

# CUDB LDAP Schema Management

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## FACILITY DESCRIPTION

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# 1 Introduction

This document provides a description for the Lightweight Directory Access Protocol (LDAP) Schema Management function of the Ericsson Centralized User Database (CUDB).

## 1.1 Scope

The purpose of this document is to describe the main features of LDAP Schema Management and the LDAP Management Tools provided to translate application-based LDAP schemas.

## 1.2 Revision Information

This section contains the changes in the feature between the releases of this document.

### **Rev. A**

This document is based on 11/155 34-HDA 104 03/9 with the following changes:

- Section 3.1.2 on page 7: Updated information on function availability. Updated BLOB list item.

## 1.3 Target Groups

This document is intended for personnel configuring, maintaining or updating CUDB LDAP schemas.

## 1.4 Prerequisites

Users of this document must have a basic knowledge of CUDB and the LDAP service.

To launch and configure the LDAP service, the following schema files are required:

- `core.schema`

`core.schema` is an OpenLDAP schema that provides the core LDAP functionality.

This file is provided by CUDB.

- `cudb.schema`



`cudb.schema` contains the `objectClasses` and attributes used in the predefined entries that build up the basic LDAP DIT. These attributes and `objectClasses` are also used by applications for their own entries.

This file is provided by CUDB.

- `internal_cudb.schema`

`internal_cudb.schema` contains the internal CUDB attributes and `objectClasses` that are not meant to be accessed by applications.

This file is provided by CUDB.

- Application schema(s)

Applications to be integrated with CUDB must provide their own schema files that define the `objectClasses` and attributes used by the applications. Applications can provide one or multiple schema files. The file name is not fixed by CUDB. Schema files that contain `objectClasses` and attributes shared among multiple applications are also supported. However, `objectClasses` and attribute definitions can not be repeated in different LDAP schemas.

Application schema files are provided by the applications either during CUDB installation or during system uptime.

- `identities.schema`

`identities.schema` contains the LDAP attributes and `objectClasses` used to create identities, special CUDB entries that facilitate searching in the database by acting as search input, such as network identifiers (MSISDN or IMSI).

**Note:** CUDB supports only one `identities.schema` file used by all the applications. Therefore, it must contain all the identities used by installed applications.

The identities are provided by the applications.

## 1.5 Typographic Conventions

Typographic conventions can be found in the following document:

- *Typographic Conventions*



## 2 Overview

CUDB is a distributed database system exposed as an LDAP directory. CUDB provides a basic LDAP Directory Information Tree (DIT) to support the storage and query of application data. For more information on the LDAP DIT, refer to *CUDB LDAP Interwork Description*, Reference [1].

Modifications and updates of the LDAP schemas are performed by using the CUDB Schema Management Tools.

### 2.1 Architecture

This section is not applicable to this feature.

### 2.2 Description

The CUDB Schema Management Tools are used to perform the translation between the LDAP application schemas and the CUDB internal database structure, and (with certain limitations) to update existing LDAP schemas already loaded in CUDB. For more information on schema update, refer to *CUDB Node Schema Update*, Reference [2].

The CUDB Schema Management Tools consist of two programs:

- **CUDB Schema Conversion Tool**

The tool is used to add new LDAP schemas during CUDB installation or system uptime. See Section 2.2.1 on page 3 for more information.

- **CUDB Schema Update Tool**

The tool is used to modify LDAP schemas already loaded on CUDB. See Section 2.2.2 on page 4 for more information.

- **CUDB Schema Management GUI**

The tool is a graphical application that allows LDAP schema files edition. See Section 2.2.3 on page 4 for more information.

Application schemas must meet specific requirements in order to be used by these tools.

#### 2.2.1 CUDB Schema Conversion Tool

The CUDB Schema Conversion Tool is a stand-alone tool running under GNU/Linux with Bash shell environment.



New application schemas can be integrated into CUDB both during system installation and system uptime. However, the application LDAP schema files must be converted with the CUDB Schema Conversion Tool before integration.

To integrate a new application schema, a set of files must be provided for CUDB to setup the internal data model. These files must be generated by using the CUDB Schema Conversion Tool. The tool converts the LDAP application schemas into internal database structures handled by CUDB. The output of this tool is a set of files that can be used both during the CUDB installation process, and when updating CUDB node schemas. For more information on updating node schemas, refer to *CUDB Node Schema Update*, Reference [2].

For information on configuring the CUDB Schema Conversion Tool, see Section 3.1 on page 7.

**Note:** This tool is to be used only by Ericsson personnel.

### 2.2.2 CUDB Schema Update Tool

The CUDB Schema Update Tool is a stand-alone tool running under GNU/Linux with BASH shell environment and Java. The tool is used to update existing LDAP application schemas during CUDB system uptime.

The CUDB Schema Update Tool supports LDAP schema updates in CUDB by comparing the currently loaded schema files with the modified schema files, then generating the files required to update the internal database structures in the CUDB nodes. If the update is not possible, the tool generates a report of the differences blocking the update. Refer to *CUDB Node Schema Update*, Reference [2] for more information on update restrictions.

The output of this tool is a set of files used during the CUDB node schema update procedure to update the internal database structures. Refer to *CUDB Node Schema Update*, Reference [2] for more information on the update procedure.

For information on configuring the CUDB Schema Update Tool, see Section 3.2 on page 8.

**Note:** This tool is to be used only by Ericsson personnel.

### 2.2.3 CUDB Schema Management GUI

The CUDB Schema Management GUI is a standalone application running in any Linux environment with Java. This tool is used to manage LDAP schema files.

The Schema Management GUI provides different interfaces for modifying specific data: Schemas, Object Classes and Attributes.

Refer to *CUDB LDAP Schema Management Graphical User Interface*, Reference [3], for more information about the Schema Management GUI.





## 2.3 Dependencies and Interactions

This section is not applicable to this feature.





## 3 Operation and Maintenance

This section describes the configuration of the CUDB Schema Management tools.

### 3.1 Configuring the CUDB Schema Conversion Tool

The CUDB Schema Conversion Tool must be installed and configured before running it. Configuration consists of two main steps: providing a set of required schema files, and modifying the configuration file of the tool.

#### 3.1.1 Schema Files Required by the CUDB Schema Conversion Tool

The schema files required by the CUDB Schema Conversion Tool are as follows:

- `identities.schema` containing all identity attributes and `objectClasses` used in the CUDB.
- Application schemas, containing all attributes and `objectClasses` used by an application.

#### 3.1.2 Modifications Required in the CUDB Schema Conversion Tool Configuration File

The configuration file of the CUDB Schema Conversion Tool must be modified to contain the following information necessary for schema conversion:

- The operator suffix corresponding to the CUDB schema deployment.
- If application Front Ends (FEs) require object classes with service prefixes, then the prefix of the service to which the object classes of the application schemas are assigned. All application object class names must start with the same prefix. For example, the object classes of a service named ABC must be named `ABCObject1`, `ABCObject2`, and so on.
- Due to the LDAP Data Views function, it can occur that application FEs require object classes without service prefixes. In such cases, the service directive for each such application must be present in the tool configuration file, followed by the application name and the location of the appropriate schema file. In this case, the service name must not be included in the configuration file `services` directive.

**Note:** The LDAP Data Views function can only be used if the Application Facilitator Value Package is available.



- The object classes to be added only to the Processing Layer Database (PLDB).
- The object classes to be added only to the Data Storage Unit Group (DSG).
- The identities used by the application.
- Binary Large Object (BLOB) object classes that must be kept on the disk storage system.

## 3.2 Configuring the CUDB Schema Update Tool

The CUDB Schema Update Tool must be installed and configured before running it. Configuration consists of two main steps: providing a set of required files, and modifying the configuration file of the tool.

### 3.2.1 Files Required by the CUDB Schema Update Tool

The files required by the CUDB Schema Conversion Tool are as follows:

- The LDAP schema files currently loaded in the system.
- The modified LDAP schema files.
- The SQL files generated for the LDAP schema files currently loaded in the system.

### 3.2.2 Modifications Required in the CUDB Schema Update Tool Configuration File

The configuration file of the CUDB Schema Update Tool must be modified to contain the following information necessary for schema updates:

- The path of the LDAP schema files.
- The path of the SQL files.
- The prefix of the application to which the object classes of the application schemas are assigned.
- The object classes to be added only to the PLDB.
- The object classes to be added only to the DSGs.

For further information on performing schema updates in CUDB, refer to *CUDB Node Schema Update*, Reference [2].



### 3.3 Fault Management

This section is not applicable to this feature.

### 3.4 Performance Management

This section is not applicable to this feature.





## 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 LDAP Interwork Description*
- [2] *CUDB Node Schema Update*
- [3] *CUDB LDAP Schema Management Graphical User Interface*
- [4] *CUDB Glossary of Terms and Acronyms*