Ericsson Centralized User Data Base (CUDB) node deployed on native BSP 8100.

1.1 Description

This Operating Instruction (OPI) describes how to replace a blade in a CUDB node. A blade replacement must be performed either because of blade fault, or due to a hardware upgrade.

1.2 Revision Information

Rev. A

This document is based on 4/1543-CSH 109 067/9 with the following changes:

- Removed obsolete information.
- Virtualization terminology updates throughout the document.
- Section 3.3.2 on page 8: Updated Step 2 and Step 3.
- Section 3.3.2.3 on page 9: Updated procedure.
- Section 3.3.3 on page 10: Updated commands. Added a note about alarms that might appear during blade replacement.
- Section 3.8 on page 17: Updated Step 7. Updated “Do!” admonition, because BIOS upgrade instructions are added to Release Notes.
- Section 3.10.1 on page 20: Added a note about how to replace multiple blades in parallel. Updated Step 6. Updated the note about replacement execution and the step list about the replacement of multiple blades in parallel.

Rev. B

Editorial changes only.

Rev. C

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



- Section 3.8 on page 17: Removed Step 5, because of obsolete BIOS upgrade instructions.

Rev. D

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

- Section 3.8 on page 17: Added a note regarding restoring stored procedures after blade replacement.

Rev. E

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

- Section 3.5 on page 11: Updated the order of subsections.
- Section 3.5.3 on page 14: Updated the description.
- Section 3.5.4 on page 14: Added Step 6.
- Section 3.6 on page 16: Updated description about booting order. Added Step 2 to the procedure on how to finalize the SC replacement.
- Section 3.9 on page 19: Updated the procedure.

Rev. F

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

- Section 3.8 on page 17: Updated list in Step 6.

Rev. G

Editorial changes only.

1.3 Typographic Conventions

Typographic conventions can be found in the following document:

- *Typographic Conventions*



2 Node Hardware Description

Before replacing any blades, make sure to check the hardware description of the node. Refer to *CUDB Node Hardware Description*, Reference [1] for more information.





3 Replacing a Blade

This section describes how to identify a faulty blade, how to perform a blade replacement in a CUDB node, and how to prepare the replacement blade for operation.

3.1 Identifying the Faulty Blade

Perform the following steps to identify a faulty blade in a CUDB node:

1. Establish an SSH session towards the target CUDB node with the following command:

```
ssh root@<CUDB_Node_OAM_VIP_Address>
```

This session is established to the first or second System Controller (SC), that is either to SC_2_1 or SC_2_2.

Refer to *CUDB Users and Passwords*, Reference [4] for more information on the default `root` password.

Warning!

If the failing blade is a master Data Store Unit Group (DSG) replica, then the below procedure results in a cluster mastership change. The mastership change can cause traffic loss, or even data loss: therefore, the blade replacement must be performed in low traffic periods. Make sure that the provisioning traffic is stopped before starting the blade replacement.

2. Several methods are available to identify an SC, a DSG, or a PLDB in the `/cluster/etc/cluster.conf` file. An example is provided below.

For instance, below is a defined node containing 2 SCs, and 8 payload blades:

```
node 1 control SC_2_1
node 2 control SC_2_2
node 3 payload PL_2_3
node 4 payload PL_2_4
node 5 payload PL_2_5
node 6 payload PL_2_6
node 7 payload PL_2_7
node 8 payload PL_2_8
node 9 payload PL_2_9
```



```
node 10 payload PL_2_10
```

```
host all 10.22.0.1 OAM1
host all 10.22.0.2 OAM2
host all 10.22.0.3 PL0
host all 10.22.0.4 PL1
host all 10.22.0.5 DS1_0
host all 10.22.0.6 DS1_1
host all 10.22.0.7 DS2_0
host all 10.22.0.8 DS2_1
.....
```

The below list provides some example scenarios for various failing blades:

- In case the failing blade is Blade 7, with the IP of 10.22.0.7 (note the last octet), then pay attention to the following two lines of the `cluster.conf` file:

```
node 7 payload PL_2_7
host all 10.22.0.7 DS1_0
```

In the above lines, `PL_2_7` is the name of the payload blade, the blade number is "7", while the identification number of the associated DS is "1" (`DS1_0`).

- In case the failing blade is Blade 3 with the IP of 10.22.0.3 (note the last octet), then pay attention to the following two lines of the `cluster.conf` file:

```
node 3 payload PL_2_3
host all 10.22.0.3 PL0
```

In the above lines, `PL_2_3` is the name of the payload blade, "3" is the blade number, while the Processing Layer ID is `PL0`. In case the blade in the cluster needs reboot, the following command must be used:

```
cluster reboot --node 3
```

- In case the failing blade is Blade 1 with the IP of 10.22.0.1 (note the last octet), then pay attention to the following two lines of the `cluster.conf` file:

```
node 1 payload SC_2_1
host all 10.22.0.1 OAM1
```

In the above lines `SC_2_1` is the name of the blade, "1" is the blade number, while the `SC ID` is `OAM1`.



3.2 Identifying Blade Rack and Subrack Position

To identify the physical blade needed to be replaced, do the following:

1. Establish a BSP CLI session:

```
ssh advanced@<BSP-NBI-SCX> -p2024
```

2. Enter the following commands:

```
show-table ManagedElement=1,DmxcFunction=1,Eqm=1,Virtua  
lEquipment=cudb -m Blade -p bladeId,userLabel
```

The output should be similar to the following example:

```
=====
```

bladeId	userLabel
=====	
0-1	SC-1
0-11	PL-6
0-13	PL-7
0-15	PL-8
0-17	PL-9
0-19	PL-10
0-21	PL-11
0-23	PL-12
0-3	SC-2
0-5	PL-3
0-7	PL-4
0-9	PL-5
1-1	PL-13
1-11	PL-18
1-13	PL-19
1-15	PL-20
1-17	PL-21
1-19	PL-22
1-21	PL-23
1-23	PL-24
1-3	PL-14
1-5	PL-15
1-7	PL-16
1-9	PL-17
2-1	PL-25
2-11	PL-30
2-13	PL-31
2-15	PL-32
2-17	PL-33
2-19	PL-34
2-21	PL-35
2-23	PL-36
2-3	PL-26
2-5	PL-27
2-7	PL-28
2-9	PL-29

```
=====
```

Note: LDE and BSP 8100 naming conventions are slightly different, so SC_2_1 on LDE level equals to SC-1 on BSP 8100 and so on.

The `bladeId` identifies the blade position in the rack, the first number meaning the subrack and the second meaning the slot within the subrack. For example, PL-14 is in the third slot of subrack 1.



3.3 Preparing the Blade Replacement

This section and the following subsections describe the preparations to perform before replacing a blade. The following steps apply to replacing every blade type (SC, DSG, PLDB).

3.3.1 Connecting to the CUDB Node

Establish an SSH session towards the target CUDB node with the following command:

```
ssh root@<CUDB_Node_OAM_VIP_Address>
```

This session is established to the first or second SC, that is either to SC_2_1 or SC_2_2.

Refer to *CUDB Users and Passwords*, Reference [4] for more information on the default `root` password.

3.3.2 Preparing Payload Blade (PLDB or DSG) Replacement

The following steps apply only to DSG or PLDB replacement. In case the replaced blade is an SC, skip to Section 3.3.3 on page 10.

3.3.2.1 Preparing DSG Replacement

If the blade belongs to a DSG, execute a planned mastership change procedure when it hosts the DSG master. Perform the following steps to do so:

1. Identify the DSG blade number in the `/cluster/etc/cluster.conf` LDE file.
2. Read the `dsGroupId` attribute of the specific instance of the `CudbLocalDs` class. For more information, refer to the *Class CudbLocalDs* section of *CUDB Node Configuration Data Model Description*, Reference [5].

Refer to the Object Model Modification Procedure in *CUDB Node Configuration Data Model Description*, Reference [5] for more information on how to check the attribute.

3. Use the following command to check if the master replica of the DSG with the given `dsGroupId` attribute is hosted on the affected blade:

```
cudbSystemStatus -R
```

4. If the DSG blade is a master, then execute a planned mastership change procedure starting from Section 3.3.2.3 on page 9.



3.3.2.2 Preparing PLDB Replacement

If the blade belongs to the PLDB, execute a planned mastership change procedure when it hosts the PLDB master. Perform the following steps to do so:

1. Identify the PLDB blade number in the `/cluster/etc/cluster.conf` LDE file.
2. Use the following command to check if the affected PLDB blade is a master or not:

```
cudbSystemStatus -R
```

3. If the PLDB blade is a master, then execute a planned mastership change procedure starting from Section 3.3.2.3 on page 9.

3.3.2.3 Disabling Automatic Mastership Change

This section describes how to disable Automatic Mastership Change (AMC) if it is enabled.

First, check whether AMC is enabled. To do so, check the value of the `enabled` attribute of the `CudbAutomaticMasterChange` class. For more information, refer to the *Class CudbAutomaticMasterChange* section of *CUDB Node Configuration Data Model Description*, Reference [5].

If AMC is enabled (that is, the value of the `enabled` attribute is `true`), then disable it on all CUDB nodes by setting the value of the `enabled` attribute to `false`.

Refer to the Object Model Modification Procedure in *CUDB Node Configuration Data Model Description*, Reference [5] for more information on all the steps required to modify the object model (for example, on using the `applyConfig` administrative operation to activate the changes).

Refer to the *Configuring Automatic Mastership Change* section of *CUDB System Administrator Guide*, Reference [6] for more information.

3.3.2.4 Mastership Change

Follow the below steps to perform a mastership change:

1. Log in to the SC of the node where the master replica is to be hosted with the following command:

```
ssh root@<CUDB_Node_OAM_VIP_Address>
```

Refer to *CUDB Users and Passwords*, Reference [4] for more information on the default `root` password.

2. Execute one of the below commands depending on the type of the mastership change:



- a. In case of a DSG mastership change, execute the following command:

```
cudbDsgMastershipChange -d <DSG_number>
```

- b. In case of PLDB mastership change, execute the following command:

```
cudbDsgMastershipChange --pl
```

Refer to *CUDB Node Commands and Parameters*, Reference [2] for more information on the `cudbDsgMastershipChange` command, and to *CUDB System Administrator Guide*, Reference [3] for more information on the manual mastership change procedure.

3.3.2.5 Checking Mastership Status

When finished, check that the system has executed the planned mastership change without faults. Use the following command to do so:

```
cudbSystemStatus -R
```

Note: If the replication status is not correct, stop the procedure, and contact the next level of maintenance support.

3.3.3 Finishing Blade Replacement Preparation

Perform the following steps to finish blade replacement preparations.

Note: In the below commands, `<name>` and `<blade>` are used to identify blades, where:

- `<blade>` is a numeric identifier, for example in SC_2_1 `<blade>` is 1, in PL_2_3 `<blade>` is 3.
- `<name>` is the controller name (SC_2_`<blade>`) or the payload blade name (PL_2_`<blade>`).

1. Lock the blade at SAF level with the following command:

```
cmw-node-lock <name>
```

2. Check if the specific blade is locked at SAF level with the following command:

```
cmw-status -v node
```

The output must be similar to the following example:

```
safAmfNode=PL-7, safAmfCluster=myAmfCluster
```

```
AdminState=LOCKED-INSTANTIATION(3)
```



```
OperState=ENABLED(1)
```

3. Make a backup of the `rpm.conf` file as follows:

- a. Make a copy of the file, and rename it to `rpm.conf_FULL` with the following command:

```
cp /cluster/nodes/<blade>/etc/rpm.conf
/cluster/nodes/<blade>/etc/rpm.conf_FULL
```

The `rpm.conf_FULL` is now contains all entries of the original `rpm.conf` file.

- b. Overwrite the contents of the original `rpm.conf` file, so that it contains only the `cudbKernelTuning` `rpm`, and the `ldews-control` or `ldews-payload` entries (depending on the type of blade to replace). Use the following command to do so:

```
grep -ia 'ldews\|linux\|cudbKernelTuning'
/cluster/nodes/<blade>/etc/rpm.conf_FULL >
/cluster/nodes/<blade>/etc/rpm.conf
```

4. In case an SC is being replaced, create a symbolic link for the executing hooks with the following command:

```
cd /cluster/hooks/<blade>
```

```
ln -s /cluster/hooks/pre-installation.tar.gz
pre-installation.tar.gz
```

```
ln -s /cluster/hooks/post-installation.tar.gz
post-installation.tar.gz
```

5. Replace the blade as described in Section 3.4 on page 11.

Note: When replacing SC, alarm SAF, LOTC Disk Replication Consistency Failed, might appear. If physical replacement is taking more than 20 minutes, alarm SAF, LOTC Disk Replication Communication Failed, might appear. These alarms are expected during blade replacement procedure on SC and should be automatically cleared when all replacement steps are executed. For more information, please follow the corresponding alarm OPI.

3.4 Replacing GEP Boards

Refer to the *Manage Blade* document in the BSP 8100 CPI for detailed information on the procedure needed to physically replace a blade.



3.5 CUDB Node Configuration Changes

This section describes the configuration changes to perform in a CUDB node in case blade replacement is needed.

3.5.1 Obtaining MAC Addresses for the New Blade

The MAC addresses are used as input to create the `cluster.conf` file, which is used by LDE. The MAC addresses are also needed to configure the Jumpstart server before installing LDE on the SCs, as well for the blade replacement procedure.

The MAC addresses are fetched through the BSP CLI. This MAC is the MAC base, used to obtain the MAC addresses necessary to complete the `cluster.conf` file generation.

To obtain the MAC addresses, do the following:

1. Establish a BSP CLI session:

```
ssh advanced@<BSP-NBI-SCX> -p2024
```

2. Execute the following commands to show the MAC addresses:

```
show-table ManagedElement=1,DmxcFunction=1,Eqm=1,Virtua  
lEquipment=cudb -m Blade -p bladeId,firstMacAddr
```

The output must be similar to the below example:

```
=====
```

bladeId	firstMacAddr
=====	
0-1	90:55:AE:3A:CB:1D
0-11	90:55:AE:3A:CA:5D
0-13	90:55:AE:3A:C9:CD
0-15	90:55:AE:3A:CA:75
0-17	90:55:AE:3A:C9:9D
0-19	90:55:AE:3A:CA:ED
0-21	90:55:AE:3A:CB:AD
0-23	90:55:AE:3A:CD:5D
0-3	90:55:AE:3A:C9:55
0-5	90:55:AE:3A:CA:15
0-7	90:55:AE:3A:C9:FD
0-9	90:55:AE:3A:C9:25
1-1	90:55:AE:3A:B0:7D
1-11	90:55:AE:3A:BF:C5
1-3	90:55:AE:3A:C1:45
1-5	90:55:AE:3A:BF:05
1-7	90:55:AE:3A:BF:1D
1-9	90:55:AE:3A:BF:35

```
=====
```




The MAC shown for each shelf slot is the base MAC. All the MACs can be obtained by adding a number to the `<base mac>`, in accordance to the following tables. Table 1 applies to BSP 8100 (GEP3) boards, while Table 2 applies to BSP 8100 (GEP5) boards.

Table 1 MAC Address Relation to GEP3 Boards

Address	Resulting MAC ⁽¹⁾	
<code><BASE MAC> + 1</code>	eth3	Left SCX Backplane Port
<code><BASE MAC> + 2</code>	eth4	Right SCX Backplane Port
<code><BASE MAC> + 3</code>	eth2	ETH-Debug Front Port
<code><BASE MAC> + 5</code>	eth0	ETH-0 Front Port
<code><BASE MAC> + 6</code>	eth1	ETH-1 Front Port
<code><BASE MAC> + 8</code>	eth5	Left SCX 10GbE Backplane Port
<code><BASE MAC> + 9</code>	eth6	Right SCX 10GbE Backplane Port

(1) The resulting MAC must be in hexadecimal format.

Table 2 MAC Address Relation to GEP5 Boards

Address	Resulting MAC ⁽¹⁾	
<code><BASE MAC> + 1</code>	eth3	Left SCX 1GbE Backplane Port
<code><BASE MAC> + 2</code>	eth4	Right SCX 1GbE Backplane Port
<code><BASE MAC> + 3</code>	eth2	ETH-Debug Front Port
<code><BASE MAC> + 5</code>	eth5	Left SCX 10GbE Backplane Port
<code><BASE MAC> + 6</code>	eth6	Right SCX 10GbE Backplane Port
<code><BASE MAC> + 8</code>	eth0	ETH-0 Front Port
<code><BASE MAC> + 9</code>	eth1	ETH-1 Front Port

(1) The resulting MAC must be in hexadecimal format.

Note: Ports ETH-0 and ETH-1 are enabled only during the initial SW installation phase from the Jumpstart server. After the LDE is installed on the blade, they remain disabled and cannot be used.

3.5.2

Obtaining Board Revision for the New Blade

In case of SC replacement in BSP 8100 systems with GEP3 hardware, perform the procedure below to check the product revision of the new blade:

1. Establish a BSP NBI CLI session:

```
ssh advanced@<BSP-NBI-SCX> -p2024 -t -s cli
```

2. Execute the following command to show the blade hardware revisions:



```
show ManagedElement=1, SystemFunctions=1, HwInventory=1  
-m HwItem -p productIdentity
```

The expected output must be similar to the below example:

```
productIdentity="ROJ 208 840/3"  
productDesignation="GEP3-HD300"  
productRevision="R4B"
```

3.5.3 Editing the LDE installation.conf File

In case of SC replacement in BSP 8100 systems with GEP3 hardware, perform the procedure below to edit the `installation.conf` file.

1. Establish an SSH session towards the target CUDB node with the following command:

```
ssh root@<CUDB_Node_OAM_VIP_Address>
```

This session is established to the first or second SC, either to SC_2_1 or SC_2_2.

Refer to *CUDB Users and Passwords*, Reference [4] for more information on the default `root` password.

2. Locate the `installation.conf` file in the following directory:

```
/cluster/etc/installation.conf
```

3. Edit the file and set parameter value depending on the hardware revision of the new blade obtained in Section 3.5.2 on page 13:

- If it is lower than R9A, use the following value:

```
disk_device_path=/dev/sdb
```

- If it is R9A or higher, use the following value:

```
disk_device_path=/dev/sda
```

3.5.4 Editing the LDE cluster.conf File

Perform the following steps to edit the `cluster.conf` file.

1. Establish an SSH session towards the target CUDB node with the following command:

```
ssh root@<CUDB_Node_OAM_VIP_Address>
```

This session is established to the first or second SC, that is either to SC_2_1 or SC_2_2.



Refer to *CUIDB Users and Passwords*, Reference [4] for more information on the default `root` password.

2. Locate the `cluster.conf` file in the following directory:

```
/cluster/etc/cluster.conf
```

3. Open the file, and replace the old MACs with the ones. Use Table 1 or Table 2 in Section 3.5.1 on page 12 as a means to calculate the actual MAC addresses.

An example of the LDE `cluster.conf` file is provided below. Interfaces 1 or 2 are related to blade number: for example, if payload blade PL_2_5 is replaced, then interface 5 needs MAC addresses adaptation.

```
# # Example /cluster/etc/cluster.conf
#####
#
# Interface definition
#

interface 1 eth3 ethernet 90:55:ae:3a:b0:7e
interface 1 eth4 ethernet 90:55:ae:3a:b0:7f
interface 1 eth5 ethernet 90:55:ae:3a:b0:82
interface 1 eth6 ethernet 90:55:ae:3a:b0:83

interface 2 eth3 ethernet 90:55:ae:3a:c1:46
interface 2 eth4 ethernet 90:55:ae:3a:c1:47
interface 2 eth5 ethernet 90:55:ae:3a:c1:4a
interface 2 eth6 ethernet 90:55:ae:3a:c1:4b

interface 3 eth3 ethernet 90:55:ae:3a:bf:06
interface 3 eth4 ethernet 90:55:ae:3a:bf:07
interface 3 eth5 ethernet 90:55:ae:3a:bf:0a
interface 3 eth6 ethernet 90:55:ae:3a:bf:0b

interface 4 eth3 ethernet 90:55:ae:3a:c9:fe
interface 4 eth4 ethernet 90:55:ae:3a:c9:ff
interface 4 eth5 ethernet 90:55:ae:3a:ca:02
interface 4 eth6 ethernet 90:55:ae:3a:ca:03

interface 5 eth3 ethernet 90:55:ae:3a:c9:26
interface 5 eth4 ethernet 90:55:ae:3a:c9:27
interface 5 eth5 ethernet 90:55:ae:3a:c9:2a
interface 5 eth6 ethernet 90:55:ae:3a:c9:2b
```

Example 1 cluster.conf File Example

4. Verify the syntax of the `cluster.conf` file with the following command:

```
cluster config -v
```



In case of any error message, check the command output and correct syntax mistakes. Warning messages can be ignored.

5. Reload the configuration with the following command:

```
cluster config --reload --all
```

Note: The command fails for a currently replaced blade, this is the expected behavior. (Node X (<name>) not responding, skipped). Continue with next step.

6. The new blade(s) start(s) booting from network.

3.6 System Controller Replacement Steps

This section describes the procedure to finalize the SC blade replacement.

The new blade is by default set to boot from network, the following procedure describes how to set it to boot from hard disk.

During this procedure, the new SC also synchronizes its replicated storage disk partition with another SC. This process can take up to one hour, depending on storage disk partition size and available network bandwidth. Use the following command on another SC to check the synchronization status:

```
cat /proc/drbd
```

Perform the following steps to finalize the SC replacement:

1. Restore the original `rpm.conf` file with the following command:

```
cp /cluster/nodes/<blade>/etc/rpm.conf_FULL  
/cluster/nodes/<blade>/etc/rpm.conf
```

In the above command, `<blade>` must be replaced with the blade number. For example, in case of SC_2_2, the blade number is 2.

2. Set the new SC blade to boot from hard disk. See Section 3.9 on page 19 for details.
3. Reboot the new SC from console interface with the following command:

```
reboot
```

3.7 DSG and PLDB Replacement Steps

If the blade to replace is a DSG or PLDB, then perform the following steps:

1. Log in to one of the SCs, and execute the following commands:

```
ssh root@<CUDB_Node_OAM_VIP_Address>
```

Refer to *CUDB Users and Passwords*, Reference [4] for more information on the default `root` password.



```
cd /opt/ericsson/cudb/OAM/support/bin/
```

```
./cudbPartTool rebuild -n <blade>
```

In the above command, *<blade>* must be replaced with the blade number. For example, in case of PL_2_5, *<blade>* is 5.

2. Check if the partition is created with the following command:

```
./cudbPartTool check -n <blade>
```

In the above command, *<blade>* must be replaced with the blade number. For example, in case of PL_2_5, *<blade>* is 5.

The output must be similar to the below example:

```
CUDB_82 SC_2_2# ./cudbPartTool check -n 5
CUDB partitioning tool

== Cluster filesystem analysis ==

Payload PL_2_5 report:
WARNING: local storages not mounted.

Done.
```

3. Restore the original `rpm.conf` file with the following command:

```
cp /cluster/nodes/<blade>/etc/rpm.conf_FULL
/cluster/nodes/<blade>/etc/rpm.conf
```

In the above command, *<blade>* must be replaced with the blade number. For example, in case of PL_2_5, *<blade>* is 5.

3.8 Finalizing Replacement

Perform the following steps to finish blade replacement. The following steps apply to replacing every blade type (SC, DSG, and PLDB).

Note: In case of SC replacement, crontab jobs and their definitions, or similar tasks, which are not deployed by default in CUDB, will be lost. If necessary, redeploy them after the procedure is completed.

1. Unlock the blade at SAF level with the following command:

```
cmw-node-unlock <name>
```

<name> is the name of the replaced blade, for example PL_2_5.



2. Reboot the newly-installed blade with the following command:

```
cluster reboot -n <blade>
```

<blade> is the number of the replaced blade, for example 5 for PL_2_5.

3. Wait until the blade has rebooted and joined the cluster. Use the following command to list the joined blades, and to check the operational states of the SUs:

```
cmw-status -v node
```

The expected output must be similar to the below example:

```
safAmfNode=PL-7, safAmfCluster=myAmfCluster
```

```
AdminState=UNLOCKED(1)
```

```
OperState=ENABLED(1)
```

4. Wait until all the processes are started in the blade and check if the system has recovered without faults with the `cudbSystemStatus` command. In case of DS, errors related to the DS database can be ignored because of the data restore done later.

Note: If the status is not correct, stop the procedure, and contact the next level of maintenance support.

5. Exit the SSH session with the `exit` command.

6. Depending on the blade type, do the following:

- If the replaced blade is an SC, the procedure is finished.
- If the replaced blade is a DSG blade, to backup and restore a DSG replica, perform the steps described in the *Performing Combined Unit Data Backup and Restore* section of *CUDB Backup and Restore Procedures*, Reference [7].
- If the replaced blade is any one in PLDB group, to backup and restore a PLDB replica, perform the steps described in the *Performing Combined Unit Data Backup and Restore* section of *CUDB Backup and Restore Procedures*, Reference [7].

After the NDBs are started and the `mysql` server connections are OK, execute the following command:

```
cudbPrepareStore --pl
```

Note: After finishing the rebuild procedure, the stored procedures are not restored. Recreate them with the following command:

```
cudbManageStore -p -o restorestoredprocedures
```

SW backup created before blade replacement will not be valid after blade replacement since the backup contains an outdated `cluster.conf` file, therefore the new blade cannot be reached. For creating a new SW backup, follow the steps described in the *Software and Configuration Backup* section of *CUDB Backup and Restore Procedures*, Reference [7] section.

- Refer to the Object Model Modification Procedure in *CUDDB Node Configuration Data Model Description*, Reference [5] for more information on all the steps required to modify the object model (for example, on using the `applyConfig` administrative operation to activate the changes).

3.9 Changing the Boot Device Order

GEP3



GEP5

3.10 Replacing Multiple Blades in Parallel

3.10.1 Parallel Blade Replacement Procedure

- 1 SC_2_2
- 2 SC_2_1
- 3 Odd-numbered PLDB blades
- 4 Even-numbered PLDB blades
- 5 Odd-numbered DSG blades
- 6 Even-numbered DSG blades

Warning!

Perform the following steps to replace multiple blades in parallel:



Note: To ensure that there is enough traffic handling capacity during replacement execution, it is recommended that the maximum number of payload blades to be replaced in parallel should not be larger than the configured value of the `redundancyLevel` attribute of the `CudbLdapAccess` class.

If there are more blades to be replaced, it should be done iteratively, in a way that in each iteration, replacement is done for maximum of N blades from the same group in parallel, where N is the value of the `redundancyLevel` attribute. However, if replacement is done in low traffic period or in a maintenance window, when the degraded traffic handling capacity could still be sufficient, it can be decided to execute replacement for more than N blades in parallel.

1. Check the value of the `redundancyLevel` attribute of the `CudbLdapAccess` class and take special note of it. For more information, refer to the `Class CudbLdapAccess` section of *CUDB Node Configuration Data Model Description, Reference* [5].
2. Identify all faulty blades inside the node, as described in Section 3.1 on page 5 to be able to group them.
3. Identify the position of all faulty blades, as described in Section 3.2 on page 6.
4. Prepare for the replacement of all faulty blades, as described in Section 3.3 on page 7.

Note: AMC is a system-wide change that must be performed only once.

5. In case of replacing SC group(s) or PLDB group(s), force the external applications to move their primary connections to another CUDB node. This applies in case primary connections are established, or the SC or the PLDB blades are affected.
6. Execute the blade replacement exactly in the following order, skipping any group which has no faulty blades:
 - a. SC_2_2
 - b. SC_2_1
 - c. Odd-numbered PLDB blades
 - d. Even-numbered PLDB blades
 - e. Odd-numbered DSG blades
 - f. Even-numbered DSG blades



Warning!

Always follow the order of groups exactly.

7. If number of blades that have been replaced in parallel was greater than value of redundancy level parameter, please also execute `cudbLdapFeRestart` command. For more information, refer to the `cudbLdapFeRestart` section of *CUDB Node Commands and Parameters*, Reference [2].



Glossary

For the terms, definitions, acronyms and abbreviations used in this document, refer to *CUDB Glossary of Terms and Acronyms*, Reference [8].





Reference List

CUDB Documents

- [1] *CUDB Node Hardware Description*
- [2] *CUDB Node Commands and Parameters*
- [3] *CUDB System Administrator Guide*
- [4] *CUDB Users and Passwords*, 3/00651-HDA 104 03/10
- [5] *CUDB Node Configuration Data Model Description*
- [6] *CUDB System Administrator Guide*
- [7] *CUDB Backup and Restore Procedures*
- [8] *CUDB Glossary of Terms and Acronyms*