

CUDB Counters List

LIST

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1 Introduction

This document lists the counters used in the Ericsson Centralized User Database (CUDB).

1.1 Document Purpose and Scope

This document provides information about the different counters made available by the CUDB. For further information on how to create and configure counters, refer to *CUDB Performance Guide*, Reference [1].

1.2 Revision Information

Rev. A

This document is based on 1/00651-CSH 109 067/9 with the following changes:

- Section 2.1 on page 3: Updated section regarding the configuration of LDAP FEs.
- Section 2.3.2 on page 14: Updated the description of `failedLdapRequests` in Table 28, and the range of `DSn`.

Rev. B

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

- Section 2.2.1 on page 4, Section 2.3.1 on page 11, and Section 2.3.2 on page 14: Updated with Key Performance Indicators (KPIs).

1.3 Typographic Conventions

Typographic conventions can be found in the following document:

- *Typographic Conventions*





2 Counter Descriptions

The following table shows a brief description of the counter fields that are provided by CUDB node. This information is shown in following chapters for each counter.

Table 1 Field Description in the Counters Tables

Field	Description
Counter name	Name of the counter as it will appear in the 3GPP XML output file
Counter group	Group to which this counter belongs.
Counter description	Brief explanation of the counter
Counter type	A counter may be a gauge (it may increase or decrease) or be cumulative (it always increases)
Triggering event	The event or events that may increase or decrease the counter

Note: The maximum size for cumulative counters is $2^{63}-1$. Counters are reset once they reach the maximum size.

2.1 LDAP Server Counters

These counters show information about the average of the number of LDAP operations. There is a counter per each possible LDAP server in the CUDB node.

Table 2 LDAP Server Transactions Counter n

Field	Description
Counter name	IdapTpsAtFrontEnd n
Counter group	LdapFrontEnds
Counter description	Number of LDAP operations per second being carried out by LDAP server number n
Counter type	Gauge
Triggering event	LDAP requests

TPS counter values are initialized to -2 for all LDAP Front Ends (FEs) that can be configured in a CUDB node, that is, LDAP FEs 1 to 34, and will be updated by the LDAP counters process after that.

Typically, CUDB nodes will not be fully configured with all possible LDAP FEs. TPS counters for non-configured LDAP FEs will keep the -2 value.



It is possible that, at the time the LDAP counters process tries to get information from an LDAP FE, the LDAP FE is down or not responding. TPS counters for configured but not-responding LDAP FEs will have a -1 value.

Note: Where n is the number of the LDAP server, from 1 to 34.

Note: This counter is incremented both by external LDAP operations received from application FEs connected to CUDB and by internal LDAP operations (that is, dummy LDAP searches used to monitor the LDAP servers).

2.2 LDAP Node Counters

These counters provide information about the LDAP requests handled by a CUDB node.

Note: Only SEARCH, MODIFY, ADD, or DELETE LDAP requests are counted. BIND, UNBIND LDAP requests or requests with invalid syntax or referring to not configured schemas are not counted.

2.2.1 Overall LDAP Node Counters

This set of counters provide information about how all the LDAP requests received in the CUDB node are handled. These counters indirectly offer a summary of how the CUDB system as a whole is performing when looking at it from this CUDB node.

Table 3 LDAP Requests Received

Field	Description
Counter name	receivedLdapReqsTotal
Counter group	LdapNodeOverall
Counter description	Number of LDAP requests received in the CUDB node
Counter type	Cumulative
Triggering event	LDAP requests

Table 4 LDAP Requests Processed Locally

Field	Description
Counter name	processedLdapReqsLocalNode
Counter group	LdapNodeOverall



Field	Description
Counter description	Number of LDAP requests processed locally, answered by querying any of the local database clusters, PLDB or DSs. This counter only considers the database cluster where the actual data related to the LDAP request is stored; PLDB lookups to figure out where (in which DSG) the requested piece of data are not counted here.
Counter type	Cumulative
Triggering event	LDAP requests

Table 5 LDAP Requests Processed at Other Nodes

Field	Description
Counter name	processedLdapReqsRemoteNodes
Counter group	LdapNodeOverall
Counter description	Number of LDAP requests processed at other nodes. This counter includes LDAP requests that were proxied to another CUDB node in the system and that were processed locally there or proxied again and processed locally in a third CUDB node.
Counter type	Cumulative
Triggering event	LDAP requests

Table 6 LDAP Requests Dropped Because the Local LDAP Servers are Overloaded

Field	Description
Counter name	droppedLdapReqsLocalLdapLayer
Counter group	LdapNodeOverall
Counter description	Number of LDAP requests dropped because the local LDAP servers are overloaded
Counter type	Cumulative
Triggering event	LDAP requests

Table 7 LDAP Requests Dropped Because the Local Clusters are Overloaded

Field	Description
Counter name	droppedLdapReqsLocalClusters
Counter group	LdapNodeOverall



Field	Description
Counter description	Number of LDAP requests dropped because the local database clusters are overloaded. This counter includes: <ul style="list-style-type: none">• LDAP requests dropped by the LDAP FEs because the clusters are overloaded• LDAP requests where any of the related database operations was rejected by the local cluster itself due to overload.
Counter type	Cumulative
Triggering event	LDAP requests

Table 8 LDAP Requests Failed to be Processed Locally

Field	Description
Counter name	failedLdapReqsLocalNode
Counter group	LdapNodeOverall



Field	Description
Counter description	<p>Number of LDAP requests failed to be processed locally. This counter includes:</p> <ul style="list-style-type: none"> • LDAP requests intended to be processed at the master replica of a masterless DSG or PLDB • LDAP requests intended to be processed at the master replica of a DSG (or PLDB) when a master election is ongoing • LDAP requests received while the local replica of PLDB is down • LDAP requests intended to be processed at a DSG when no replica of that DSG is available • LDAP requests intended to be processed at a local DS (or PLDB) when the local cluster happens to be unreachable • Write LDAP requests on an entry which is blocked during reallocation when the master replica of the DSG storing that LDAP entry is hosted in the local node • Write LDAP requests on a DSG (or PLDB) whose master replica is hosted in the local node and is full • LDAP requests not processed due to thread limits in the LDAP FE • LDAP search requests intended to be handled locally that were not answered within the time limit set for the operation
Counter type	Cumulative
Triggering event	LDAP requests

Table 9 LDAP Requests not Processed at Other Nodes

Field	Description
Counter name	nonProcessedLdapReqsRemoteNodes
Counter group	LdapNodeOverall



Field	Description
Counter description	<p>Number of LDAP requests not processed on other nodes. This counter includes every kind of operation to be processed on a different node but that was not, because:</p> <ul style="list-style-type: none">• they were proxied to another node but turned out to be "Dropped Because the Local LDAP FEs Are Overloaded", "Dropped Because the Local Clusters Are Overloaded" or "Failed to Be Processed Locally" operations in that remote node• they were proxied to another node but the time limit for the operation was reached before a response was received from the remote node
Counter type	Cumulative
Triggering event	LDAP requests

Table 10 Processing Capacity Used by LDAP Requests

Field ⁽¹⁾	Description
KPI name	kpiLdapFeLoad
KPI group	LdapNodeOverall
KPI description	Processing capacity used by LDAP requests, in % ⁽²⁾
KPI type	Gauge
Triggering event	LDAP requests

(1) Valid for CUDB systems deployed on native BSP 8100 only.

(2) The average of the LDAP FE load of the associated virtual cores within the node for the previous 15 minute monitoring period.

Table 11 Percentage of LDAP Requests Dropped Because LDAP FE is Overloaded

Field ⁽¹⁾	Description
KPI name	kpiRatioDroppedLdap
KPI group	LdapNodeOverall
KPI description	Ratio of LDAP requests dropped due to the overload of the local LDAP FE over the total number of LDAP requests received during the same period, in ‰ ⁽²⁾
KPI type	Gauge
Triggering event	LDAP requests

(1) Valid for CUDB systems deployed on native BSP 8100 only.

(2) Calculated as the average of the values collected during the previous 15 minute monitoring period.



The following relationship holds among the above counters:

$$\begin{aligned} \text{receivedLdapReqsTotal} = & \text{processedLdapReqsLocalNode} + \\ & \text{processedLdapReqsRemoteNodes} + \text{droppedLdapReqsLocalLdapLayer} \\ & + \text{droppedLdapReqsLocalClusters} + \text{failedLdapReqsLocalNode} + \\ & \text{nonProcessedLdapReqsRemoteNodes} \end{aligned}$$

2.2.2

Per-Application Group LDAP Node Counters

This subset of counters provides information about the LDAP requests handled by a CUDB node on a per-application group basis. LDAP users can be mapped to application groups by means of a configuration parameter, `countersGroup`, part of the `CudbLdapUser` class. For details on this parameter, refer to *CUDB Node Configuration Data Model Description*, Reference [2].

There are four configurable application groups, `AppGroup n` , with n ranging from 1 to 4. A fifth, "catch all", application group gathers any LDAP users not assigned to one of the four configurable application groups.

Table 12 LDAP Requests Received from LDAP Users Belonging to Application Group n

Field	Description
Counter name	<code>receivedLdapReqsAppGrpn</code>
Counter group	<code>LdapNodePerApplication</code>
Counter description	Number of LDAP requests received from LDAP users belonging to application group n
Counter type	Cumulative
Triggering event	LDAP requests

Table 13 LDAP Requests Received from LDAP Users Belonging to Application Group n That Were Processed

Field	Description
Counter name	<code>processedLdapReqsAppGrpn</code>
Counter group	<code>LdapNodePerApplication</code>
Counter description	Number of LDAP requests received from LDAP users belonging to application group n and that were processed
Counter type	Cumulative
Triggering event	LDAP requests



Table 14 LDAP Requests Received from LDAP Users Belonging to application Group n That Were Dropped or Failed to Be Processed

Field	Description
Counter name	droppedAndFailedLdapReqsAppGrp n
Counter group	LdapNodePerApplication
Counter description	Number of LDAP requests received from LDAP users belonging to application group n and that were: <ul style="list-style-type: none">• dropped because any of the components in the CUDB was overloaded, or• failed to be processed due to one of the reasons indicated in Table 8
Counter type	Cumulative
Triggering event	LDAP requests

Table 15 LDAP Requests Received from LDAP Users That Do Not Belong to Any Application Group

Field	Description
Counter name	receivedLdapReqsCatchAll
Counter group	LdapNodePerApplication
Counter description	Number of LDAP requests received from LDAP users that do not belong to any of the four configurable application groups
Counter type	Cumulative
Triggering event	LDAP requests

Table 16 LDAP Requests Received from LDAP Users That Do Not Belong to Any Application Group That Were Processed

Field	Description
Counter name	processedLdapReqsCatchAll
Counter group	LdapNodePerApplication
Counter description	Number of LDAP requests received from LDAP users that do not belong to any of the four configurable application groups and that were processed
Counter type	Cumulative
Triggering event	LDAP requests



Table 17 LDAP Requests Received from LDAP Users That Do Not belong to Any Application Group That Were Dropped or Failed to Be Processed

Field	Description
Counter name	droppedAndFailedLdapReqsCatchAll
Counter group	LdapNodePerApplication
Counter description	<p>Number of LDAP requests received from LDAP users that do not belong to any of the four configurable application groups and that were:</p> <ul style="list-style-type: none"> • dropped because any of the components in the CUDB was overloaded, or • failed to be processed due to one of the reasons indicated in Table 8
Counter type	Cumulative
Triggering event	LDAP requests

The following relationship holds among the above counters:

$$\text{receivedLdapReqsAppGrpn} = \text{processedLdapReqsAppGrpn} + \text{droppedAndFailedLdapReqsAppGrpn}$$

$$\text{receivedLdapReqsCatchAll} = \text{processedLdapReqsCatchAll} + \text{droppedAndFailedLdapReqsCatchAll}$$

2.3 Per Database Cluster Counters

2.3.1 PLDB Cluster Counters

This set of counters provides information about the local PLDB database cluster. Some counters report how the cluster is performing as far as LDAP processing is concerned. Other counters reports cluster memory usage and used processing capacity.

PLDB lookups to figure out where (in which DSG) the requested piece of data is are counted here. So, if an LDAP operation involves a PLDB lookup and after that one or several other databases are accessed, the counters incremented are: a PLDB counter and a counter for each of the other databases that have been accessed.

Note: Only SEARCH, MODIFY, ADD or DELETE LDAP requests are counted. BIND, UNBIND LDAP requests or requests with invalid syntax or referring to not configured schemas are not counted.

*Table 18 LDAP Requests That Required Access to the PLDB Cluster*

Field	Description
Counter name	intendedLdapRequests
Counter group	Pldb
Counter description	Number of LDAP requests that required access to the PLDB
Counter type	Cumulative
Triggering event	LDAP requests

Table 19 LDAP Requests That Actually Accessed the PLDB

Field	Description
Counter name	processedLdapRequests
Counter group	Pldb
Counter description	Number of LDAP requests that actually accessed the PLDB.
Counter type	Cumulative
Triggering event	LDAP requests

Table 20 LDAP Requests Dropped Because the PLDB Cluster Is Overloaded

Field	Description
Counter name	droppedLdapRequests
Counter group	Pldb
Counter description	Number of LDAP requests dropped because the PLDB is overloaded. This counter includes: <ul style="list-style-type: none">• LDAP requests dropped by the LDAP FEs (first line of defense) because the cluster is overloaded, and• LDAP requests where any of the related database operations was rejected by the local cluster itself due to overload.
Counter type	Cumulative
Triggering event	LDAP requests

Table 21 LDAP Requests Failed to Be Processed by the PLDB

Field	Description
Counter name	failedLdapRequests
Counter group	Pldb



Field	Description
Counter description	Number of LDAP requests failed to be processed by the PLDB. These would fall in one of the following cases: <ul style="list-style-type: none"> LDAP requests intended to be processed at the local PLDB when the local PLDB happens to be unreachable Write LDAP requests on the PLDB when the master replica is hosted in the local node and is full
Counter type	Cumulative
Triggering event	LDAP requests

Table 22 PLDB Cluster Memory Usage

Field ⁽¹⁾	Description
KPI name	memoryUsage
KPI group	Pldb
KPI description	Used database memory pages over total database memory pages, in %
KPI type	Gauge
Triggering event	Changes in the amount of data stored in PLDB

(1) Valid for CUDB systems deployed on native BSP 8100 only.

Table 23 Used Processing Capacity of the PLDB Cluster

Field ⁽¹⁾	Description
KPI name	kpiClusterLoad
KPI group	PLDB load indicator
KPI description	Used processing capacity of the PLDB cluster, in %. ⁽²⁾
KPI type	Gauge
Triggering event	PLDB cluster requests

(1) Valid for CUDB systems deployed on native BSP 8100 only.

(2) The average value of the peak PLDB load in the associated virtual cores for the previous 15 minute monitoring period.

Table 24 Percentage of LDAP Requests Dropped Because PLDB is Overloaded

Field ⁽¹⁾	Description
KPI name	kpiRatioDroppedCluster
KPI group	PLDB dropped LDAP requests ratio indicator



Field ⁽¹⁾	Description
KPI description	Ratio of LDAP requests dropped due to the overload of PLDB, including requests dropped by the LDAP FE and by the local cluster, over the total number of LDAP requests that attempted to access PLDB during the same period, in ⁰ / ₁₀₀₀ . ⁽²⁾
KPI type	Gauge
Triggering event	PLDB cluster requests

(1) Valid for CUDB systems deployed on native BSP 8100 only.

(2) Calculated as the average of the values collected during the previous 15 minute monitoring period.

2.3.2 DS Cluster Counters

These sets of counters provide information about each of the local DS_n database clusters, with *n* ranging from 1 to 17. Some counters report how the DS_n cluster is performing as far as LDAP processing is concerned. Other counters report DS_n cluster memory usage and used processing capacity.

Note: Only SEARCH, MODIFY, ADD or DELETE LDAP requests are counted. BIND, UNBIND LDAP requests or requests with invalid syntax or referring to not configured schemas are not counted.

Table 25 LDAP Requests That Required Access to DS_n

Field	Description
Counter name	intendedLdapRequests
Counter group	DS _n
Counter description	Number of LDAP requests that required access to DS _n
Counter type	Cumulative
Triggering event	LDAP requests

Table 26 LDAP Requests That Actually Accessed DS_n

Field	Description
Counter name	processedLdapRequests
Counter group	DS _n
Counter description	Number of LDAP requests that actually accessed DS _n
Counter type	Cumulative
Triggering event	LDAP requests



Table 27 LDAP Requests Dropped Because DSn Is Overloaded

Field	Description
Counter name	droppedLdapRequests
Counter group	Dsn
Counter description	<p>Number of LDAP requests dropped because DSn is overloaded. This counter includes:</p> <ul style="list-style-type: none"> • LDAP requests dropped by the LDAP FEs (first line of defense) because the cluster is overloaded. • LDAP requests where any of the related database operations was rejected by the local cluster itself due to overload. <p>Note: In case of LDAP search operations that affect several DSs, if the operation is rejected due to overload in any of the DSs, this counter will be incremented for all the affected DSs and not for just the ones overloaded.</p>
Counter type	Cumulative
Triggering event	LDAP requests

Table 28 LDAP Requests Failed to be Processed by DSn

Field	Description
Counter name	failedLdapRequests
Counter group	Dsn
Counter description	<p>Number of LDAP requests failed to be processed by DSn. LDAP requests are intended to be processed at a local DS when that local DS happens to be unreachable.</p> <p>Note: Even though it may seem reasonable to also count as failed operations for a DS those that fail either because of a lock due to reallocation, they will not be counted as such. In these cases, the overall counter for failed operations will be incremented as well as the one for processed operations in the per local cluster counters group for the PLDB but no update will be done on the per local cluster counters for the target DS.</p> <p>Note: In case of LDAP search operations that affect several DSs, if the processing in any of the DS fails, this counter will be incremented for all the affected DSs and not for just the ones for which the operation failed.</p>



Field	Description
Counter type	Cumulative
Triggering event	LDAP requests

Table 29 DS Cluster Memory Usage

Field ⁽¹⁾	Description
KPI name	memoryUsage
KPI group	Dsn
KPI description	Used database memory pages over total database memory pages, in %
KPI type	Gauge
Triggering event	Changes in the amount of data stored in DS _n

(1) Valid for CUDB systems deployed on native BSP 8100 only.

Table 30 Used Processing Capacity of the DS_n Cluster

Field ⁽¹⁾	Description
KPI name	kpiClusterLoad
KPI group	DSG load indicator
KPI description	Used processing capacity of the DS _n cluster, in %. ⁽²⁾
KPI type	Gauge
Triggering event	DS _n cluster requests

(1) Valid for CUDB systems deployed on native BSP 8100 only.

(2) The average value of the peak PLDB load in the associated virtual cores for the previous 15 minute monitoring period.

Table 31 Percentage of LDAP Requests Dropped Because DS_n is Overloaded

Field ⁽¹⁾	Description
KPI name	kpiRatioDroppedCluster
KPI group	Dropped LDAP requests ratio indicators
KPI description	Ratio of dropped LDAP requests due to overload of the DS _n , including requests dropped by the LDAP FE and by the local cluster, over the total number of LDAP requests that attempted to access DS _n during the same period, in ⁰ / ₁₀₀₀ . ⁽²⁾



Field ⁽¹⁾	Description
KPI type	Gauge
Triggering event	DS _n

(1) Valid for CUDB systems deployed on native BSP 8100 only.

(2) Calculated as the average of the values collected during the previous 15 minute monitoring period.

2.4 Notifications Counters

These counters show information about notifications sent to other application FEs. For more details, refer to *CUDB Notifications*, Reference [3].

Table 32 Notifications Counter

Field	Description
Counter name	notificationsSent
Counter group	SoapNotifications
Counter description	The accumulated number of total notifications sent from a CUDB node
Counter type	Cumulative
Triggering event	Any event configured in CUDB to trigger a notification.

Table 33 Failed Notifications counter

Field	Description
Counter name	notificationsFailed
Counter group	SoapNotifications
Counter description	The accumulated number of failures detected in the acknowledgement from notification recipients, accounted per CUDB node
Counter type	Cumulative
Triggering event	Any faulty acknowledgement to a notification sent by any CUDB node.





Glossary

For the terms, definitions, acronyms and abbreviations used in this document, refer to *CUDB Glossary of Terms And Acronyms*, Reference [4].





Reference List

CUDB Documents

- [1] *CUDB Performance Guide*
- [2] *CUDB Node Configuration Data Model Description*
- [3] *CUDB Notifications*
- [4] *CUDB Glossary of Terms And Acronyms*