

# Storage Engine, Data Inconsistency between Replicas Found in DS, Major Ericsson Centralized User Database

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## OPERATING INSTRUCTION

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# 1 Introduction

This instruction concerns alarm handling for the Storage Engine, Data Inconsistency between Replicas Found in DS, Major alarm.

## 1.1 Alarm Description

This alarm is raised as a result of issues found when running a Consistency Check on a Data Store Unit Group (DSG) slave replica by means of the `cudbConsistencyMgr` command. For further information about the command, refer to *CUDB Node Commands and Parameters*, Reference [1]. For more information about Consistency Check, refer to *CUDB Consistency Check*, Reference [2].

The alarm is issued in the following situations:

- The number of divergences between the slave replica and its master replica is higher than the threshold (default or selected value).
- A schema mismatch between the slave replica and its master replica is found.

The possible alarm causes and the corresponding fault reasons, fault locations, and impacts are described in Table 1.

*Table 1 Alarm Causes*

Alarm Cause	Description	Fault Reason	Fault Location	Impact
High number of divergences between the slave replica and its master replica.	The number of divergences between the slave replica and its master replica found when running a consistency check is higher than the threshold.	Wrong backup restored on the slave replica.	Affected DS cluster.	If this slave replica becomes the master replica, there might be a service impact for the subscribers affected by the data inconsistency.
		Slave replica addressed by faulty maintenance operation.		
Schema mismatch between the slave replica and its master replica.	A schema mismatch between the slave replica and its master replica is found when running a consistency check.	Wrong backup restored on the slave replica.	Affected DS cluster.	If this slave replica becomes the master replica, there might be a service impact for the subscribers affected by the data inconsistency.
		Slave replica addressed by faulty maintenance operation.		
		Incomplete of faulty schema update procedure.		

The alarm attributes are listed and explained in Table 2:



Table 2 Alarm Attributes

Attribute Name	Attribute Value
Auto Cease	No
Module	STORAGE-ENGINE
Error Code	22
Timestamp First	Date and time when the alarm was raised for the first time.
Repeated Counter	Number which indicates how many times the alarm was raised.
Timestamp Last	Date and time of the most recent alarm raised.
Resource ID	.1.3.6.1.4.1.193.169.1.2.22.<DG>.<NODE>
Alarm Model Description	Data inconsistency between replicas found, Storage Engine.
Alarm Active Description	Storage Engine (DS-group #DG): Data inconsistency between replicas found, major, in node #<NODE> (task <TASKID>).
ITU Alarm Event Type	processingErrorAlarm (4)
ITU Alarm Probable Cause	databaseInconsistency (160)
ITU Alarm Perceived Severity	(4) - Major
Originating Source IP	Node IP where the alarm was raised.
Sequence Number	Number which indicates the order in which alarms were raised.

In Table 2, the indicated variables are as follows:

- <DG> is the DSG the DS cluster belongs to.
- <NODE> is the CUDB Node identifier the inconsistent slave replica is located at.
- <TASKID> is the identifier of the check task.

## 1.2 Prerequisites

This section provides information on the documents, tools, and conditions that apply to the procedure.

### 1.2.1 Documents

Before starting this procedure, ensure that you have read the following documents:

- *CUDB Node Fault Management Configuration Guide*, Reference [3], regarding alarm configuration.
- The section on the `cudbConsistencyMgr` command in *CUDB Node Commands and Parameters*, Reference [1].



- *CUDB LDAP Interwork Description*, Reference [4] and *CUDB Consistency Check*, Reference [2] regarding the LDAP tree log file and Consistency Check.
- *CUDB System Administrator Guide*, Reference [5] regarding the location of master replicas.
- *CUDB Backup and Restore Procedures*, Reference [6] regarding the combined unit data backup and restore procedure.
- *System Safety Information*, Reference [8].
- *Personal Health and Safety Information*, Reference [9].

### **1.2.2 Tools**

Not applicable.

### **1.2.3 Conditions**

Not applicable.





## 2 Procedure

When this alarm is raised, perform the following steps:

1. Locate and identify the Lightweight Directory Access Protocol (LDAP) tree log based on the `<DG>` and `<TASKID>` parameters in the alarm as follows:

Search for the `/local/cudb_ddci/replica_check/cudbDsuDiff_tree_TASKID*.xml` file on both System Controllers (SCs) of:

- Either the CUDB node that contained the master replica of the DSG with ID `<DG>` at the time the check was executed.
- Or, if the previous information is not known, all the CUDB nodes that hold a replica of the DSG with ID `<DG>`, except the current node.

**Note:** In case of 1+1+1 redundancy, this may mean two CUDB nodes to check.

2. Align the slave replica to its master in DSG with ID `<DG>` as follows:

- If this node is still a slave node of the DSG with ID `<DG>`, and the node where the LDAP tree log was found is still the master node of the DSG with ID `<DG>`, perform a combined unit data backup and restore on the DSG against this CUDB node.

**Note:** If the DSG has more than one slave, then consider ordering consistency check for the rest of slaves after restoring the backup.

- If this node (which was the checked slave at the time of the check) has become a DSG master node since raising the alarm, perform a combined unit data backup and restore on the DSG against the CUDB node where the LDAP tree log was found.

**Note:** Do not perform combined backup and restore if that has been done since the mastership change of the DSG.

Also, if the DSG has more than one slave, then consider ordering consistency check for the rest of slaves after restoring the backup.

- In any other case ignore the results. Consider that the DSG may not be consistent and further checks—involving the new master—are needed to verify it.
3. Perform the following steps to find subscribers impacted by data inconsistency:



- Analyze the LDAP tree log file to find the subscribers impacted by the data inconsistency.

For User Data Consolidation (UDC) application data (such as HLR or HSS), build a list of the impacted Distribution Entries (DEs, `mscId` and `assocId`; refer to *CUDB LDAP Interwork Description*, Reference [4] for further details). A DE is impacted if any of its child entries are included in the LDAP tree log file.

For example, if an entry with the `ImsShDynInfId=ImsShDynInf, IMPU=sip:262280000194171@ims.mnc280.mcc262.3gppnetwork.org, serv=IMS, assocId=194171, ou=associations, <rootDn>` DN shows up in the LDAP tree log file, then the `assocId=194171, ou=associations, <rootDn>` DE is impacted.

- Once the list of impacted DEs is ready, identify the related public identities for each impacted DE by running the following filtered LDAP query:

```
ldapsearch -Y CUDB-CRYPTO -h <cudbNodeVIP> -p 389 -U
<ldapRootUser> -W -b <impactedDistributionEntryDn> -s
subtree -a always | grep -E "^MSISDN|^IMSI|^IMPU|^
IMPI"
```

**Note:** A prompt to enter LDAP root user password will be shown.

- Validate the subscribers with those public identities, or consider reprovisioning them. Refer to the application Front End (FE) documentation for the procedure to validate or reprovision subscribers.
4. If the LDAP tree log contains internal error, notify the next level of support. To interpret the contents of the LDAP tree log, refer to *CUDB Consistency Check*, Reference [2].
  5. Clear the alarm manually as described in *CUDB Node Fault Management Configuration Guide*, Reference [3].

To find out where the master replicas are, refer to *CUDB System Administrator Guide*, Reference [5]. For further information about the combined unit data backup and restore procedure, refer to *CUDB Backup and Restore Procedures*, Reference [6].



## Glossary

For the terms, definitions, acronyms, and abbreviations used in this document, refer to *CUDB Glossary of Terms and Acronyms*, Reference [7].





## Reference List

### **CUDB Documents**

- [1] *CUDB Node Commands and Parameters*
- [2] *CUDB Consistency Check*
- [3] *CUDB Node Fault Management Configuration Guide*
- [4] *CUDB LDAP Interwork Description*
- [5] *CUDB System Administrator Guide*
- [6] *CUDB Backup and Restore Procedures*
- [7] *CUDB Glossary of Terms and Acronyms*

### **Other Ericsson Documents**

- [8] *System Safety Information*
- [9] *Personal Health and Safety Information*