A MITEL
PRODUCT
GUIDE

Unify OpenScape 4000 Manager

Feature Description

Feature Description
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Mitel

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Contents

1 Preliminary Remarks on Feature Description

1.1 Feature Description

The feature description provides an overview of OpenScape 4000 Manager and its modules.

1.2 Target Group

The Feature Description is primarily intended for the following groups:

- Customer account managers
- Consultants and Solution architects

1.3 Scope and Content of Feature Description

OpenScape 4000 Manager V10 is the latest management platform for OpenScape 4000 systems and OpenScape 4000 networks. This description refers exclusively to the feature scope in conjunction with the OpenScape 4000 V10 communication platform.

It gives users an overview of the OpenScape 4000 Manager concept, presenting the modules and the way they interact with external applications.

This is followed by a description of the individual OpenScape 4000 Manager modules.

Associated applications such as HiPath User Management (UM), OpenScape Accounting Management (AM), and OpenScape Fault Management (FM) are not described in detail. They are only covered in this document to the extent that is necessary for understanding the functions of OpenScape 4000 Manager.

1.4 Differentiation From Other User Manuals

A description in terms of a user manual (masks, menu items, operating steps, etc.) will not be provided. This information can be obtained from the relevant service and user manuals. The same applies to service-relevant topics such as installation, implementation, AMOs, parameter descriptions, etc.

1.5 Scope of Validity

This feature description is applicable for sales Germany and the international markets.

2 OpenScape MetaManagement

2.1 OpenScape MetaManagement Concept

OpenScape MetaManagement covers all the components required for administering and maintaining OpenScape products in a corporation-wide communications environment. OpenScape MetaManagement includes special management products and components that are themselves components of OpenScape products. The application-specific management components are known as the Element Manager.

OpenScape 4000 Manager is the corresponding element manager for OpenScape 4000. It is a central component in OpenScape MetaManagement. The OpenScape Management applications, such as OpenScape Fault Management and OpenScape Accounting Management, can be integrated in OpenScape 4000 Manager via the existing standard interfaces.

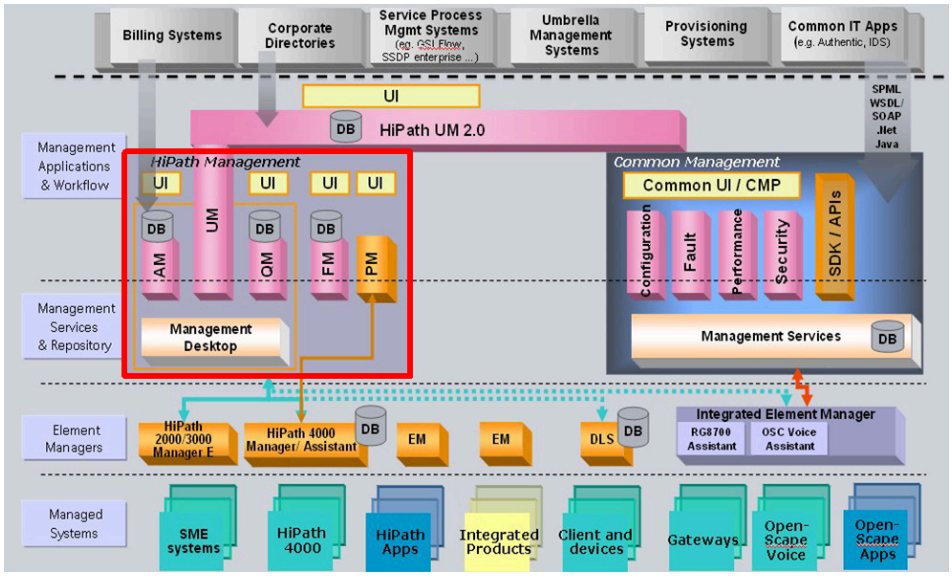

Figure 1: Management Architecture

2.2 OpenScape 4000 Management

OpenScape 4000 Management is a component of the OpenScape Meta Management concept and includes the element manager for OpenScape 4000 and a range of special management and administration applications.

OpenScape 4000 Assistant:

OpenScape 4000 Assistant supports basic management functions for single OpenScape 4000 systems:

- Configuration Management (CM for stand alone systems)
- Switch Diagnosis Support
- Inventory Management (board administration)
- Fault Management

- Performance Management
- Collecting agent (COL)
- Automatic Data Synchronization
- SNMP Support Interface
- License Management Tool (LMT)

These administration functions can be accessed via the Web. They can be accessed directly or over the OpenScape 4000 Manager user interface.

OpenScape 4000 Manager:

OpenScape 4000 Manager provides enhanced administration functions for OpenScape 4000 standalone systems and OpenScape 4000 networks. The following network-wide functions are supported by OpenScape Manager 4000:

- Configuration Management (CM) (CM for networks)
- Performance Management (PM)
- Collecting Agent (COL)
- High Availability Solution
- OpenScape 4000 License Management Tool
- Encrypted XIE Web server Interface
- SNMP Support

OpenScape Management applications:

The following OpenScape Management applications can be integrated in an OpenScape 4000 Manager environment:

- OpenScape Fault Management (OpenScape FM)
- OpenScape Accounting Management OpenScape AM)
- HiPath User Management (HiPath UM)

Concept

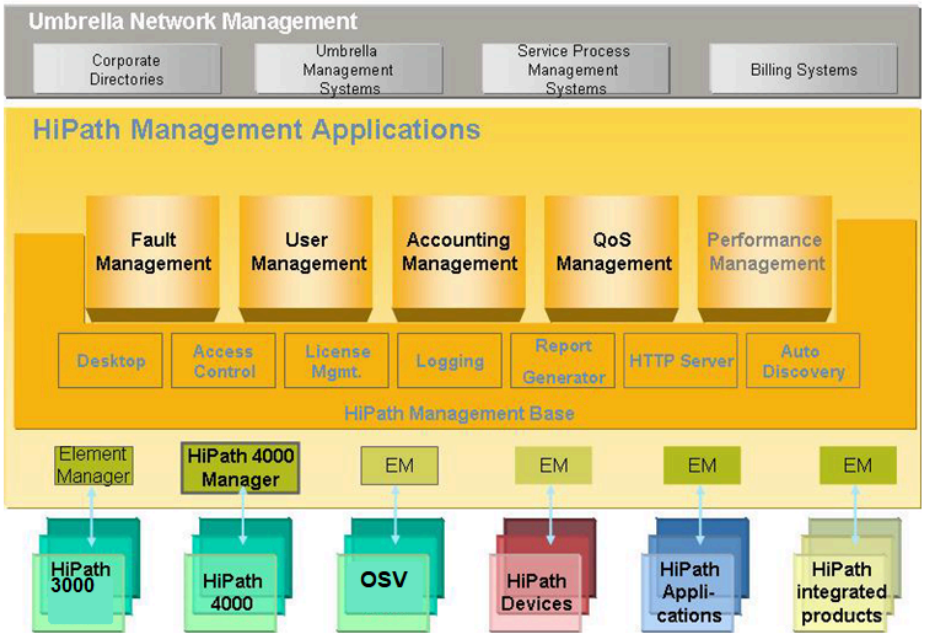

Figure 2: OpenScape 4000 Management Configuration Overview

You can access the individual OpenScape 4000 Assistant or OpenScape 4000 Manager modules via a Web browser.

2.2.1 Overview of OpenScape 4000 Assistant

OpenScape 4000 Assistant is the management solution for OpenScape 4000 standalone systems. As an integral component in every OpenScape 4000 system, OpenScape 4000 Assistant offers basic management functions that are required for configuring and monitoring standalone systems.

OpenScape 4000 Assistant can be used both on standalone systems via direct Web access from a client PC and in networks via the external OpenScape 4000 Manager server.

2.2.1.1 Configuration Management

Configuration Management allows the efficient and extensive configuration of the entire OpenScape 4000 system. This includes the administration of subscriber devices (system phones, IP and cordless phones), centralized configuration of Least Cost Routing (LCR) and the administration of personal data (name, company, location). Trunks and boards and individual key layouts are easy to configure with the intuitive graphical user interface. The GUI supports the user in executing changes consistently and efficiently by performing complex logical checks and providing multiple help options. Up to 85% of all administration tasks can thus be performed with the Web-based GUI. Any additional configuration tasks can be performed in expert mode by direct use of operating commands.

2.2.1.2 Performance Management

Performance Management (PM):

- provides statistical information on trunk or line load behavior
- analyzes call patterns of subscribers, hunt groups, attendant consoles and attendant console groups and load patterns on the switch processors

2.2.1.3 Switch Diagnosis Support

The real time diagnosis system (RDS) permits line monitoring and error localization.

2.2.1.4 Backup and Restore

This tool provides the automatic and time scheduled archiving of configuration and user data to a local system drive or a back up server.

2.2.1.5 Inventory Management

This tool provides information about the hardware, software and loadware installed on the OpenScape 4000 system.

2.2.1.6 Fault Management

Integration of OpenScape Fault Management in OpenScape 4000 Assistant for service usage (grace period free of charge) or, as an option, with full functionality.

2.2.1.7 Automatic Data Synchronization

Configuration changes made in OpenScape 4000 Assistant are instantly synchronized with the database of the relevant system and take immediate effect.

2.2.1.8 Test Simulation of Key Function Activity (TSKA)

The TSKA application lets OpenScape 4000 Assistant users display and simulate optiPoint and OpenStage telephones (CorNet TS and HFA, non-local functions and SIP variants). TSKA reproduces the following information:

- display messages
- LED status
- function key allocation
- self-labeling key texts

The user can simulate the actuation of function keys and keys on the keypad. The device is graphically displayed in the browser window to let the user do this.

2.2.1.9 TDM Software Deployment Manager (TSDM)

The TSDM application lets OpenScape 4000 Assistant users distribute software to telephones in the OpenStage series (TDM variant). The software can be distributed manually, automatically or on schedule. TSDM also allows users to start and query trace files.

2.2.1.10 SNMP Support

OpenScape 4000 Assistant features an "SNMP Support" function. This option forward error and alarm messages directly as SNMP-compliant messages to one or more network management systems (such as OpenScape Fault Management).

Inventory data from a OpenScape 4000 system can also be accessed over this interface ("get function" in SNMP).

Supported versions: SNMP v1 and SNMP v3

2.2.1.11 OpenScape 4000 CSTA support

OpenScape 4000 Assistant features an "OpenScape 4000 CSTA support" function. This contains:

- distribution and activation of CSTA Software
- single sign on to CSTA-GUI from OpenScape 4000 Assistant GUI
- Backup and restore of OpenScape 4000 CSTA data

2.2.1.12 Gateway Dashboard

The Gateway Dashboard application provides detailed overview of Gateways connected to Assistant (configured in RMX). Only boards known to the operations technology of the OpenScape 4000 system are displayed.

The application provides:

- Hierarchical list of OpenScape gateway boards and OpenScape Access modules currently connected and configured on Assistant
- description of type and functionality of them
- current loadware versions of all boards
- current status of all boards
- further, detailed information about all boards
- SSH and Web access to OpenScape gateways
- SSH, Web and SFTP link to SoftGate

2.2.1.13 Collecting agent

The Collecting Agent in OpenScape 4000 Assistant collects all records from the OpenScape 4000 system, filters them and makes them available to other applications in separate files. The call details collected are known as enhanced call data records (CDRe). These are not only used for calculating call charges, but also provide the information required for Performance Management.

2.2.1.14 License Management Tool (LMT)

The license used for OpenScape 4000 are managed by LMT. LMT use CLC for getting license information and based on this the LMT generate and activate codeword on the OpenScape 4000.

2.2.1.15 IPTrace

IPTrace provides a centralized trace collection solution for service technicans, BLS and GVS (also remote access via SIRA). IPTrace produces log files containing error messages, and if set, additional debugging information.

Only STMI and NCUI boards which include rpcap deamon are supported. Other boards and Softgate are not supported.

2.2.1.16 Java Husim Phone Tester (J- HPT Web)

Java Husim Phone Tester (J-HPT) for Web is a web tool to remotely control OpenStage telephones via the internet/intranet. It is used to simply reproduce the real phone behavior in a web interface and to generate events to be sent to the controlled phones.

2.2.2 Overview of OpenScape 4000 Manager

2.2.2.1 Configuration Management

Configuration Management (CM) provides **network-wide**, consistent administration functions for all aspects of subscriber management, lines and trunks. Configuration Management is used to for administration; this ensures that approximately 85% of all operating commands (AMO commands) can be performed via a user-friendly, Web-based user interface. Any additional configuration tasks can be performed in expert mode by direct use of operating commands.

2.2.2.2 Performance Management

Performance Management (PM) is based on the evaluation of call detail records and:

- provides statistical information on trunk and line load behavior. PM supports mixed networks of OpenScape 4000 systems.
- analyzes call patterns of subscribers, hunt groups, attendant consoles and attendant console groups and load patterns on the switch processors.

The call detail records are obtained by the Collecting Agent (COL) and made available to the performance management. There may be large volumes of data depending on the size of the network and the traffic load.

The individual reports can be configured using flexible filter functions depending on their purpose. Time-controlled, automatic output of predefined reports is possible. The analyzed data can be presented in various diagrams or exported

in Excel, PDF, HTML or CSV format. This enables the results to be conveniently processed in line with individual requirements.

2.2.2.3 Collecting Agent

The Collecting Agent in OpenScape 4000 Manager collects all records from a OpenScape 4000 systems within a network and CDR's which are buffered in local control units during the survivabilty phase, filters them and makes them available to other applications in separate files. The call details collected are known as enhanced call data records (CDRe). These are not only used for calculating call charges, but also provide the information required for Performance Management.

2.2.2.4 XIE Web Server interface

OpenScape 4000 Manager/Assistant provides an encrypted Web service interface, suitable for external applications and substitutes the former XIE-API. As a Web service the software is designed to support interoperable machine-to-machine interaction. The API is defined by the Web service description language (WSDL).

The API application permits data to be exported from the central database of the Configuration Management to external applications, or to be imported. This ensures that external applications can always access the latest communication data, such as number, name, device, etc., which not only greatly simplifies the administration of these applications, but also ensures data consistency.

The relevant data can be easily selected via a user-friendly mask on the client PC and subsequently exported to a file.

2.2.2.5 Dual-Computer Configuration with Smart Switch Over (SSO)

The dual server configuration "Smart Switch Over (SSO)" is a high-availability solution which provides the system with a mechanism for manual switch over to a standby server if the OpenScape 4000 Manager server fails. This minimizes possible downtimes.

2.2.2.6 License Management Tool (LMT)

The License Management tool regularly checks the permissible capacity limits of the entire network. This means that the purchased software licenses can be moved as required between the systems in the network. This makes the administration of a large network very flexible.

Not unless the maximum number of licenses permitted in the network has been exceeded is a warning message displayed to indicate that additional licenses should be ordered.

2.2.2.7 SNMP Support of OpenScape 4000 Manager

For an efficient integration of the OpenScape 4000 Manager into the Managed Service Structure, enhancements concerning the monitoring of errors / alarms and events are supported. Based on SNMP protocol alarms and set/get Requests could be send or initiate to and from OpenScape Fault Management or other 3rd party Management tool.

2.2.3 External Management Applications

2.2.3.1 OpenScape Fault Management

OpenScape Fault Management (OpenScape FM) permits the whole network to be monitored.

OpenScape FM is able to recognize the operating status of a large number of other OpenScape systems and applications such as OpenScape Voice as well as network components using SNMP and MIB II standards. OpenScape Fault Management uses the Auto Discovery function to find all standard-compliant objects in the network and represent them in a shared network topology.

OpenScape Fault Management also offers a wide range of functions in managing and monitoring all QoS-based VoIP components in a OpenScape 4000 network.

The following functional components are included in the solution:

- QoS Configuration and Monitoring,
- QoS Analysis and Reporting,
- Service Level Management and
- QoS Data Transfer

2.2.3.2 OpenScape Accounting Management

OpenScape Accounting Management (OpenScape AM) makes the company's communication costs transparent. It records and processes communications in the conventional voice sector as well as voice communications in the IP sector, e-mail and Internet. Naturally, each authorized user has access to the individual reports on the Web.

2.2.3.3 HiPath User Management

HiPath User Management is another module in the OpenScape MetaManagement concept which permits the efficient administration of converged networks. By gradually incorporating all OpenScape Element Managers, HiPath User Management provides a single point of entry for user data from all OpenScape components and applications as well as the central administration tool for all element managers. Central storage and administration of user data and automatic synchronization of all OpenScape platform

databases, along with the possibility of synchronizing data with corporate directory data, eliminate duplicate data entries and guarantee network-wide data consistency.

Templates are used to configure subscribers and assign resources. In this way consistent organization data and resource properties can be defined once for specific user groups and reused again and again for new users.

3 OpenScape 4000 Manager

3.1 New Features

For information on the availability of individual functions, refer to the latest sales release.

Version

Table 1: For more information see .....

Applet replacement for Logging Management on Manager / Assistant	V8R0	Logging Management V8 manual
Direct Access applet replacement on Manager / Assistant	V8R0	Start Page V8 manual
Single Sign On in Windows Domain for Manager / Assistant	V8R0	Access Management V8 manual
Performance Management Filter Improvements	V8R0	Performance Management V8
Support both-way sync between DLS and OS4K (DLS Script MAC synchronization)	V8R0	Chapter 3.6.1.9
Use WebStart to Launch applets (JNLP)	V8R0	Start Page V8 manual
Licenses with ALI	V8R0	License Management V8 manual
Port independent Manager license	V8R0	
System trunk channels are free of charge in the system, but still require Manager Port licenses	V8R0	
New licensing counter distinguishes between TDM and IP license ports	V8R0	License Management V8 manual
Allow CFW Setting and Execution for Service fax although the device is not configured for Service FAX.	V8R0	
Support of administration of SLMUC in Assistant / Manager	V8R0	
Support of administration of STMIX in Assistant	V8R0	
Support of DeskPhone CP200	V8R0	
Integrated Phone Software Management	V8R1	Integrated Phone Sofware Management V8 manual
Support of DeskPhone CP400/CP600	V8R1	
Support of Windows 2016 Server	V8R1	
External API for Backup and Restore	V8R2	Backup and Restore V8 manual
Gateway Manager applet replacement on Assistant	V8R2	Gateway Manager V8 manual

Software Manager (Software Transfer applet replacement on Manager and Assistant)	V8R2	Software Manager V8 manual
Support "Call Forward Ignore" per subscriber	V8R2	
AP3700-9 support for Enterprise Gateway	V8R2	
Enterprise Gateway with integrated SoftGate	V8R2	
OSMO support in UC/Voice Mode	V8R2	

3.2 OpenScape 4000 Manager Concept

OpenScape 4000 Manager is a central component of the OpenScape Meta Management concept and the element manager for OpenScape 4000 standalone systems and networks.

OpenScape Manager features the following modules:

- Configuration Management (CM)
- Collecting Agent (COL)
- Performance Management
- Application Program Interface (API)
- Smart Switch Over (SSO)

The modular concept permits the combination of applications and functions for any type of OpenScape network configuration and therefore provides long-term protection of your investment in the communications infrastructure.

Areas of application

OpenScape 4000 Manager is intended for use in:

- OpenScape 4000 standalone systems to enhance the OpenScape 4000 Assistant feature scope by additional applications such as Accounting Management, Fault Management, and extensive Performance Management or to grant other applications access to the latest communication data (API), and report faults to a superior Fault Management application (SNMP).
- OpenScape 4000 networks to perform the administration and monitoring tasks for the entire network
- OpenScape 4000 Routing Gateway 830x (direct access from OpenScape 4000 Manager via System Management)

and support the platforms in HiPath 4000 V1.0 up to and including OpenScape 4000 V8.

Data administration

The Manager server is used to administer the central database, authorized and registered users and registered clients. The central functions are used to monitor access to applications and stored data. If changes are made to the database (as in the case of relocation or network expansions), OpenScape 4000 Manager checks the plausibility and operability of the inputs before performing the administration tasks. Only then will the OpenScape 4000 Manager supply every system in the network with individual configuration jobs. The network-wide database is updated as soon as all systems have acknowledged execution. For the user, this leads to a dramatic reduction in effort, and also eliminates administration errors.

3.3 Server Platform

The server platform should be selected in accordance with the size of the network to be administered and the modules used on the Manager.

OpenScape 4000 Manager is available on different server platforms with different degrees of performance. The resulting scalability permits economic use of OpenScape 4000 Manager in standalone systems and networks.

Server selection is dependent on the following parameters:

- The size of the network to be administered (number of systems and ports)
- The number of Web clients (concurrent session)
- The number and type of required ports
- Server availability (redundant components, (HD/RAID system, power supply, ventilators, memory, processors), UPS (Uninterrupted Power Supply))
- Necessary additional memory (customer-specific fields, longer term storage of CDRs (PM statistics) backup on server/streamer
- Number of simultaneously running applications and the type and intensity of usage of each one (CM, PM, API, COL, FM)
- Expandability and performance reserves for future expansions

OpenScape 4000 Manager is executable under the operating system "SUSE Linux Enterprise Server".

As an alternative OpenScape 4000 manager can be installed within an virtual environment using VMware.

Installation and application-specific configuration of the operating system (for example, the file system and partitioning) must performed as outlined in the OpenScape 4000 Manager Installation and Service Manual.

The Manager application is connected via LAN to the OpenScape 4000 network to be administered.

Further information about the servers that can be ordered, other released server components, and dimensioning can be obtained from the relevant project planning guidelines.

3.4 High Availability Solution

Smart Switch Over (SSO) is a high availability solution in which a standby server is automatically synchronized with an active OpenScape 4000 Manager server. In the case of failure, the system can manually be switched to the standby server.

This minimizes possible downtimes. The data is automatically transferred to the standby server on a regular basis. The maximum data loss is limited to the time between the last data transfer and the switch over.

Both servers must feature identical hardware and software components.

3.5 Administration Workstations

OpenScape 4000 Management clients are the administrator workstations for OpenScape 4000 Manager. Clients can access all OpenScape 4000 Management and OpenScape Management applications via a Web browser.

The applications can be used by any standard PC with a Web browser from almost any location. (Prerequisite: there is a LAN connection between the client and OpenScape 4000 Manager.) The supported Web browser is MS Internet Explorer.

The client hardware platform consists of a standard PC with a LAN connection and a Web browser.

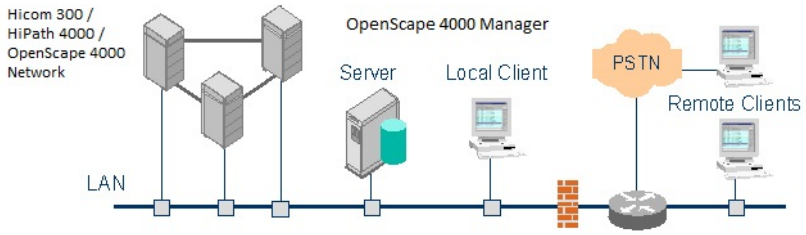

Figure 3: OpenScape 4000 Manager

Multiple access

A concurrent session license is required for administration access to the Manager application. They are counted and monitored in the Security Management (SecM) application of OpenScape 4000 Manager. Users can be specified, deleted and edited with SecM.

Users receive a password-protected ID for logging on to OpenScape 4000 Manager. Users log on via the client browser. Each user that registers using an ID or password opens a new session in OpenScape 4000 Manager. A further logon using the same ID is also counted as a new session. Users are also configured in Manager SecM for applications that access the Informix database via the API. These also open sessions that are counted.

3.6 Configuration Management (CM)

3.6.1 General

Configuration Management (CM) permits the configuration of all OpenScape 4000 systems in a network. This includes the administration of subscriber lines (system phones, IP and cordless phones), centralized administration of least cost routing (LCR) and the administration of personal data (name, company, location). Configuration Management in OpenScape 4000 Assistant also permits trunk and board administration. Approximately 85% of all AMO administration tasks can thus be performed using the intuitive, graphical user interface. The GUI provides logical checks and help options to support the user in executing network-wide changes consistently and efficiently.

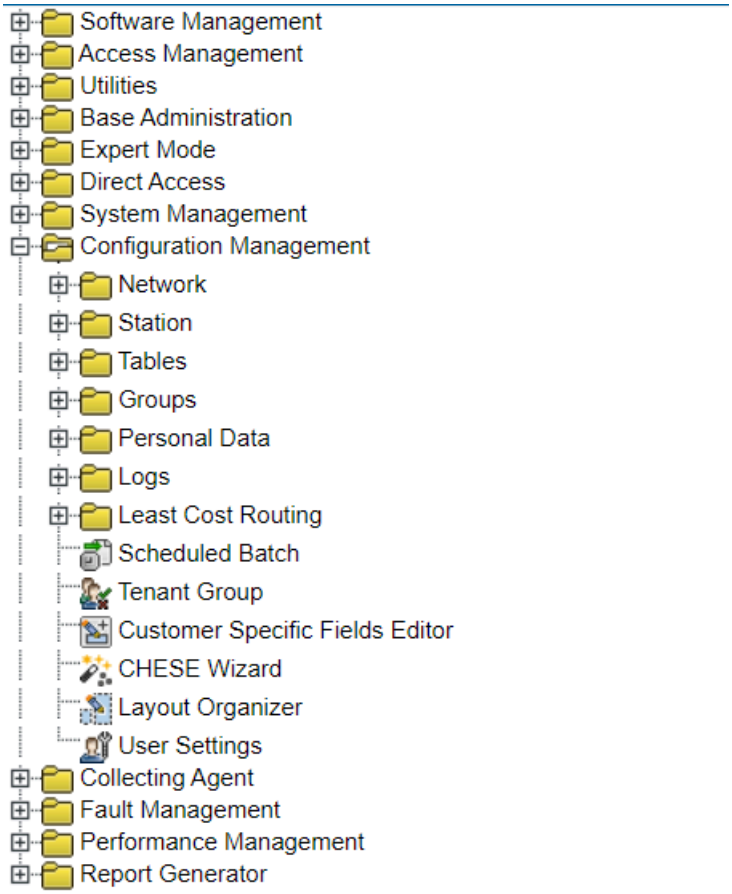

Figure 4: OpenScape 4000 Manager Configuration Management

OpenScape 4000 Manager Configuration Management is primarily used in OpenScape 4000 networks. Additional administration features beyond those available in OpenScape 4000 systems include network-wide functions such as a numbering plan, system administration, network domain configuration and administration, uniform classes of service, speed dial numbers or key layouts, voice mailbox administration, etc. The data and parameters required for administering the subscribers are stored for the entire network in the Configuration Management central Informix database. They are checked for consistency when new subscribers are configured or if any changes are made, and acknowledged by the individual OpenScape 4000 systems in the network when administration tasks have been performed. This ensures that the data is consistent.

3.6.1.1 User Interface and Views

The Configuration Management GUI presents information from the database in a browser-based interface. Data for the administered system objects is displayed to the user in different views. The objects can be displayed as individual or table views. In table view, you can determine the assignment and display of the table columns. This setting is user-specific. Configuration Management views provide object-based search and research options. CM also facilitates bulk changes to data, subscriber relocation and report printing.

3.6.1.2 User Settings

User Settings allows each user to customize settings for Configuration Management operation and behavior.

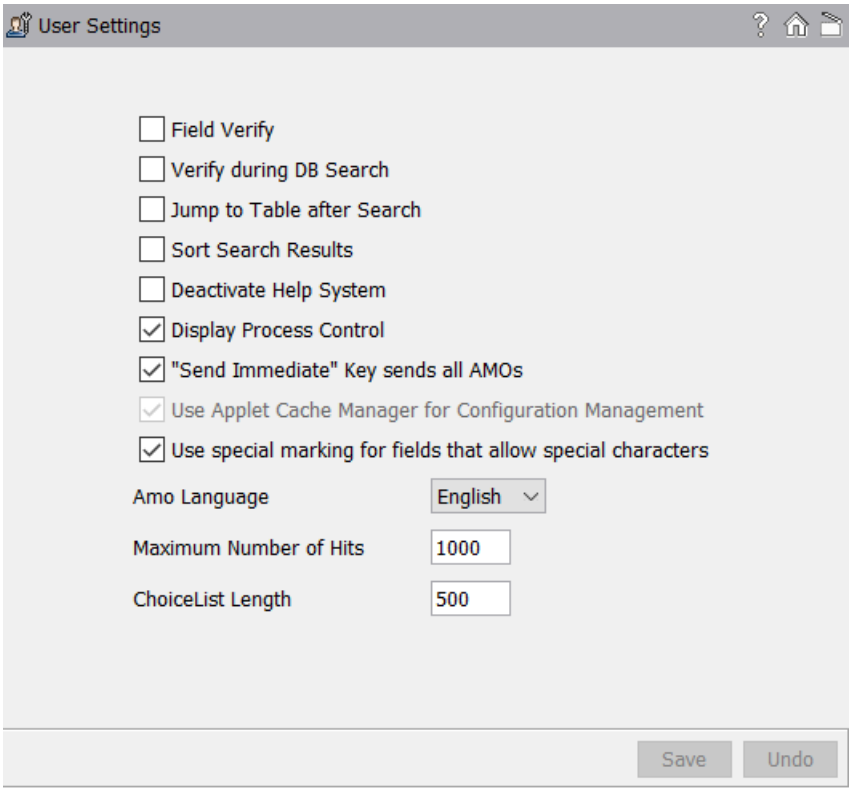

Figure 5: User Settings

3.6.1.3 Bulk Data Changes

Configuration Management permits several data records to be processed in a single step. The parameters modified in a sample entry are copied to the other selected entries. This is a quick and efficient means of configuring uniform parameters. Multiple entry selection is possible via the mouse or keyboard. Status icons are used to display execution of the changes. In this way, the execution process for the changes can be monitored (OK, error, warning).

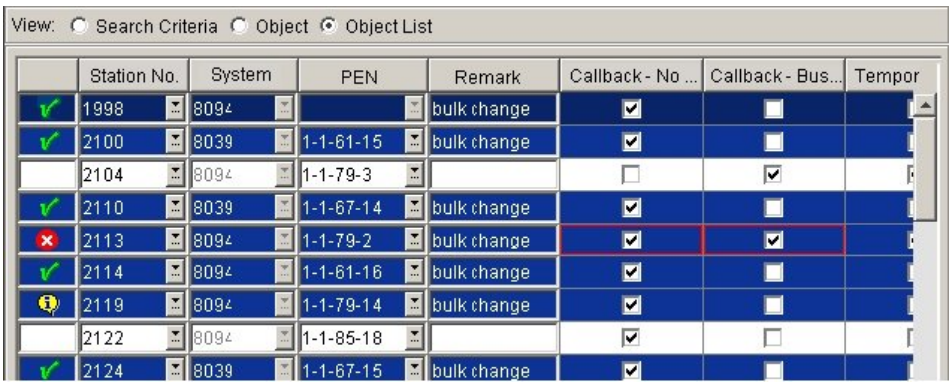

Figure 6: Bulk Data Changes in Configuration Management

3.6.1.4 Synchronization of System Data

Configuration Management ensures the network-wide synchronization of system data. Synchronization is required if a data record is being used on another system.

Configuration Management allows you to distribute the following data to one or more systems:

- Classes of Service
- Class of Service Switch over
- Speed Dial List
- Standard Key Layout
- Phone Mail Class of Service
- Communication Group
- LCR Class of Service - Data, Voice
- Digit Pattern
- Outdial Rule
- Timetable

3.6.1.5 Scheduled Batches

The Scheduled Batch function in Configuration Management permits time-controlled execution of configuration changes in OpenScape 4000 systems. You can define scheduled batches by creating a new batch via the menu and specifying the required configuration data.

You can search for, edit or delete existing scheduled batches. You can assign any name to each scheduled batch. You can specify any time to run the batch. The operability of the specified inputs is checked before the defined batch execution time. Any errors that occur are logged in the session log and can then be corrected. Scheduled batches are started at the defined execution time, and the executable tasks are performed. Any non-executable tasks are ignored. Scheduled batches can be correctly executed across different time zones by specifying the OpenScape 4000 target system and entering the required local execution date and time.

3.6.1.6 Customer Specific Fields

The length of default fields or new fields displayed in Configuration Management masks can be changed. Existing dialog tabs can be individually displayed or hidden. Empty tabs are automatically hidden.

Each field in mask can be set to "read only" to prevent accidental or unauthorized changes. Functions in a mask (such as, Create, Delete, etc.) can be activated or deactivated. If a function is deactivated, it cannot be executed in this mask by any users.

Customer-specific modifications made to masks are saved. This ensures that customer-specific mask layouts are retained when OpenScape 4000 Manager is upgraded.

3.6.1.7 Individual Masks for Stations

Programmable mask layouts are available for creating customer-specific views of the station mask. Three of these masks have already been defined with different layouts. Seven other masks are available for creating customized views with varying degrees of complexity. This enables masks to be customized for individual administrator roles (such as, user, basic administrator and supervisor roles).

Mask layouts are edited using the "Customer Specific Field Editor". Each mask can be accessed directly via an individual entry in the Configuration Management directory tree.

The individual mask layout can be customized using the functions provided to perform the following tasks:

- hide existing fields
- edit label text
- modify the length of fields in the mask
- display the new customer-specific fields

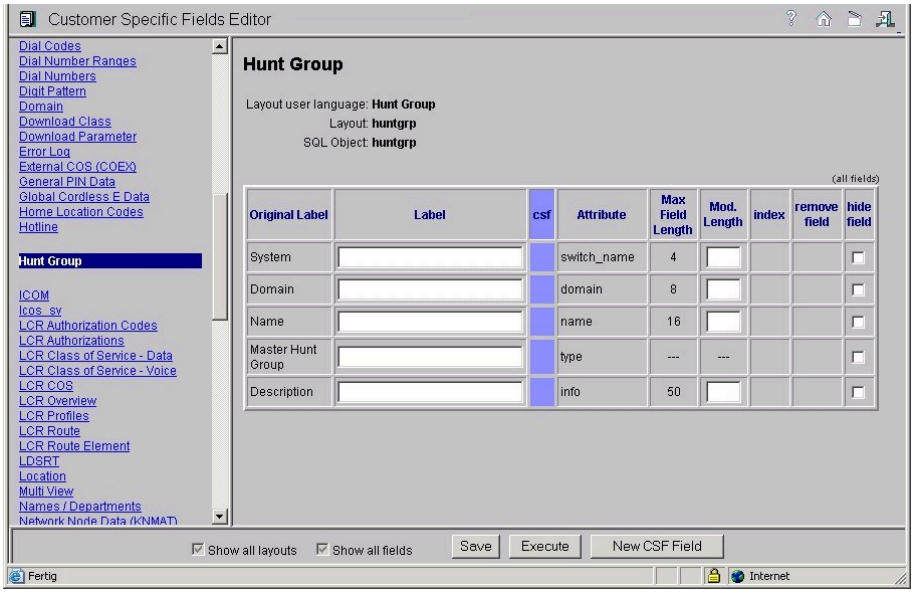

Figure 7: Example of Individual Mask Layout: Hunt Group Object

You can insert empty rows in the field table to add new fields. New fields are displayed on one or more new tabs in the main object window of the GUI.

3.6.1.8 Enhanced Client Capability

The client administration function in Configuration Management allows you to block users for a system or domain. Blocked users are not permitted to configure, change or delete any data records for these systems in Configuration Management.

This feature allows you to restrict users' access to Configuration Management information. Administrators can only display and edit tenant group data if they have authorization for this group.

Subscribers in a OpenScape 4000 system or a OpenScape 4000 network can then be logically split into different tenant groups and administered in these groups.

Enhanced Client Capability can be used to assign the following objects to a specific tenant group:

- stations (port)
- group functions
- personal user data
- organization

Up to 150 tenant groups can be configured. Group functions include, Hunt Group, Pickup Group, CHESE, and COM Group. Use the relevant object mask in Configuration Management to assign the tenant group to an object.

Configuration Management allows you to perform the following functions.

- Create a new tenant group
- Delete a tenant group
- Add an object to a tenant group
- Query all elements in a tenant group
- Assign users to a tenant group

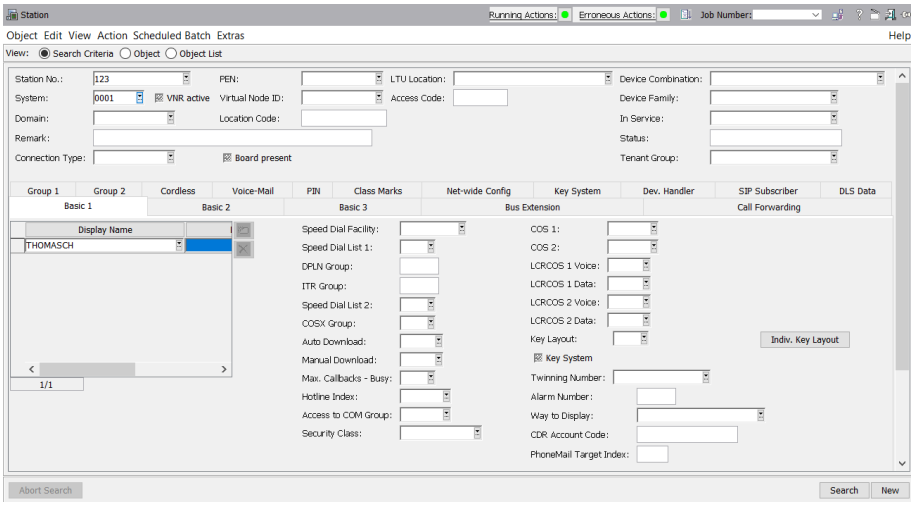

Figure 8: Assigning the Tenant Group in the Station Mask

3.6.1.9 Synchronization between DLS and OpenScape 4000 Manager

Updating can be automated for IP phones if their telephone numbers and gateways are allocated in the OpenScape 4000 system. Synchronization is performed with one or more DLS servers over an access on OpenScape 4000 Manager (DLS proxy).

The following figure provides a schematic representation of the LAN-based connection without the intermediary insertion of a firewall or NAT.

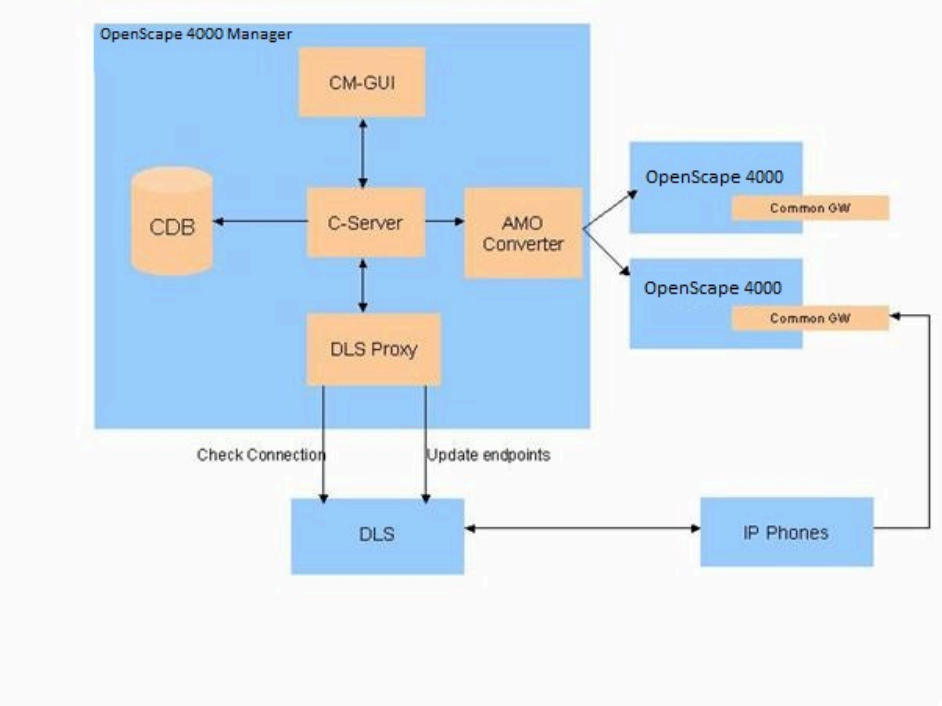

Figure 9: DLS Overview

DLS data (DLS name, version, user name, connection status, etc.) is also stored in OpenScape 4000 Manager.

The following data is transferred to the DLS:

- old user phone number
- old phone number in E.164 format
- new user phone number (if the phone number was changed)
- new phone number in E.164 format (if the phone number was changed)
- new gateway address (if the gateway allocation was changed)

The layout of the Configuration Management GUI with the "DLS Administration" function selected is as follows:

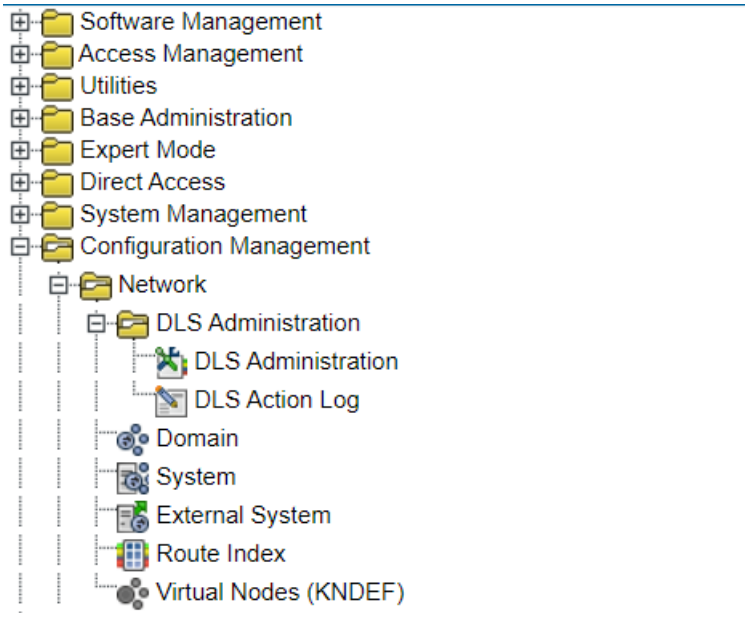

Figure 10: DLS Initiation

Synchronization DLS - OpenScape 4000 Manager

DLS administration allows to synchronize all IP stations so that DLS (Deployment Service) and OpenScape 4000 Manager will have similar data fields like MAC-address, IP-address and Loadware version.

The action "Synchronize Data" is active when a DLS application defined having status connected. After this action triggered, MAC-address, IP-address and load ware version on DLS application will be gathered for all IP stations previously and added to DLS server defined on CM.

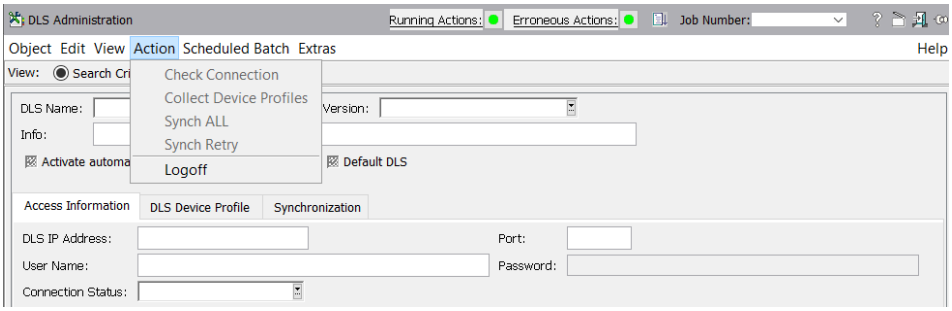

Figure 11: Synchronize data between DLS and OpenScape 4000 Manager

DlSproxy is enhanced in a way that all IP stations can be synchronized in two forms:

- Action name: synchronize data

  Place of invoking: DLS dialog

  Modified data:

  – same data with "Synchronize data with DLS" but for all stations having that DLS server name

- Action name: synchronize data with DLS

  Place of invoking: station dialog

  Modified data:

  – IP Address, Basic 2 tab sheet
  – IP Address, SIP Subscriber tab sheet
  – Exact Device Type, SIP Subscriber tab sheet
  – Loadware Version, SIP Subscriber/Basic 2 tab sheets
  – MAC Address, DLS data tab sheet
  – DLS Name, DLS data tab sheet
  – DLS Device Profile, DLS data tab sheet

  After synchronization of IP phones, whether all stations synchronized successfully or not, new data tab Synchronization on DLS Administration window will be updated. The status of synchronization is shown. The status can have two possible values "Failed" or "Completed".

3.6.2 Station Administration

3.6.2.1 Station for Voice Users

Configuration Management allows you to process all station-relevant data. The Configuration Management Station window allows you to set the properties assigned to stations and their devices, such as subscriber data, name, display text, etc. This also applies to the administration of OpenScape Cordless stations. Stations include system-specific interfaces, such as, UP0/E for optiPoint (OpenStage or HFA stations as well as standard S0 and analog T/R ports. The Configuration Management Station function also supports cordless-specific settings and voice mail box assignment.

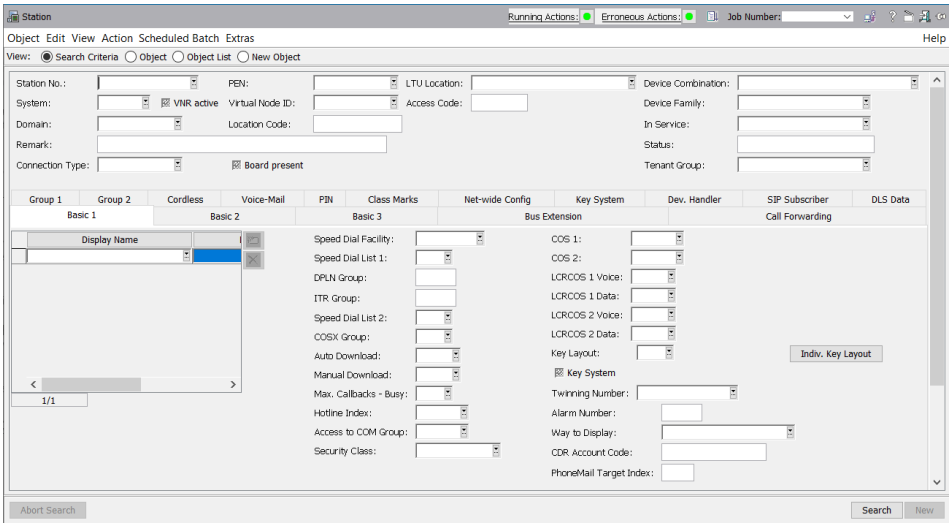

Figure 12: Station Mask

The following functions are supported:

1) Create a new station

- Search for existing stations according to any criteria
- Modify a station
- Delete a station

The station parameters are classified by tabs in the Configuration Management input mask. In this mask you can edit the connection parameters, basic station data, the device type and display name and configure the voice mail box.

Basic station data

Basic station administration allows you to make the following basic settings for the selected station:

- Configure the scope of functions for the terminal
- Assign authorizations
- Assign lists (e.g. speed dial lists)
- Configure features
- Security class

Device combination choice list

Within the Configuration Management GUI of OpenScape 4000 Assistant and OpenScape 4000 Manager, the existing "device combination choice list" supports the configuration of BLF key module for OpenStage 30, 40, 60 and 80 and key module configuration for DeskPhone CP400 and CP600. The CM- GUI displays the BLF in five divided tabs to reduce complexity of the dialog.

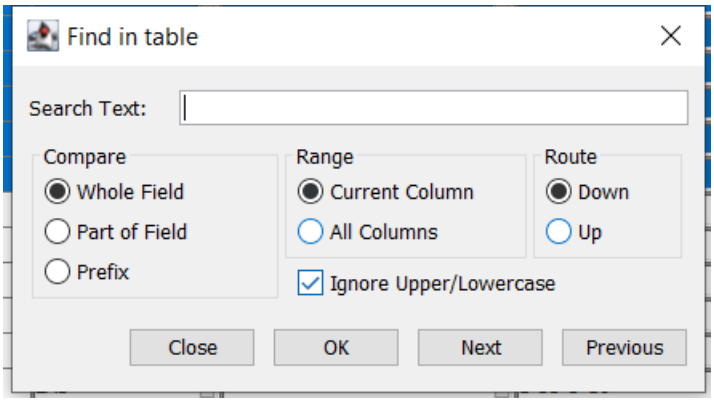

Figure 13: Device combination choice list with BLF options

Bus configurations

You can set the following specific parameters for ports with buses:

- Main station number
- MSN (Multiple Subscriber Number) features
- Protocol variants for the individual services
- ID numbers for the individual services
- Individual service options

Call forwarding

You can configure, activate and edit call forwarding for a station.

Group parameters

You can assign group features to the station. Global group features are administered in a separate Configuration Management edit mask. You can assign the following group features to the station:

- Hunt Group
- Chese Group
- Pickup Group (PU)
- Network wide Team
- COM Group
- Night Options

PIN

The following PIN (Personal Identification Number) data can be configured for the station via the Configuration Management Station mask:

- PIN type
- PIN type
- PIN feature
- PIN class

You can assign several PINs to a station. Global PIN settings are edited via general PIN administration.

Subscriber authorizations

You can assign different authorizations to the subscriber. You can set up additional authorizations using COS administration.

Keyset

The parameters of a keyset (telephone with multiple line access) can be viewed and some can be edited. Stations that are configured as key systems have incoming and outgoing access to a primary line and up to 28 secondary lines.

Individual key layout

In addition to the predefined standard key layouts, you can program individual key layouts for each system-specific telephone. You can display and edit the key layouts for telephones and add-on devices using the Configuration Management graphical user interface. The following actions are available for configuring the individual key layout of a station:

- Create, modify, delete destination from DSS and name keys
- Modify key functions
- Create, modify, delete destination from line keys

Modified keys are displayed with a yellow border. Save the key layout to display it on the telephone.

Sample stations

You can use existing station configurations as templates for creating your own sample stations. These sample stations can then be used to configure new stations easily and quickly. Additional associated fields, such as, Organization Unit, Display Name or PIN Type, can also be saved for the sample station. You can access sample station templates via a separate mask in Configuration

Management. The sample stations can be organized in a tree structure in this mask.

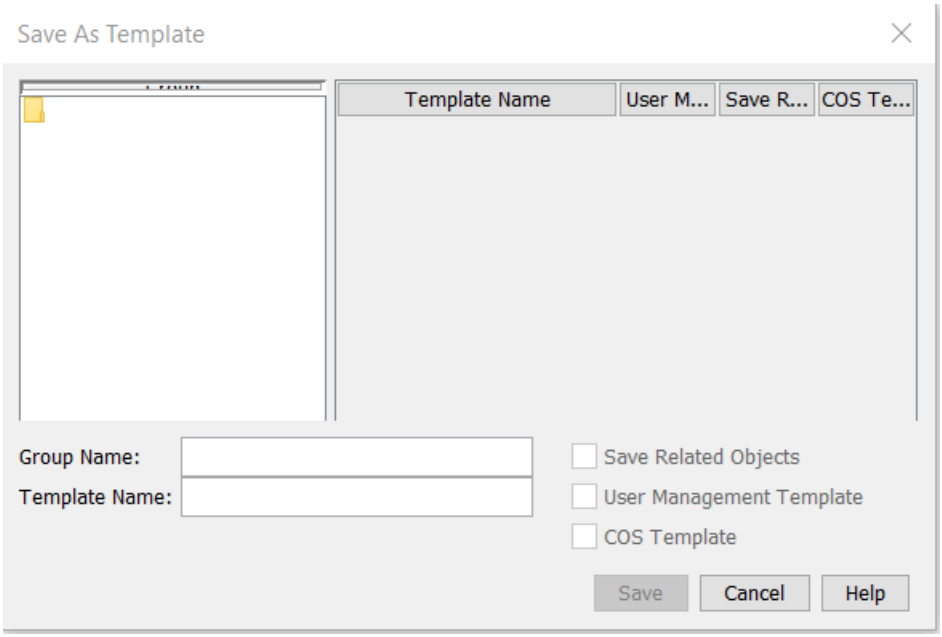

Figure 14: Sample Station Mask

Bulk configuration of new stations

Up to 50 stations can be configured simultaneously in the Station mask's New Object List view. All stations are configured on the basis of a predefined sample station. Free station numbers and PENs can be selected for new subscribers from the drop-down lists. If station numbers or PENs are not entered manually, the system assigns them automatically (if they are available). Station data is taken from the fields in the sample station you have selected. This data can be modified and supplemented if necessary.

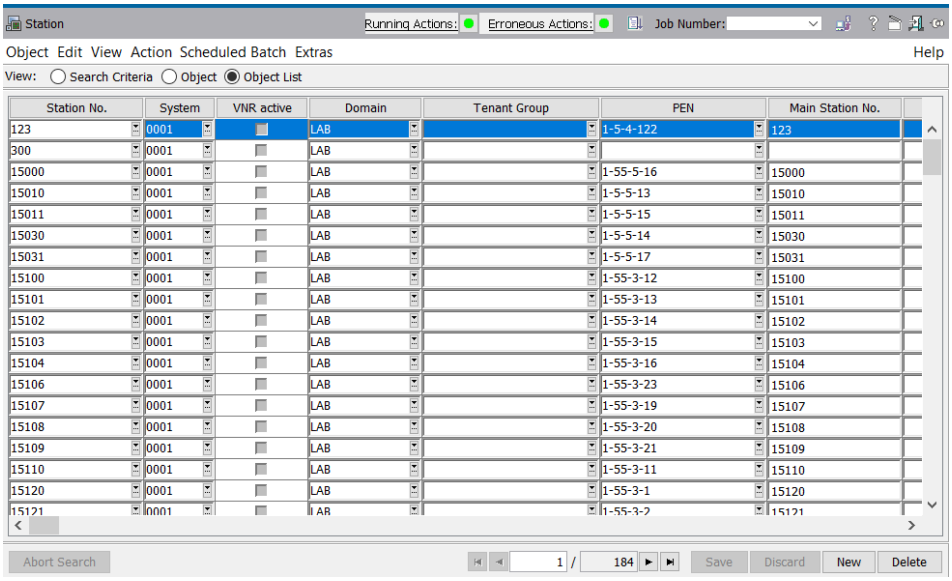

Figure 15: Object List for Bulk Station Configuration

Subscriber relocation in Configuration Management

Configuration Management allows you to conveniently relocate stations within a system or domain and domain-wide. Configuration Management offers two variants for station relocation:

- One-Phase Move:

  In this variant, the station is set up in a new location and deleted from the old one as soon as you have initiated a move (processed the AMO command in the system).
- Two-Phase Move:

  The station is first assigned a temporary station number in its new location [Allocated][assigned. In the first phase of the move, both the old and the new stations are available. When the second phase is initiated, the temporary station number is replaced by the number being relocated and the station is deleted from its old location. You can undo the first phase of a two-phase move.

Station Administration in Configuration Management supports the function "Move station with group relationships". This function lets users relocate stations in a pickup group or hunt group without affecting group relationships (move list).

One-phase move is the only variant allowed to move stations with group relationships within a system and within a domain.

In the following figures, the "Action" pull-down menu in OpenScape 4000 Manager's "Station" mask is expanded to include the new "Move" function; the stations to be moved (up to 50 objects) can be selected by choosing "Move List".

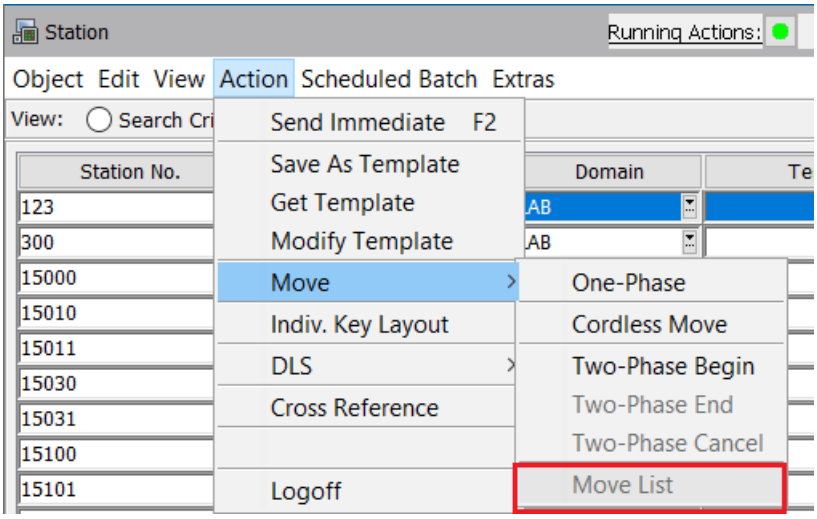

Figure 16: Station Move List

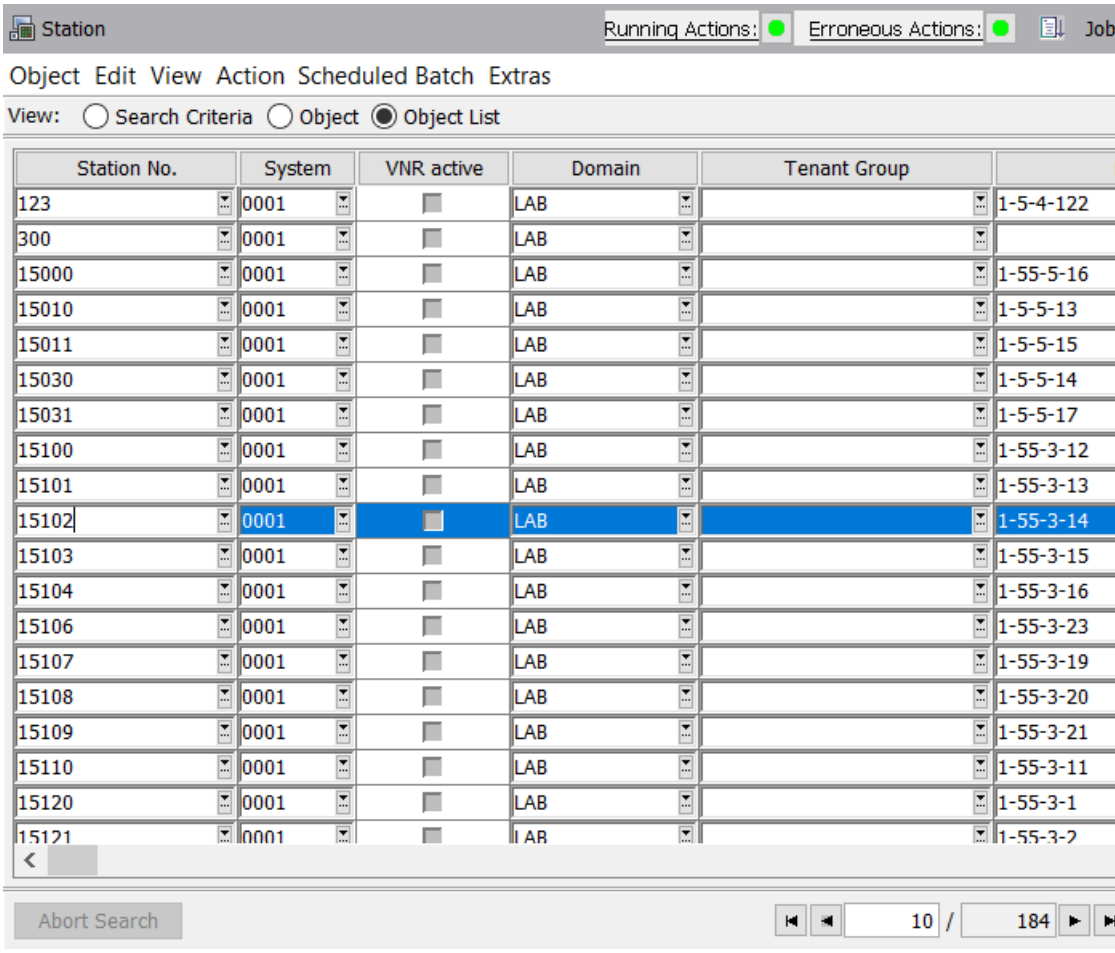

Figure 17: Move List

This function does not support master stations and pilot numbers for hunt groups.

Simplified registration of mobile users

In the "traditional" registration procedure for mobile users, an administrator releases users for registration. Users then have to enter an eight-digit dynamic PIN to register within this time frame. The simplified registration function in Configuration Management now means that several users can be defined in a list and simultaneously released for registration. Users can then register their handsets by entering a four-digit static PIN in the system. Once the user phone number is displayed, the handset is registered in the system.

In the simplified procedure, telephone numbers are automatically assigned according to the registration order. The administrator can use the OpenScape 4000 Manager to predefine the telephone numbers to be assigned.

Relocation of mobile users

When mobile users roam from one SLC board to another this increases the strain on performance in the corresponding OpenScape node as well as the tie traffic in the network. If mobile users spend a lot of time or are constantly in another visitor SLC board area, it makes sense to relocate them from their previous SLC board to this SLC.

Previously, a user had to register on the new SLC after relocating. The "Automatic Relocation" feature enables handsets to be relocated to a target SLC board without having to manually register at this board.

A handset can be relocated to another SLC within the same node or in another node. As with the relocation of corded stations, group relationships (for example, pickup group, hunt group) are terminated when a mobile station is relocated.

Central telephone directory (Phone book) function for cordless stations

This feature provides mobile users in the OpenScape Cordless system with a private telephone directory and up to 99 group telephone directories on the telephone. A private telephone directory can be transferred from the handset and saved centrally on the hard drive of the corresponding OpenScape 4000 node. It can also be reloaded from here.

The group telephone directories are also stored on the hard drive of the OpenScape 4000 node. They are managed centrally using the OpenScape 4000 Manager.

The telephone directory functions and data exchange with OpenScape 4000 are operated from the handset menu. Both individual entries and complete telephone directories can be saved in the system. Individual entries are added to a directory that has already been saved. When a complete telephone directory is saved, it overwrites the existing version. Users can access available directories from their handsets. Once a user has selected a private or group directory from the list, it is transferred from OpenScape 4000 to the handset where it can immediately be accessed.

The function for using telephone directories with handsets is managed in Configuration Management's Station Administration tool. In Configuration Management, settings can be made to define whether each user can access a private or group telephone directory. Group telephone directories can still be managed. Administrators can create and maintain group telephone directories. Entries can be added to a group directory or modified or deleted. Up to 99 group telephone directories can be created and managed.

3.6.2.2 Virtual Numbering

OpenScape 4000 lets you set up virtual numbering within one or more networked OpenScape 4000 systems. The Station Administration GUI in Configuration Management can be used to administer stations with identical or overlapping phone numbers within a domain.

This extension essentially focuses on the "Station" mask and the associated changes and enhancements in the Configuration Management GUI. These include

- extending the phone number length from 6 to 12 digits (unabbreviated call number = virtual node number + phone number)
- providing a display indicating whether the VNR flag is set for using virtual numbering in the system (read-only)
- providing a display to show the virtual access code for all stations (read-only)

Flag indicating the use of virtual numbering

This field is read-only and is used to display whether or not the function is active. If the flag is not set, phone numbers are displayed in abbreviated form (unique numbering). All functions in Configuration Management can continue to be used as before.

If the flag is set, virtual numbers can be configured. All phone number must therefore be configured in long format (virtual access code + phone number). Unique phone numbers are also accepted in abbreviated form (phone number) and can therefore be configured.

COL-specific feature

If the VNR flag is not set, the phone numbers in COL are supplied in short format (six digits) as before.

If the VNR flag is set, the output format in COL must be set from 6 to 12 digits.

Phone number extension from 6 to 12 digits

If the "Virtual Numbering" function is used, the virtual access code is added to the existing phone number and displayed in all relevant Configuration Management masks.

Virtual access code

Each virtual node number is permanently allocated a "virtual access code" which becomes part of the long-format phone number. This code helps the user uniquely select and identify phone numbers that appear several times in a domain.

The virtual access code cannot be modified over the CM.

Miscellaneous notes:

- Mixed configurations, that is, systems with and without unique numbering plans are only possible through different domain formation
- In mixed configurations, a number of CM-based administrative operations are subject to restrictions.
- CM does not support the configuration of phone numbers in overlapping phone number ranges
- Display and reservation of numbers is only possible for phone numbers marked "free"; selection by virtual node number is not possible
- Restrictions when making bulk data changes (adding stations)
- Restrictions when moving stations to other virtual nodes

UC integration in VNR networks (KNOWNNET)

For E.164 modifications to ACL, every switch in the network must know every virtual node existing in the network to be able to modify all network wide existing numbers to an international E.164 number. So every node with Type OWN (AMO-KNDEF) existing in the network has to be configured as TYPE=KNOWNNET in KNDEF of every system.

Because Manager knows all nodes of the whole VNR network, it is possible to replicate this information is such cases as

- A switch is added to manager or deleted from manager
- An OWN node is added to (or removed from) a switch of manager

Therefore the following handling are supported

- Automatic Node Replication

  Automatic Node Replication watches all node operation on the Manager. If an OWN node is created or deleted or changed on a switch, this will trigger an update of all KNOWNNET nodes in the network.
- Regenerating Replicated Nodes

  This functionality is similar to automatic node replication except that user can reset all replicated nodes and recreate them (re-sync). Even though automatic node replication is working in a Manager, user can change some nodes and break the sync. This functionality will re-sync the nodes in a Manager network.

3.6.2.3 Special Stations

Configuration Management allows you to administer special stations. These are:

- General answering stations
- Messenger stations
- External announcement devices
- Pagers (PSE)
- Common voice mail interfaces

The following functions are available:

- Create a new special station
- Search for a special station according to any chosen criteria
- Delete a special station

Different announcements

Within an IPDA environment, based on OpenScape 4000, different announcements and ton tables could be configured for each access point separately. For this purpose e.g. SIU tone table country, SIU announcement text language and dial tone receiver country has been added to the IPDA access point dialog in Assistant.

In addition one GUI text box is added to the special subscribers dialog to configure external announcement devices per LTU assignment.

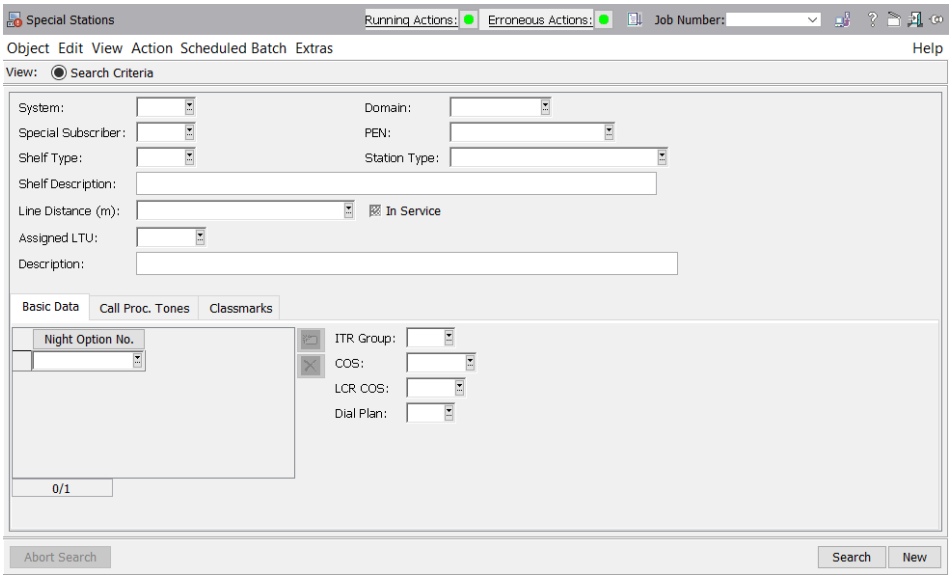

Figure 18: LTU Assignment - external announcement devices in IPDA - environment

3.6.2.4 Personal Data

Personal data

Configuration Management allows you to display, edit and delete personal data for a station in the OpenScape 4000 system. You can administer additional subscriber data that is stored in the manager database at personal level.

At this level, you can display and edit further personal and port-related data for a subscriber. The following subscriber data can be administered:

- Name, company and organization unit
- Display subscriber name
- System and station number data
- Personal identification numbers (PINs)
- Phone Mail box with predefined standard data
- Xpressions Voice mail system
- Additional information of any kind

- Collecting Agent (COL)

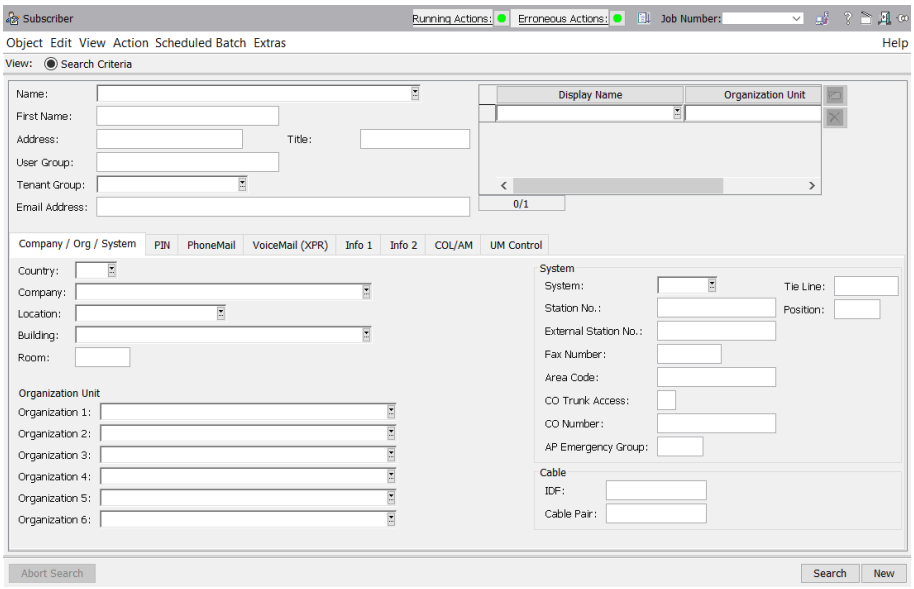

Figure 19: Personal Data in Configuration Management

You can assign up to six company organization levels to a subscriber.

You can assign a country or company affiliation to the subscriber. You can also maintain data for collecting and further processing charge data such as personal number, cost center and bank details for the individual subscribers. This personal data is stored in the Configuration Management database only and is not yet assigned to the port-related station data in OpenScape 4000.

Additional data that is to be assigned to the subscriber, such as country, company, location or organization level, can be collected separately and is available in the Configuration Management database. You can easily assign this data to the subscriber using the selection list.

3.6.3 Team Feature

Configuration Management allows you to administer the group features in the OpenScape 4000 system. This includes the administration of network wide group relationships.

3.6.3.1 Hunt Group

A hunt group is a group of stations whose voice, data or fax devices can be reached under a common station number. The station number may be an access code or the station number of the first subscriber port in the hunt group. The Configuration Management GUI provides the following functions:

- Create a new hunt group
- Search for an existing hunt group according to any chosen criteria
- Modify the properties of a hunt group
- Delete a hunt group
- Add members to a hunt group

- Delete members from a hunt group

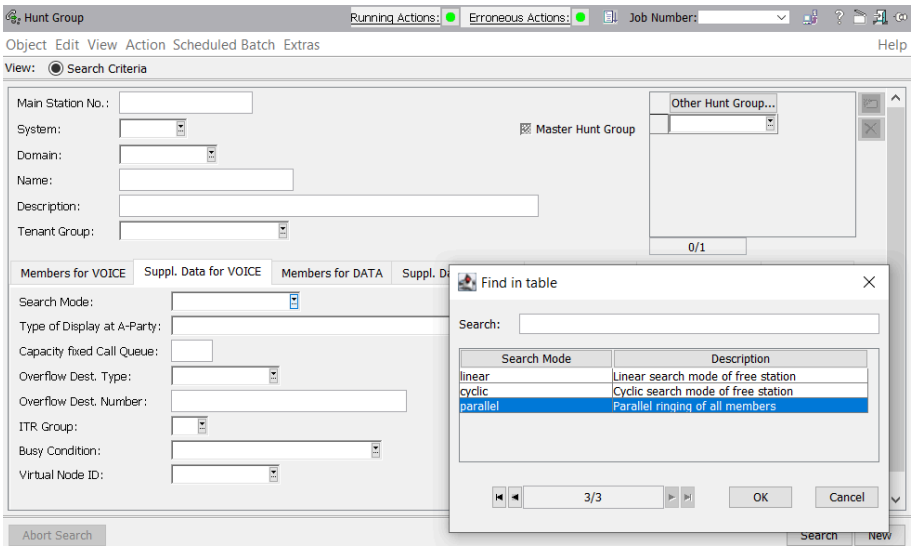

Figure 20: Hunt Group in Configuration Management

Configuration Management allows you to process all aspects of a hunt group. For example, you can display the station number, system and display name of the members. You can also set the type of hunt group, be it the master hunt group or a code hunt group, as well as the capacity of the call queue and overflow destination. The configured search mode of the hunt group specifies the procedure for searching for a free hunt group station. If a hunt group is called, the system searches for and seizes a free hunt group member.

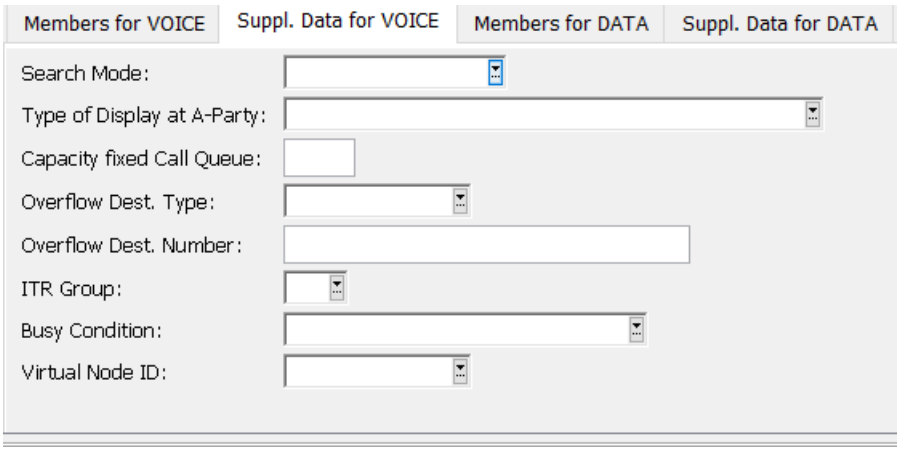

Figure 21: Supplementary data for hunt group

A search is run successively through all members until a free member is found. The following three procedures can be set:

- Linear

  The list of members is always searched from top to bottom.
- Cyclic

  The search begins with the member last seized in the group (previous call). The search is run from here until the end of the list before jumping back to the very top. The search ends again with the last member seized.

- Parallel ringing

  Incoming external and internal calls ring at all available members of the group

Configuration Management allows you to search for all configured hunt groups network wide. If the required hunt group is found, you can change directly to the individual view of the hunt group to edit it.

3.6.3.2 Pickup Group

Pickup groups consist of stations that can answer each other's calls. Configuration Management allows you to administer the different configurations of a pickup group. The following variants are available:

- Local pickup group
- Network-wide pickup group
- Parallel pickup group

The following actions can be performed:

- Create a new pickup group
- Search for an existing pickup group according to any chosen criteria
- Modify the properties of a pickup group
- Delete a pickup group
- Add members to a pickup group
- Delete members from a pickup group
- Add external links (remote links) to a pickup group
- Delete external links (remote links) from a pickup group

Configuration Management allows you to conveniently search for all configured pickup groups network-wide. Once the required pickup group is found, you can change directly to the individual view of the pickup group to edit it.

3.6.3.3 Communication Group

Members of a communication group can connect to one another via speed dialing. The COM Group Call feature permits digital telephone users within a communication group to call each other without having to dial the complete extension number. The required station can be called by dialing just two or three digits. This call is signaled as a special call at this station.

Configuration Management allows you to process communication groups as follows:

- Configure a communication group
- Add new members to a communication group
- Display a communication group
- Edit the composition of a communication group
- Delete a communication group or a member of it
- Synchronize communication groups (copy to selected systems)

3.6.3.4 Night Attendant

In night service, attendant console groups are replaced by a night attendant. All calls to the attendant console group are signaled on a free telephone that is assigned to this night attendant.

The following administration tasks are possible:

- Set up night attendants
- Search for an existing night attendant according to any chosen criteria
- Modify the properties of night attendants
- Delete night attendants

3.6.3.5 Network wide Team

Configuration Management allows you to configure network-wide teams. In terms of functionality, a network-wide team is the equivalent of an executive/ secretary group and can have up to four executives, four secretaries and two deputies. Configuration Management allows you to perform the following tasks:

- Set up a new team
- Search for an existing team according to any chosen criteria
- Modify the properties of a team
- Delete a team
- Add members to a team
- Delete members from a team
- Configuration of DSS Keys (Direct station selection)

3.6.3.6 CHESE wizard

A wizard helps you create and edit local CHESE groups. The interactive wizard supports users throughout the entire procedure of administering CHESE configurations. The CHESE wizard offers the following functions:

- Create
- View and Modify
- Delete

A system of consecutive masks guides you through the procedures for creating or editing CHESE configurations.

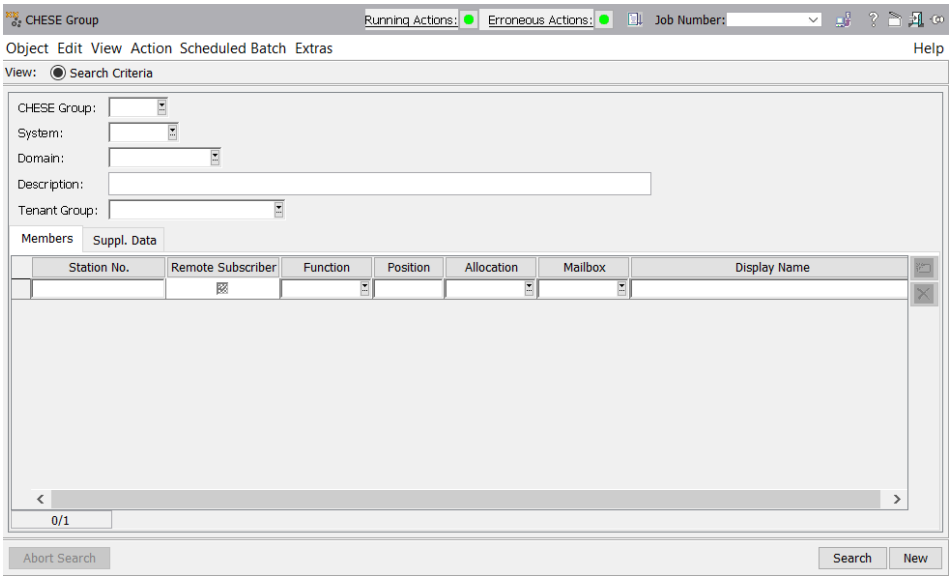

Figure 22: CHESE Assistant

3.6.4 Table Administration

3.6.4.1 PIN Administration

You can define the PIN classes with their properties and functions for the individual PIN applications (e.g. PIN manual, PIN ID, COS switch over, account codes, etc.). The basic parameters, such as PIN length, PIN text and PIN verification rules, can be edited. You can query, edit or delete the personal identification numbers assigned to a station.

3.6.4.2 Subscriber Authorization

Classes of service

Classes of service (COS) contain combinations of Access Authorizations and features. Depending on the respective service, voice, fax or data, you can assign different authorizations in the classes. The classes of service are assigned to one or more subscribers. COS authorizations are also assigned trunks for inter-PBX traffic. The following tasks can be performed:

- Create a new class of service
- Search for an existing class of service according to any chosen criteria
- Modify the description of a class of service
- Add individual access authorizations to a class of service
- Delete an individual access authorization from a class of service
- Delete a class of service
- Synchronize the COS with other systems

COS changeover group

Stations can be assigned to COS changeover groups (COSX groups). Classes of service are switched over for all members of a COS changeover group at fixed times. You can set the switch over times for each weekday.

3.6.4.3 Speed Dial List

You can edit speed dial lists using Configuration Management and synchronize them with other systems in the network. A speed dial index and a corresponding unabbreviated call number are defined in the speed dial list. The following administration tasks can be performed for the speed dial list:

- Create a new speed dial list
- Search for an existing speed dial list according to any criteria
- Modify the properties of a speed dial list
- Delete a speed dial list
- Add entries to a speed dial list
- Modify entries in a speed dial list
- Delete entries from a speed dial list
- Synchronize speed dial lists

3.6.4.4 Device Combination

Configuration Management allows you to predefine device combinations. Once a device combination has been defined, you can set up any number of stations. You do not need to enter the scope of features for the devices again. You can assign a name to each device combination. The following tasks can be performed:

- Create a new device combination
- Search for an existing device combination according to any chosen criteria
- Modify a device combination
- Delete a device combination

3.6.4.5 Numbering Scheme and Node Configuration

Configuration Management permits you to query and configure dial plans and numbering schemes and process node-specific codes. The following data can be edited:

- Dial numbers and dial number ranges
- Route info for subscribers and networks
- Dial codes
- Virtual nodes
- Network node data
- Node format tables
- Node prefix tables
- Number conversion
- Partial dialing plans

Numbering plan and digit analysis

You can use the "Free Dial Numbers - Domain View" mask to check the free dial numbers available in the OpenScape 4000 domain and processed them further. The dial numbers are only displayed once for each domain in the results screen. Only free dial numbers are displayed. This makes it easy for the administrator to perform unique reservations, for instance, for dial numbers in a domain.

The following tasks can be performed on a domain-wide basis:

- find and display free dial numbers
- create a new dial number
- delete a dial number
- reserve dial numbers using a PEN
- reserve dial numbers without a PEN

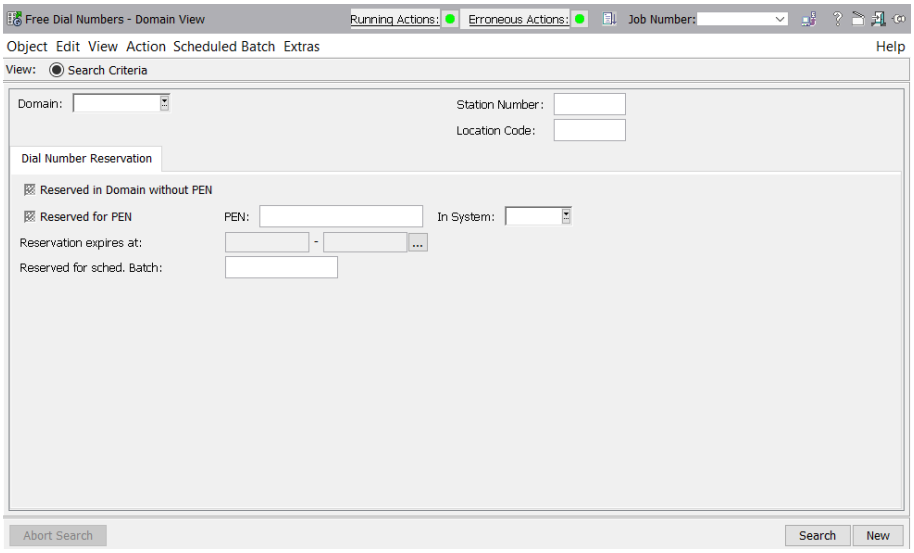

Figure 23: Free Dial Numbers - Domain View

Dial numbers can be reserved in a domain without or without a PEN. The reservation can also be assigned an expiry date.

Node configuration

Configuration Management allows you to configure virtual nodes, node connection data, and node formats and prefixes. It also permits you to configure number conversion and partial dialing plans.

3.6.4.6 Hotline Destinations

Configuration Management permits you to define hotline destinations for the Hotline feature. The destinations are setup under Hotline Index for the "Hotline" and "Code blue/Offhook recall" features. The destinations are assigned to the subscriber via the Station Configuration Management mask. As soon as you pick up the phone, the Hotline feature sets up a connection to the configured hotline destination. The "Code blue/Offhook recall" feature sets up a connection within a specific period if the subscriber does not dial a number after picking up the phone. You can administer the following functions with Configuration Management:

- Search for a configured hotline
- Create a hotline
- Modify hotline data
- Delete a hotline

3.6.5 Network Data

Domain and system administration

You can display the systems in a particular network via domain administration. Information on any existing sub-domains is also displayed.

Basic data for the systems managed by the Manager application is administered in the System mask of Configuration Management. You can perform the following functions:

- Search for an existing system according to any chosen criteria
- Query system data
- Set up a new system
- Modify an existing system
- Delete an existing system

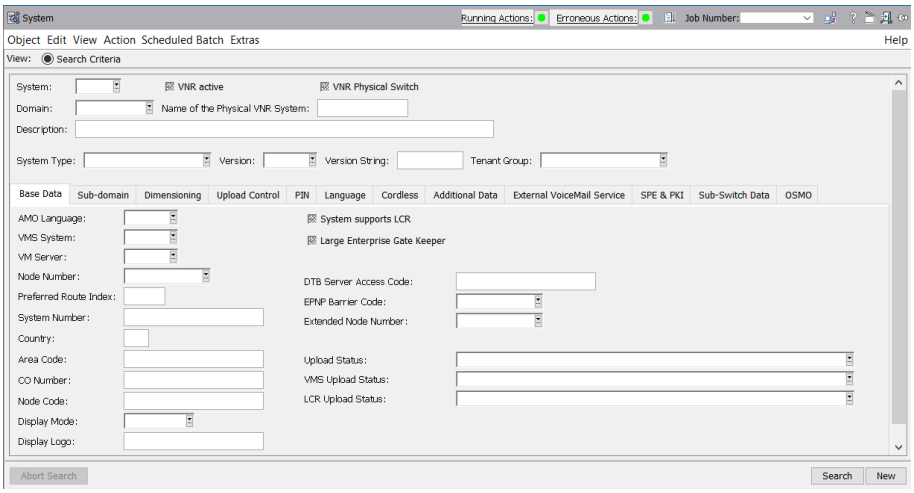

Figure 24: Configuration Management System Administration

Information such as system name, system type and version number is also stored in this mask along with the system location and dial number data. In addition, you can display or edit information on system dimensioning, status, data synchronization and network data.

Data synchronization

You can control data synchronization (Upload Control tab) between the OpenScape 4000 system and the OpenScape 4000 Manager database separately from this mask. You can also configure time-controlled upload and select the system data to be stored. You can synchronize the entire data or perform a delta synchronization.

Languages

You can set any of five predefined languages. You can assign preferred languages to devices with displays in the Station mask of Configuration Management.

Cordless

The system-wide Cordless data necessary for managing mobile users is displayed and can be administered.

You can reserve standard key layouts, classes of service and LCR classes of service here.

3.6.6 Boards and Lines

3.6.6.1 Boards

To configure boards and stations, you can use Configuration Management to display all locations where stations are configured (used) or where stations can be configured (free; signed off).

Boards are not configured in a location using Configuration Management. This is performed by external administration (expert mode). Configuration Management contains information on all locations at which subscriber devices can be connected. You can perform the following functions:

- Search for locations according to any chosen criteria
- Reserve a location for a station number
- Assign two mainframe connections to the location
- Input a location description
- Delete a location description

3.6.6.2 Lines

For line and trunk group administration, OpenScape 4000 Manager provides direct access to the OpenScape 4000 Assistant on the relevant system. You can use the Assistant to configure the boards as necessary. Users do not need to change workstations and can continue to use the familiar OpenScape 4000 Manager user interface.

3.6.6.3 Cordless System

You can configure the OpenScape Cordless SLC and vSLC (software based virtual SLC card in an Softgate environment) boards and the connected base stations via CATool. The following actions can be performed:

- Modify the SLC board configuration
- Modify the base station configuration
- Accept global cordless data
- Search for SLC boards

- Search for base stations
- Delete configured base stations and
- Configure base stations

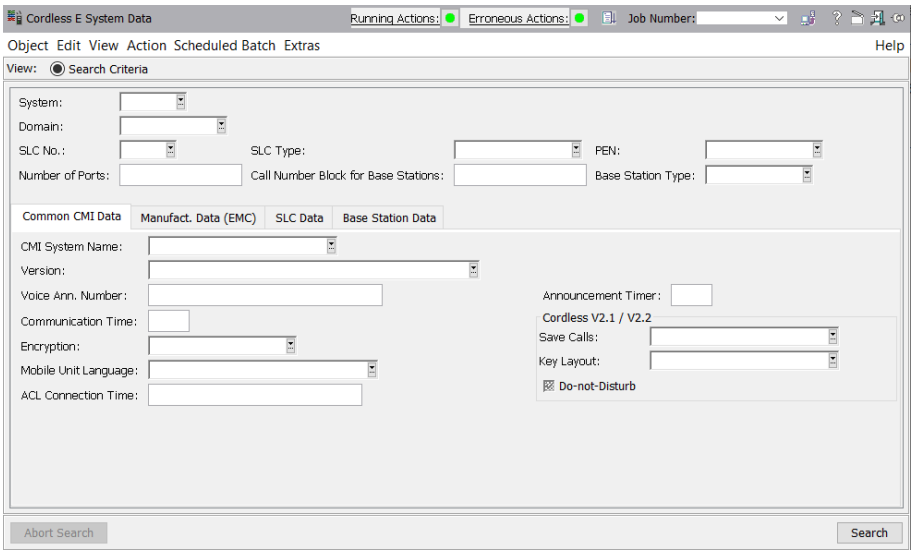

Figure 25: Cordless Administration

You can process all Cordless-specific parameters in this mask. In addition to global parameters, these include the voice announcement number if the call cannot be connected, the mobile unit language, key layout, and encryption. For performance reasons, it makes sense to restrict the maximum number of cordless stations for each board and switch in larger CMI networks. These maximum values are predefined for each SLC24 board and switch but can be modified to correspond to individual requirements. The value is always checked when a new cordless station has to be registered.

3.6.6.4 IPDA Configuration

The integrated Wizard permits the configuration of IPDA-based systems. The IPDA Wizard is integrated in OpenScape 4000 Assistant Configuration Management from where it can be started. The intuitive input masks facilitate the setup of IPDA configurations. Users are guided step-by-step through the IPDA configuration masks.

IPDA wizard support the configuration of OpenScape 4000 SoftGates. A SoftGate looks like a AP 3700IP shelf to OpenScape 4000 Assistant and is transparent for OpenScape 4000 Assistant for WBM.

3.6.7 Logs

With OpenScape 4000 Manager CM, logs are available network-wide and can be classified as follows:

- Action Control
- Error Log
- Session Log
- System Log

3.6.7.1 Action Control

This function displays the log for each system in a text box. Authorization is required for controlling other user's actions. Without the appropriate authorization, you can only display your own actions.

Possible actions are:

- Search for an action according to any chosen criteria
- Delete the log for a finished action
- Display a system log

Possible criteria are:

- System
- User
- Job number
- Action
- Action number
- Action status
- Phone number
- Number
- Name
- Time of action execution
- End time
- Status

3.6.7.2 Error Log

An error log is created every day for each system. Error logs contain a record of all actions that were incorrectly performed.

Possible actions are:

- Search for an error log
- Delete an error log

In the main Logging Management window, subscribers can be selected according to switch and date (past).

The log in the subsequent window provides information on:

- All administration commands that were not performed or only partially performed
- All associated negative responses from the selected OpenScape 4000 system on the selected day

3.6.7.3 Session Log

The Session Log window displays a list of the existing session logs. The Session Log contains a list of all activities for each user on a daily basis. You can also view the logs for scheduled batches (one log per batch) in this mask.

Only the activities of the current user are displayed.

Possible actions are:

- Search for a session log
- Display a session log

The following types of logs can be selected:

- Daily log - summary of activities on a particular day
- Verification log of scheduled batch <name>, reverification of scheduled batch <name>
- Procedure log for scheduled batch <name>, execute scheduled batch <name

3.6.7.4 System Log

The System Log window displays a list of the existing daily logs in the system. One system log is created per day and per system. It contains all administration commands executed for a OpenScape 4000 system on a particular day with the corresponding results. The logs only contain actions that were successfully completed.

Possible actions are:

- Search for a system log
- Display a system log

3.6.8 Least Cost Routing (LCR)

LCR Management is used to manage the financial aspects of route selection and to maintain LCR data. It is assumed that LCR use has been taken into account when planning the network and generating the systems in the network.

The LCR function in Configuration Management serves to display and update existing LCR data. Overview windows are provided along with windows for administering individual components of the LCR data warehouse.

LCR can be classified as follows:

- System Networking
- LCR Authorization Codes and LCR Authorization
- LCR Route
- LCR Route Element
- LCR Overview
- Out dial Rule
- Timetable
- Zone Data
- LDSRT
- Source Depending Routing (KNLCR)
- LCR Profiles

Unless otherwise specified, the functions described in the following section are available in both OpenScape 4000 Assistant CM and Manager CM.

3.6.8.1 System Networking

The System Networking mask displays all trunk groups that are configured on a system and that can be used in routes. Selected properties of these trunk groups that are relevant for LCR are also displayed. Each trunk group's "destination" is also displayed. This consists of the trunk group's destination system and the number configured for the trunk group. This mask thus gives details of the network configuration. You can also enter or supplement networking information. For example, you can enter or complete the destination data.

3.6.8.2 LCR Authorization Codes

In this mask, you can administer the authorization codes for accessing the services of a second source public provider from a private network. You can configure up to four authorization codes for each traffic restriction group (ITR group). The authorization codes are used by the LCR feature and are referenced by the LCR outdial rules. You can input the authorization code in a readable or encrypted format. You must set up the correct authorization code to permit an ITR group to access a public second source channel. No error will be generated if you do not set up the correct authorization code.

Caution: Even if you entered the authorization code in encrypted format, it will be displayed in unencrypted format later on (AMO conversion).

3.6.8.3 LCR Authorization and LCR Classes of Service

LCR authorizations are combined to form LCR classes of service (LCOS). There are 32 classes of services available for each voice and data service. These are preassigned to each system and therefore cannot be deleted or configured. You can modify the content of LCR classes of service by adding or deleting individual LCR authorizations. LCR Management permits you to edit LCR classes of service. The LCR Class of Service Voice and LCR Class of Service Data masks are available for this purpose. In these masks, you can check the meaning of individual authorizations by clicking a link to the LCR Authorization window. You can distribute the content of individual LCR authorizations through synchronization within the network.

LCR Authorization

LCR Authorization manages:

- Access to dial numbers: which ([Subscriber][Dial Numbers] or trunk) can call which dial numbers? (LCR authorization in LCR dial plan)
- Access to alternative routes during connection setup: which access authorization can be used to seize the route trunk group of a route element? (LCR authorization of a route element)

The LCR authorization of a station is contained in its LCR class of service for voice and data services. During connection setup, authorization is transferred from the source node to the destination node. This station authorization is verified at each transit node when determining the next hop of the route to its destination.

Conclusion: LCR authorizations must have the same meaning in every network node. The 64 individual LCR authorizations (LAUTH) have no universal applicability and can be customized by the user. The meaning of each LCR authorization is determined during network planning. For example, LAUTH 6 as the authorization for trunk access. To make this information available to the administrator, you can specify the valid meaning for each LCR authorization in this window. We recommend implementing a universal concept for assigning LCR authorizations. This ensures a network-wide use of LAUTH for administration purposes.

Example:

- LAUTH=1-5 administration of restricted trunk access.
- LAUTH=6-x administration of expensive tie trunks
- LAUTH=x-62 administration of private tie trunks.
- LAUTH=63 access granted to all subscribers.
- LAUTH=64 access denied to all subscribers.

3.6.8.4 LCR Route

This mask allows you to display and administer LCR routes.

There are two types of LCR routes which have different names in the "LCR Type" field:

- LCR
- NWLCR

You can display LCR routes of the type "NWLCR" - Networking LCR" but you cannot configure, modify or delete them.

3.6.8.5 LCR Route Element

This mask allows you to assign the following to each routing element:

- A value within the LCR route
- A route trunk group
- An LCR outdial rule
- An LCR authorization
- Optional LCR attributes

3.6.8.6 LCR Overview

In a window, the LCR outdial plan of a system is linked via the assigned LCR routes to the route elements and thus to the outdial rules for processing it. The characteristics of each data type are selected from all these different LCR data types. The window is only used for finding and displaying data. From several of the fields, you can activate a complete overview of the individual LCR data types using the "Jump to the linked object" function. All fields can only be over-written in search mode or not at all.

3.6.8.7 Outdial Rule

An outdial rule is set up step by step as its elements are defined. The elements are automatically assigned consecutive numbers during this process and can then be accessed individually at this number (field position). An outdial rule is completed with the END element. This can only be used when the outdial rule is complete; that is, assigned to an LCR route element.

3.6.8.8 Timetable

LCR timetables are used for time-controlled route selection. They are used for the "LCR Expensive Tone" feature. Each timetable is assigned a number of switchover times for each traffic restriction group within a week, thus achieving strip-like coverage of the whole week. This allows you to emulate the time dependency of network operator charge rates. Each LCR route element can either be used (default), marked as expensive or blocked for each timetable.

3.6.8.9 Zone Data

The Zone Data mask allows you to select the parameters for the network operator fields and route element window zone. In this mask, you can enter all combinations of network operators (number) and zones (system name) that are useful for a particular system.

3.6.8.10 LDSRT

You can use this function to block specific dial-in numbers. You can use this function to block specific dial-in numbers for route elements. To do this, you must define LCR restriction tables that can be assigned LCR route elements. Any dial-in number listed in the restriction table will be denied. You can assign up to 16 restriction tables and up to 5120 dial-in numbers to a route element. You can do this in the Restrictions tab of the LCR Route Element mask.

3.6.8.11 Source Depending Routing (KNLCR)

This function allows you to administer the classes of service that are used for modifying the LCR authorizations for route selection. This enables the source/ destination-controlled seizing of LCR routes through the modification of LCR authorizations when initiating route selection.

The LCR route is controlled by the LCR authorizations. Two combinations of LCR authorizations are used to modify the original preassigned LCR authorizations:

- One combination allows you to extend the original LCR authorizations (Extend Access Rights tab)
- The other combination allows you to restrict the original LCR authorizations (Restrict Access Rights tab)

You can thus administer the use of LCR routes (activate or deny use) for one or more nodes in a network on a source- and time-controlled basis.

3.6.8.12 LCR Profiles

LCR profiles can be configured and edited. LCR routes with calls routed to CO are assigned to LCR profiles in a table. You can use an LCR profile instead of an LCR route in the Digit Pattern window.

3.6.8.13 DMC Domain

Any-to-any payload switching sets up a direct media connection (DMC) between the IP endpoints via the IP network.

A DMC domain is defined by DMC endpoints that are permitted to set up DMC connections to each other.

- A DMC endpoint may not set up a DMC connection to another DMC endpoint outside its own DMC domain. This is useful if IP addresses are not globally unique or if IP capacities are not to be used for DMC.
- DMC domains are defined via LCR by allowing DMC connections to access route elements. This access means that the route element leads to a partner in the same DMC domain.
- By definition, all DMC endpoints in a system belong to the same DMC domain.

3.7 Performance Management

3.7.1 Performance Management at a glance

PM is a Web-based application which provides statistics analysis for:

- Line load
- Trunk group load
- Subscriber and hunt group call behavior
- Attendant console and attendant console group load

Performance Management is based on the evaluation of call data records (CDRs). For this reason, you must configure call detail recording in all OpenScape 4000 systems that will be included in an evaluation. The Collecting Agent (COL) gathers the CDRs from the whole network, filters them and stores them separately for Accounting Management (AM) and Performance Management (PM).

Restrictions

Call charge recording and transfer tie up resources in all participating components (see Figure 3-24). You must agree upon and document the required memory for recording and transfer, the transfer rates/frequencies, the provision of data and the archiving procedures.

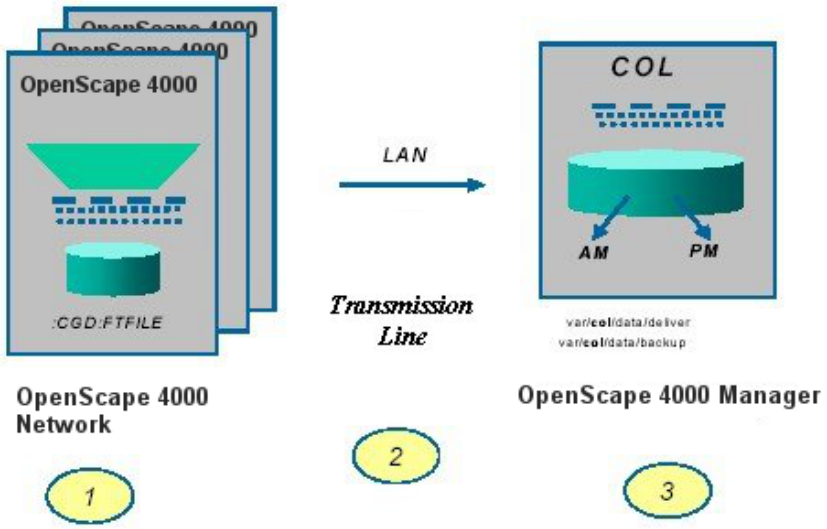

Figure 26: Performance Management Call Charge Recording

You can set the following parameters to select the filter function:

- Determine the measuring objects
- Determine the call types and routes
- Define the measuring interval

The filter describes which data is used from the data collection to generate the report.

Measuring objects

The following measuring objects can be selected:

- Systems
- Trunk Groups
- Groups of Trunk Groups
- Lines
- Extensions
- Subscriber calls
- Hunt Groups
- Attendant consoles
- Cordless E
- Feature utilization
- SWU ADP load

Call types

Depending on the network configuration, you can distinguish between the following call types:

- Internal:

  1. Call with source and destination within a single system

  2. Calls with source and destination within the network (within or between the systems)

- External:

  1. Calls with source and destination in the external network

  2. Call with source and destination outside the system
- Transit:

  Transit calls are calls that are not initiated or completed on the monitored object (relevant for external lines and line trunks only).

Routes

Route measurements are distinguished as follows:

- Incoming: Incoming calls are calls that are completed on the monitored object.
- Outgoing: Outgoing calls are calls that are initiated on the monitored object.

Measuring interval

Performance Management takes a modular approach to defining, executing and generating (time-controlled) reports. Different pages are used to define the filter, select the report, determine the report period (default report interval setting: 15 minutes), and execute the report according to date and time.

In the modular PM approach, each user has a single mask for defining and saving reports or running them on request. Users can also create dynamic ad hoc reports that elapse immediately. In contrast to ordinary reports, ad hoc reports are not saved.

The following options are available for defining the measuring interval:

- Default: 15 minutes according to ITU
- Hourly or every 2, 3, 4, 6, 8, 12 hours
- Daily, weekly, monthly
- Specific weekday
- Specific day in the month

The standard report templates can be used to perform the evaluations. You can also create user-specific templates.

You can display, save and print the evaluation results. You can further process the reports with the option for exporting the standard PM report results in Excel or CSV format.

Options for initiating reports

The following options are available for initiating reports:

- Manual selection and manual start (also ad hoc reports)
- Time-controlled selection specifying date and time
- Time-controlled selection with specified time intervals:
  - Hourly or every 2, 3, 4, 6, 8, 12 hours
  - Daily, weekly, monthly
  - Specific weekday
  - Specific day in the month

Procedure:

Once you have selected the system to be evaluated and the measuring objects, you should specify the filter that describes which data from the data collection

is used for generating the report. The next steps include flexible definition of the report, specifying when to run the report and interpretation of results. The PM application features more than 80 standard professional reports that can be flexibly used to create tabular or graphical reports. These can be exported as predefined graphs or in Excel, PDF, HTML or CSV format.

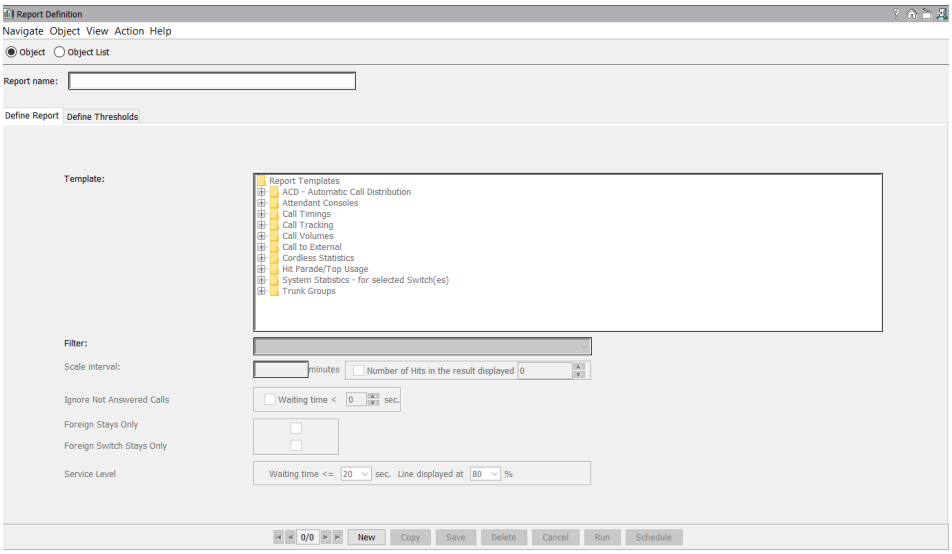

Figure 27: Report Selection Example: Bar Chart

Thresholds

Thresholds can be created for some PM reports/report groups. These are output as lines in the corresponding report. This function can be activated as an option in Report Definition. The upper and lower thresholds can be entered in the appropriate entry fields. Normally, the values are entered as absolute numerical values. However, you can enter percentages between 1 and 100 for reports that deliver evaluations as percentages. If a value entered exceeds or falls short of a threshold, an entry is made in OpenScape 4000 Manager Logging Management. An alarm message can also be created in OpenScape Fault Management.

Organizational level report

You can use the organizational level report to create reports based on the organization data available in OpenScape 4000 Manager. You can use the eight organization levels from Configuration Management Station Administration. When you create a new filter for a report, you can choose between the "Organizational" filter or the "Telephony" filter. The "Organizational" filter lets you select all stations associated with an organization level for the reports. All stations in this organization level are then evaluated. Different organization level filters can be predefined in Performance Management.

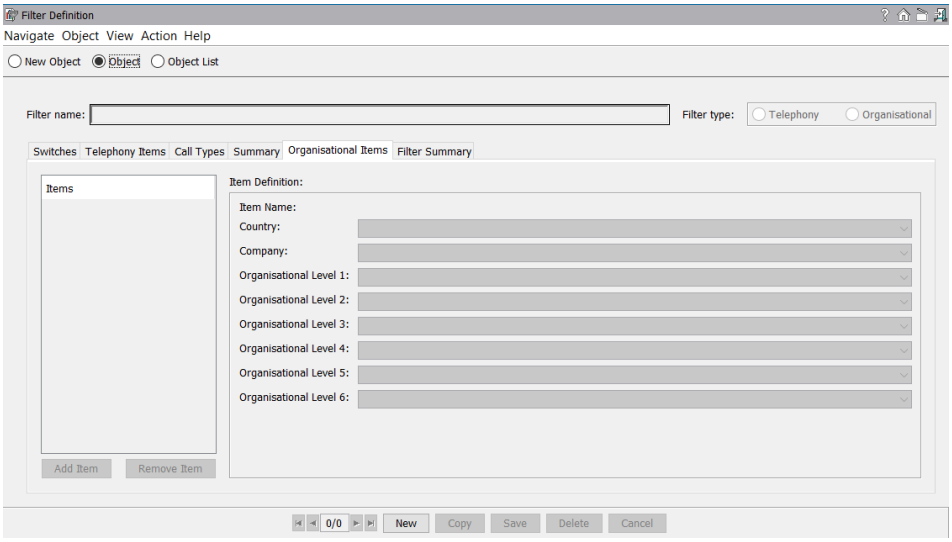

Figure 28: Organizational Filter Definition

Call tracking reports

Call tracking reports make it easier to detect routing problems in the network.

There are two types of call tracking report.

- Call-by-Call

  This report summarizes information on individual or multiple calls and displays it in a table. The data on display is taken from the corresponding call detail records (CDR). Data, such as, the time and duration of the call, the source and destination number as well as the node numbers, is displayed for every call. The call status is also displayed. This specifies whether and how the call came about (for example, answered, not answered, busy) as well as the feature it was created in (including: standard call, pickup group, call transfer, recall).
- Call Flow

  This variant displays all call data with the same node and sequence number. This means the report shows the complete progress of a call, from start to finish. An incoming call can be transferred through different call segments, for example, via forwarding or consultation hold. Users can use call flow reports to track calls, segment by segment, across all stations in the network.

Top 10 reports

Performance Management uses top-10 reports to provide an overview of peak values in the system. This enables the user to identify critical situations more quickly and react accordingly.

The following top-10 reports are available:

- The top 10 number of calls
- The top 10 number of answered calls
- The top 10 number of unanswered calls
- The top 10 number of missed calls when busy
- The top 10 load values per trunk group

3.7.2 Reporting of trunks

PM supports the measurement and evaluation of traffic load on:

- lines
- trunk groups
- groups of trunk groups.

You can perform the evaluation for all OpenScape 4000 systems in a network and in mixed OpenScape 4000 networks.

The data collected is presented in diagrams. Overburdened or superfluous connections in the network can be quickly identified in this way and optimized according to the company's needs.

The following standard reports are available:

- Peak Traffic Times
- Statistics about the situation in peak traffic hours during the monitored time period
- Trunk Group Load
- Information on the load for each selected trunk group
- Time Load displays the load per trunk group during the selected time
- Trunk Group Availability displays the availability status of each selected trunk group
- Time Availability shows the availability of each trunk group during the selected period

The evaluations are provided as tables or diagrams.

Periodic performance test

The evaluation in a PM report always refers to certain lines or trunk groups. The evaluation results, however, always depend on the actual channel resources available.

As a result, you can also check the availability of channel resources in the trunk group to be evaluated for the PM reports. When defining a report, you can select whether the channel status should be periodically checked for the trunk groups to be measured. The result of the check specifies how many channels in a trunk group were actually available during the measurement period (status READY in OpenScape 4000).

The results are displayed as diagrams or tables in the corresponding PM reports. The following figure is an example of a report for evaluating trunk group load.

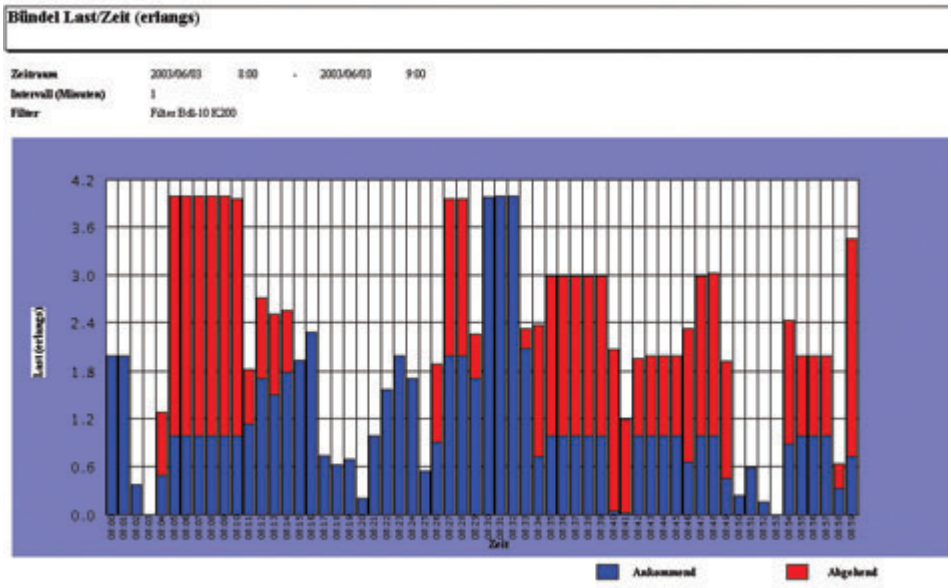

Figure 29: Sample Report

In addition to the bar chart showing the percentage of trunk group load, the red line chart provides the user with information on the channel resources that were actually available in the trunk group at the time of measurement. The measured data can also be created as a tabular PM report.

In order to evaluate the channel status, the corresponding parameter must be activated in COL before the measurement is made.

Compressed report

Trunk group measurements can be performed in compressed mode. This means that the call data is compiled over a period of 15 minutes. Afterwards, the individual, underlying CDRs are deleted. The reports can then be prepared on a daily or weekly basis. This can significantly reduce the memory required for the call data. This makes it possible to perform long-term measurements with a relatively low amount of data.

3.7.3 Reporting of subscriber lines

Performance Management permits you to map and evaluate the load for a multitude of other objects in OpenScape 4000 systems and OpenScape 4000 networks, such as:

- Subscribers
- Hunt groups
- Attendant consoles
- Cordless E
- Feature utilization
- SWU ADP load

The various measuring options, such as ring time, hold time, and call duration, allow you to make other adjustments as required.

The following standard reports are available:

- Call Volume
  - Total number of calls - statistics on the number of all calls on the basis of the selected objects.
  - Answered calls - statistics on the number of answered, unanswered and lost calls (busy state) at the selected objects.
  - Peak traffic times - statistics on traffic at peak times at the selected objects in accordance with ITU regulations.
  - Availability - statistics on availability (connectivity) percentage for the selected objects.
- Call Timing
  - Call status (hold, ring, call and idle time) Statistics on the connection statuses of the selected measured objects (on hold, busy or blocked, digit input, call, ring and idle).
  - Average ring, wait and service time Statistics on the average total of ring and wait time for answered and unanswered external calls and the average service time of the called party.
  - Average ring, wait and call time
  - Statistics on the average wait, ring and call times for calls to the selected measured objects.
  - Call times Statistics on the minimum, average and maximum call times for calls to the selected measured objects.
  - Ring times Statistics on the minimum, average and maximum ring times for calls to the selected measured objects.
  - Ring times for answered and unanswered calls Statistics on the ring times for answered and unanswered calls to the selected measured objects. The calls are divided into five groups according to their ring time.
  - Total ring and wait times Statistics on the ring and wait times for answered and unanswered calls to the selected measured objects. The calls are divided into five groups according to this total time.
  - Wait times Statistics on the minimum, average and maximum wait times for calls to the selected measured objects.
- Attendant console
  - General statistics General statistics is a combination of the following reports: Number of calls per call type, number of answered calls per line type, initial calls/recalls, average ring, wait and call times
  - Number of calls per call type Statistics on the sum of incoming/outgoing calls per AC line type (CO, attendant or personal line). These statistics can only be determined for attendant consoles or groups of attendant consoles.
  - Number of answered calls per line type Statistics on the number of incoming calls per AC line type (CO, attendant or personal line). These statistics can only be determined for attendant consoles or groups of such that are deactivated, on night service or have the jack removed.
  - Deactivated, night answer, and no jack Statistics on the times during which the attendant console(s) are active or inactive (deactivated, have no jack or are on night service).
  - Initial calls/recalls Statistics on the number of initial calls or recalls for the selected measured attendant console or attendant console group.
  - Average ring, wait and call times Statistics on the average wait, ring and call times to the selected measured objects.
  - Jack inserted/removed Statistics on the times during which the jack was inserted or removed from an attendant console(s).

- System statistics
  - Feature - Access data Statistics on the number of times features are activated (always valid for the entire PABX and not just for measured objects). Example: activate 'Do-not-disturb'.
  - ADP - Load data Statistics on the average ADS/ADP load in percent.
  - SWU - Load data Statistics on the average SWU load in percent.
- Cordless base station
  - Base station resets Statistics on the number of resets in a base station.
  - Total calls Statistics on the total number of outgoing and incoming calls for OpenScape Cordless.
  - Inter SLC handover Statistics on the number of handover between two base stations in two SLC boards.
  - Intra SLC handover Statistics on the number of handover between two base stations in one SLC board.
  - Layer 1/2 error Statistics on the number of Layer 1/2 errors in a base station.
  - Carrier handover Statistics on the number of internal channel changeovers in a base station.
  - Unsuccessful carrier handover Statistics on the number of unsuccessful internal channel changeovers in a base station.
  - Successful carrier handover Statistics on the number of successful internal channel changeovers in a base station.
  - Interrupted connections Statistics on the number of calls that are interrupted during connection.
  - Overload situation Statistics on the number of times the RSP Busy Flag is indicated for each base station.
- Cordless SLC cards
  - Inter SLC location update Statistics on the number of times the SLC location is updated.
  - Intra SLC location update Statistics on the number of times the intra SLC location is updated.
  - SLC board no handover Statistics on the number of calls that cannot be extended to another SLC board.
- Cordless location statistics
  - Cordless location per extension Statistics on the total base station logon time per extension within the selected time period.
  - Detailed cordless location statistics Statistics on the cordless base station logon time regardless of the interval selected. These statistics display all cordless base station logons within the selected time period.
- Cordless overload duration
  - Overload duration per base station Statistics on the total duration of overload situations per base station during the selected time period.
  - Overload duration per interval Statistics on the duration of overload situations per interval in the time period.
  - Detailed overload duration statistics Statistics on the duration of overload situations regardless of the interval selected. All overload situations are displayed.
- Attendant console

3.8 Collecting Agent

3.8.1 General

The Collecting Agent (COL) gathers call data records for AM and Performance Management (PM). Users can perform various administrative tasks using the Web-based COL user interface. For example, they can define input and output formats, output lines, and filters, and monitor the COL status. COL analyzes individual call charge records and can be configured so that these records are combined with and extended by the personal/organizational data in Configuration Management. The resulting individual connection data is available as an ASCII file (unformatted) and can thus be evaluated by any downstream application that supports a file interface (for example, OpenScape AM, SAP).

3.8.2 Functions

The Collecting Agent provides the following functions:

- Records individual call charge data records in OpenScape 4000 systems.
- Filters and store PM-relevant data in the OpenScape 4000 Manager database.
- Provides CDR output files for OpenScape AM, for example
- Supports flexible CDR format in input and output files
- Supports CDR output filters on the basis of specific connection data elements
- COL administration (activation/deactivation, recording planning, etc.)
- Logs COL activities

3.8.3 Input Lines, Input Formats, Output Lines, Output Formats

Due to its ability to operate several input lines, the COL is not restricted to one data record format. It can be adjusted according to the requirements of the different systems that can then be grouped into different input lines.

The system features a range of standard input formats for each system and application type (OpenScape AM, COL, COL+PM, PM). If required, you can create individual formats with the Input Format Editor and assign them to one or more input lines. The same applies to the Output Format Editor, which you can use to create individual output files, and to the Filter Editor, which you can use to define conditional output.

The Collecting Agent enables you to perform scheduled processing of incoming data transferred via the receive line. The administrator can use the Collecting Agent to control the time slot when call details are integrated in the database by the system. This enables the administrator to specify processing at off-peak times. This prevents additional strain being placed on the system.

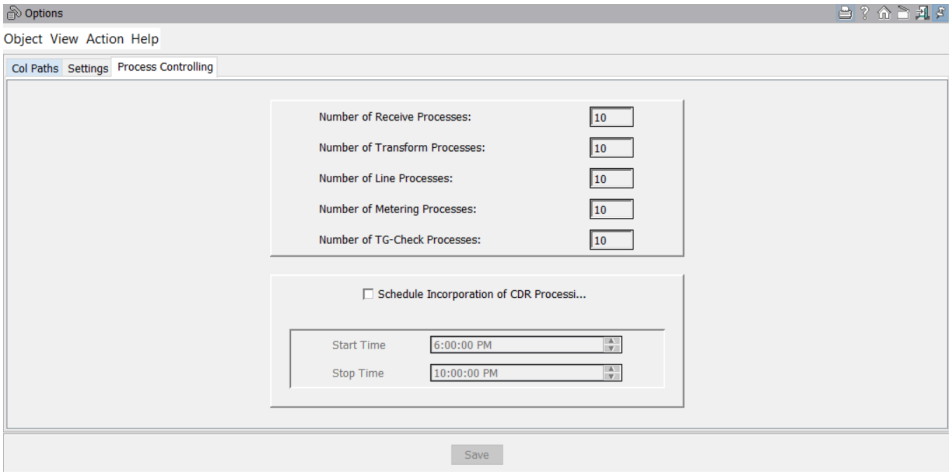

Figure 30: Scheduling Further Processing during Off-Peak Times

3.8.4 Administration

You can stop and start input and output lines in addition to providing information on them. Call charge data is not discarded in the event of errors, but can be sent back to the output process via the user interface once the error has been rectified.

Call data records can be stored in a backup file and deleted or updated there or re imported as an input file. Additional functions are available to:

- automatically refresh backup files
- determine remaining filesystem space
- set the storage time for backup files

Extensive logging functions for input and output line events and all error events and user activities enable error analyses to be performed even for past periods. Since log files may enlarge considerably during operation, they are monitored to prevent memory overflow. The option of temporarily storing the plain charge records on the server cuts the diagnosis times if service is required.

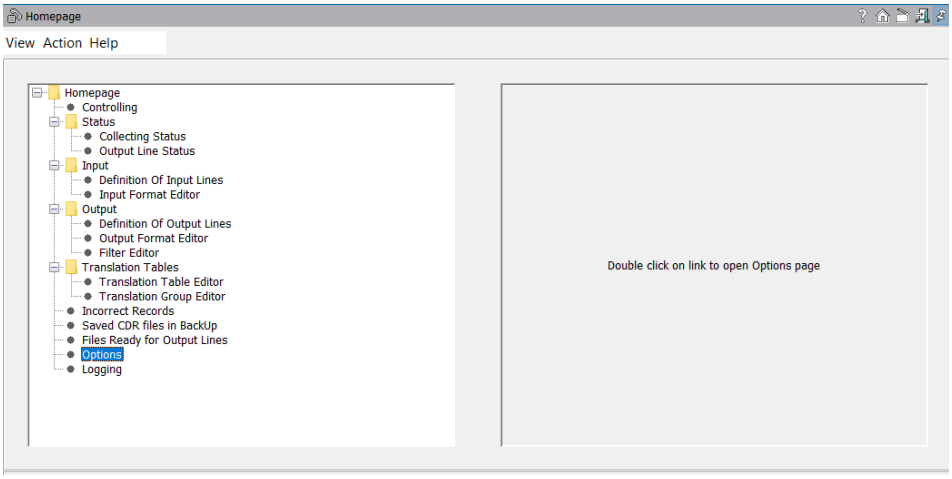

Figure 31: Collecting Agent Home page/Logging

The display of COL logging events can be started in the Collecting Agent. The events are displayed in a list which can be sorted by field and output as necessary (print or export).

Field

Description

Description of the fields in the "Logging" dialog

Field	Description
Date	Date and time of the logging message
Category	Logged activity category
Error	Error message
System ID	ID of the network node that was logged
Short message	Brief description
Long message	Detailed description
Severity	Urgency of the logging message
Print/Export	

OpenScape 4000 Manager can be used to activate monitoring for an initiated or blocked call data retrieval operation between the system and OpenScape 4000. If monitoring is active, the retrieval operation is monitored at fixed intervals (default setting is 20 minutes, intervals can be set between 10 and 60 minutes) and can be used to detect "frozen" processes and the data transfer status.

The "Output Line Status" menu item can be used to display selected data records or entire files in the output line or output them in a deliver directory.

Call data records can also be displayed and output with the menu items "Incorrect Records", "CDR Files Saved from Backup Files", and "Files Ready for Output Lines".

The "Maintenance" function provides options for optimizing the "pm_cdrdatatbl" table. This operation removes unnecessary data records from the database. Access is restricted to technicians.

3.8.5 Restrictions when Using PM

Due to the large volume of data that can arise when PM measuring objects are activated, the following restrictions must be taken into account when dimensioning the performance of the server and any existing OpenScape 4000 systems.

- The disk capacity in the switch is only 30 MB. This results in very short server access times which can put a heavy load on the server.
- Shorter access cycles naturally mean that data records must be stored in the database more frequently, which may additionally burden the server.

- The CPU load in the switch resulting from the high volume of data traffic increases noticeably
- To ensure the shortest possible data transfer times, there must be a high-performance connection between the OpenScape 4000 systems and the server.
- The hard disk capacity on the server is limited and may need to be extended with additional disks.
- Evaluations in Performance Management can cause loss of performance due to the volume of data being processed.

3.9 Operating Moduls

3.9.1 Access Management

Access Management is the access control component for OpenScape 4000 servers. It controls which users are allowed to access a specific server, and which applications and access rights these users may use. Possible users are customer administrators and service technicians that manage OpenScape systems.

For those users, Access Management creates user accounts, manages their passwords, password attributes and other account-related data, and controls their access via a web browser.

Further features of Access Management are:

- Web Session Management
- Network Single Logon (NSL)
- Emergency Password Reset (EPR)
- Password History Configuration
- Control of system accounts
- Managing Web Server certificates (starting with Version 2.0)
- Single Sign On
- PKI Management
- Password Policy Management

Access Management provides five different Security Levels. Every user that logs on to a OpenScape 4000 server belongs to exactly one of these levels.

For four of them, predefined user accounts with initial passwords are created to grant immediate access to the OpenScape 4000 server.

For security reasons, the initial password must be changed when the user logs on for the first time.

3.9.1.1 Access Right Configuration/Access Right Group Configuration

The process for selectively assigning access rights is simplified by combining them into access right groups. In addition to the predefined access right groups for each application, which contain the maximum access rights, you can create and modify individual rights. Changes made to an access right group automatically apply to all users assigned to the group.

All access right groups are divided into access objects (predominantly 'maximum access' rights and 'read only' rights) as illustrated in the following "Configuration Management" example.

- Action Control · Action Control (read access) · Display action control for all users
- System Log · System Log (read access)
- Pickup Group · Pickup Group (read access)
- Converged Speed Dial View - Converged Speed Dial View (read access)
- Converged Hunt Group View - Converged Hunt Group View (read access)
- Change Display Name
- Hunt Group · Hunt Group (read access)
- Session Log · Session Log (read access)
- Subscriber · Subscriber (read access)
- Station · Station (read access)

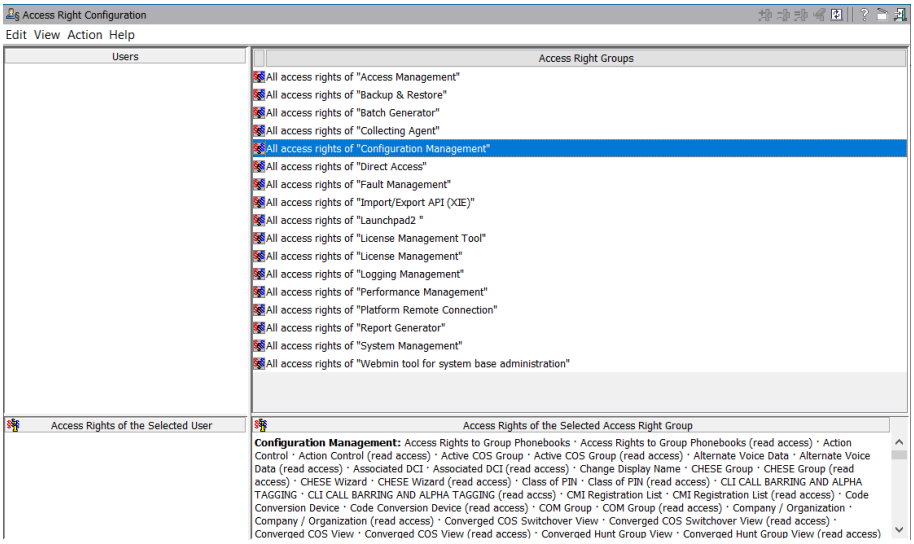

Figure 32: Access Right Configuration

3.9.1.2 Session Management

The Session Management function supports a user interface via which you can change the user password and a Web Session Manager, which provides you with an overview of all Web sessions for the current user. Users can view login and connectivity information for their sessions, and can also close (kill) sessions manually.

3.9.1.3 Exporting User Data

User and access right configuration can be exported from the server to a file on the client for further processing/use.

3.9.2 Security

OpenScape 4000 Management offers a wide range of security functions for client/server communication.

3.9.2.1 Authentication

A user name and password are required for system authentication. The password must be created in accordance with password policy specifications (minimum length, special characters, upper and lower case, etc.). Users can be prompted to reenter their passwords at regular intervals.

3.9.2.2 Authorization

User profiles can be configured and used to create different access authorization levels for users. Enhanced Client Capability allows you to restrict object level access (station level, for instance). Configuration Management can be used to restrict users' edit authorization to specific client groups (see also Section 3.6.1.8, "Enhanced Client Capability").

3.9.2.3 Data Integrity

Passwords and data transfer are encrypted to prevent unauthorized access to the system (SSL/TLS, strong encryption).

OpenScape 4000 Manager contains SFTP and SSH protocols to improve security for administrative access and data transfer.

SFTP (Secure File Transfer Protocol) is implemented to ensure secure connections. This protocol ensures that the connection between the client and the FTP server is encrypted. Data is then transferred via this encrypted connection (SSH tunnel). The SSH protocol allows client and server programs to communicate securely and transfer data.

IPsec can also be used to encrypt communication between the client and the server. IPsec is supported by default in the SUSE LINUX operating system. Users can configure encryption to meet their individual requirements.

3.9.2.4 Logging

Starting and ending sessions, invalid logon attempts, creation and deletion of rights, modifying security settings.

This function prevents user accounts created by user account management from being accessed via other software that can access command line interfaces.

3.9.3 Software Management

The installed applications and their selective storage on various media is administered by the following modules:

- Software Transfer required for transferring software packages to OpenScape 4000 systems.
- Software Activation (SWA-2) permits you to update software on OpenScape 4000 Manager

3.9.3.1 Software Transfer (SWT)

- allows multiple selections for transfer and display of overall transfer progress
- takes also into consideration the version from Minor/Fix release and contains final version information (version after upgrade) of all subsystems.
- supports multiple transfer - user could select more packages to be activated as one job
- it is possible to transfer single upgrade packages
- running transfer job could be cancelled
- if transfer is aborted (e.g. OpenScape assistant/manager reboot or network disconnection) a new transfer has to be initiated. Already transferred parts will not be transferred again.

3.9.3.2 Software Activation (SWA2)

- allows selections of upgrades which should be done and settings of upgrade options
- supports multiple activation - user could select more packages to be activated as 1 job
- handle sequence of activation for HotFixes and Minor/Fix release
- handle transferred HotFixes which should be activated after successful Minor/Fix release activation
- behavior in case of failure is configured
- it is possible to activate single upgrade packages
- Scheduled software activation jobs could be cancelled, but it is not possible to cancel an running activation job
- if OpenScape Assistant/Manager reboot occurs during activation, activation will continue with upgrade from the last interrupt step
- default activation orders are:
  - last available (transferred) A&S HotFix
  - last available (transferred) RMX HotFix
  - last available (transferred) CSTA HotFix
  - last available (transferred) PLT HotFix
  - Available Minor/Fix release available on device
  - last available (transferred) A&S HotFix after MR/FR
  - last available (transferred) RMX HotFix after MR/FR
  - last available (transferred) CSTA HotFix after MR/FR
  - last available (transferred) PLT HotFix after MR/FR

- HotFix cleaning mechanism
  - when MR/FR upgrade is successfully finished, all HFs files related to the original MR/FR are removed from the file system (from transferred directory)
  - HF cleaning during HF activation removes all older (from a version point of view) HF files available on system
  - the latest two HF stay on the file system
- Activation history

  When a subtask from a activation job has finished, an activation history will appear. So when the whole activation job has finished, activation history contains records according to processed activation

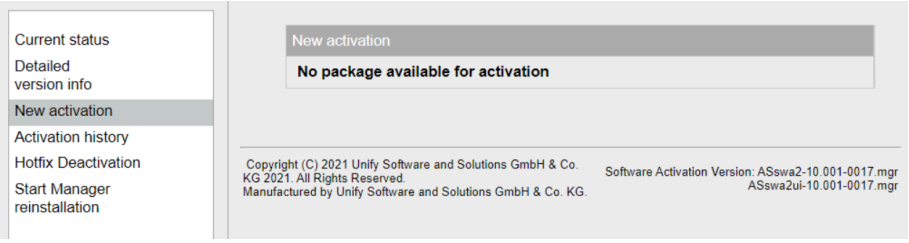

Figure 33: SWA2 activation screen

3.9.4 Data Backup

HBR allows you to create a backup of configuration data or software for operating systems and applications. If the system malfunctions, you can thus access correct and backed up data and/or software and restore smooth operation quickly.

HBR function overview

The browser-based user interface allows you to perform the following functions:

- Backup: save specific backup units and configuration data to a local medium or to a backup server
- Restore: restore a backup set (consisting of several backup units) from a local medium or a backup server
- Display the contents of an archive or all archives
- Display status during backup/restore
- History: display a status list for the last 25 backup/restore operations
- Schedule: define when and how often an automatic backup cycle should be executed
- Administer the external devices and the backup server

- saving of large LOGBK data

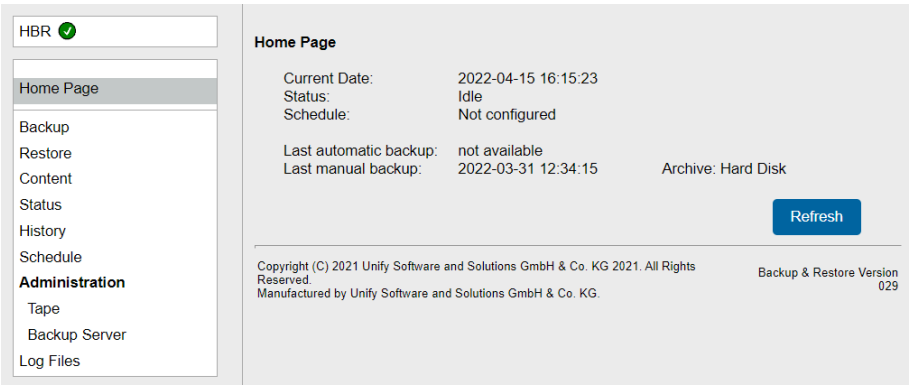

Figure 34: OpenScape 4000 Backup & Restore

3.9.5 Alarm and Error Handling

3.9.5.1 OpenScape 4000 Alarm Configurator

The Alarm Configurator allows you to administer up to 512 system alarms. Automatic alarms can be assigned to stations or lines that have not been allocated alarms. In the event of errors, these alarms are then displayed in OpenScape Fault Management.

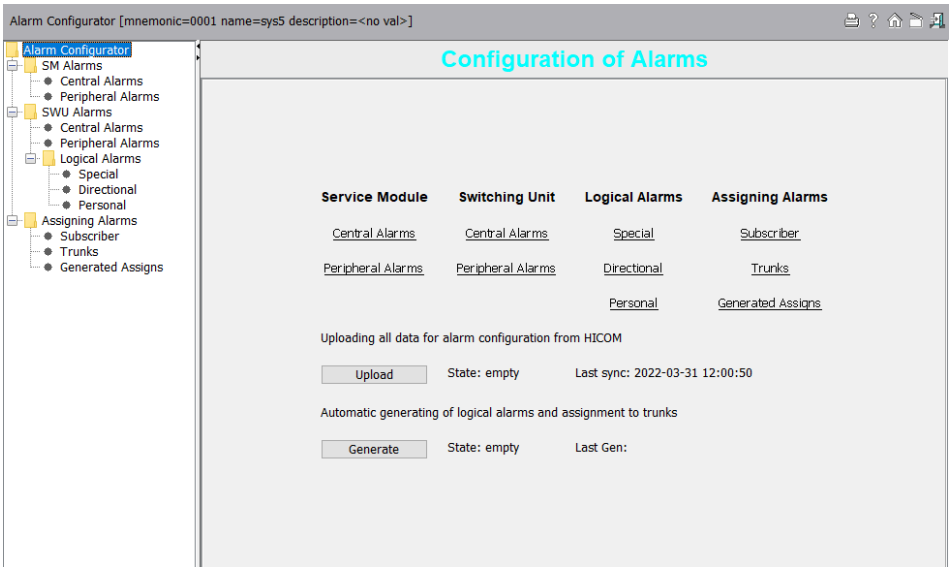

Figure 35: Alarm Configurator

3.9.5.2 Flag Trace Watchdog

The OpenScape 4000 Management Flag Trace Watchdog application is a tool designed for system specialists. It facilitates quick evaluation of a

monitored call, for example, by collecting diagnostic or trace information from all participating nodes of a telecommunications network into a single file. This can cut diagnostic or service times considerably.

3.9.5.3 SNMP Support

For an efficient integration of the OpenScape 4000 Manager into the Managed Service Structure, enhancements concerning the monitoring of errors / alarms and events are supported. Based on SNMP protocol traps (errors or alarms) could be send to OpenScape Fault Management or other 3rd party Management tools.

Such SNMP trap identifies the failure from its naming in the MIB. So instead of general trap model (one trap with many variable bindings based on AFR monitoring) the little data trap model is used (one trap OID per error/event).

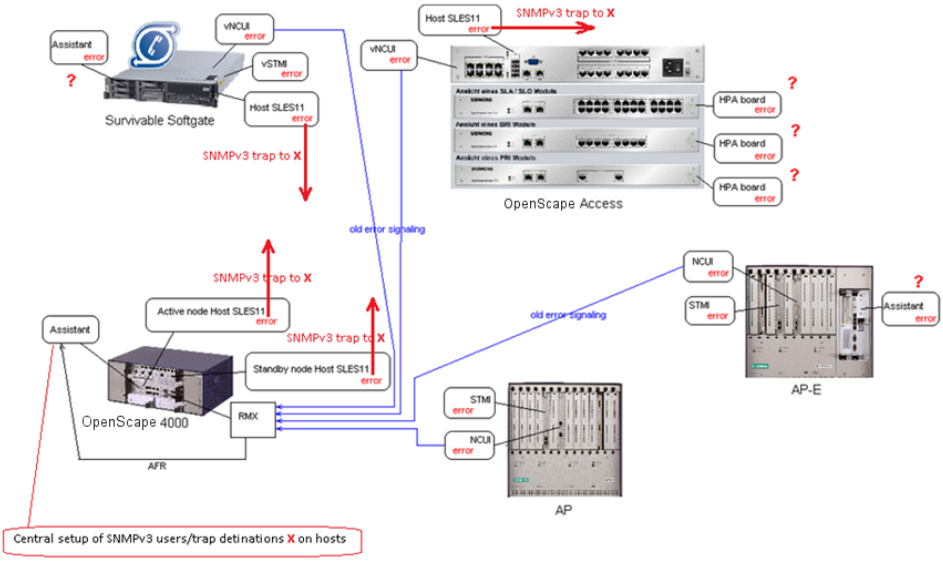

Figure 36: SNMP-Service

On each host a SNMP service is running configured centrally from Assistant. This SNMP service are able to send snmp traps (e.g. traps for hardware errors, kernel messages from syslog-ng and critical traps from services/applications) running on the host. The solution consists of following parts:

- distribution of SNMPv3 configuration to all 4k hosts
- setup of service contact/location/name for mib2 and activate mib2agent on each host
- define syslog-ng message format for applications an services on 4k hosts
- create new 4k hosts MIB with notification messages for each possible hardware/applications error which should be send as SNMP trap
- create consolidation / filtering application on host
- create agents for hardware monitoring
- OpenScape FM compliance

The solution actual considers:

- the hardware components of the cPCI and eco-server
- a separated quorum node

- the host applications on the platform
- the virtual and physical gateways including the messages from the operating systems
- Softgate with the corresponding operating system and active applications
- the RMX messages from SWU and ADP

3.9.5.4 SNMP Configuration - User Interface

With this feature user is able to:

1) Configure SNMPv3 parameters for all hosts from Assistant
2) Review SNMPv3 setup on the portal
3) Configure hostMIB trap filter for all hosts from Assistant
4) Review hostMIB trap filter setup on the portal
5) Stop sending error traps from host portal
6) Configure keep-alive traps interval for all hosts and stop sending of all SNMP trap messages from all hosts and RMX in Assistant GUI
7) Review keep-alive trap on host portal
8) Send test trap from host portal
9) Save configuration of SNMPv3 parameters, keep-alive trap, trap filter on all hosts
10) Reset All alarms raised on RMX from Assistant/Manager.
11) Download Host 4000 MIB from Assistant/Manager
12) Setup MIB2 parameters for each host and review them for example
    - Hardware type (e.g. VMware, eco-server, DSCXLv2, HP500i,..)
    - Deployment type (e.g. host node A, host node B, Quorum node, Softgate,...)
    - business name (e.g. OpenScape 4000, OpenScape 4000 SoftGate,..)
    - Version - SWRM syntax based version of the host system
13) Backup/Restore of SNMP setting on each host
14) Use Host 4000 MIB on NMS for understanding error messages
15) Use Host 4000 MIB for hardware monitoring
16) Use hicom MIB (not HIM) for getting list of hosts/IP addresses in 4K area
17) Use MIB2 for getting contact/name/location information from host

18) Use OpenScape Fault Management

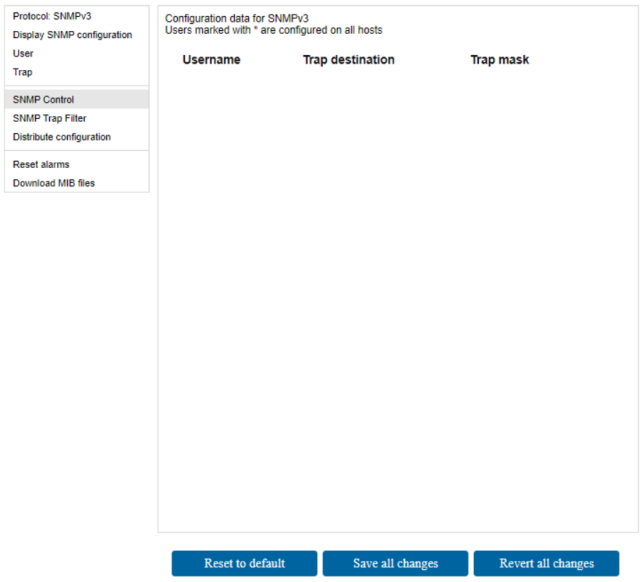

Figure 37: SNMP- configuration system settings

The template "OpenScape 4000 system settings" of SNMP configuration contains the

- the MIB2 parameters (contact person, administratively-assigned name, physical location) for each host. After node installation MIB2 parameters
  - for OpenScape 4000 host systems (node A, node B, Quorum node) can be setup over Assistant System Management
  - for Softgate based APs and softgate AP-E; the values are distributed automatically based on information specified in RMX database (AMO USSU, UCSU)
  - for IPDA based AP-E systems, these values can be set over Assistant Management on AP-E
- keep alive trap
- SNMPv3 users
- trap filter

3.9.5.5 Central SNMP Configuration

With this feature the administrator is able to:

- save and distribute SNMPv3 configuration (including filter and keep-alive setup to all hosts of all machines in OpenScape 4000 area from Manager or Assistant Remark: IPDA based AP-E's using the Assistant for configuration
- reset alarms on all/selected systems including Assistant/Manager alarms from alarm group 7
- use Gateway dashboard on Assistant to see and save SNMPv1 configuration parameters on list of the IP gateways
- use Gateway dashboard on Assistant to change QoS data collection (QDC) settings on list of IP gateways.

3.9.5.6 Access Point Board Recognition

With this feature the Fault Management also knows what kind of hardware the AP is affected (in addition to error message, PEN identification, LTU-number). Fault Management get this information from hardware agent running on Assistant/Manager. This information gathered by hardware agent during hardware discovery.

Also IP address of the host system for the frame are discovered. The fields realHWtype, hostIPaddress in hicomMIB of hicomFrameTable includes this values. For IPDA based access points the host IP address will be empty.

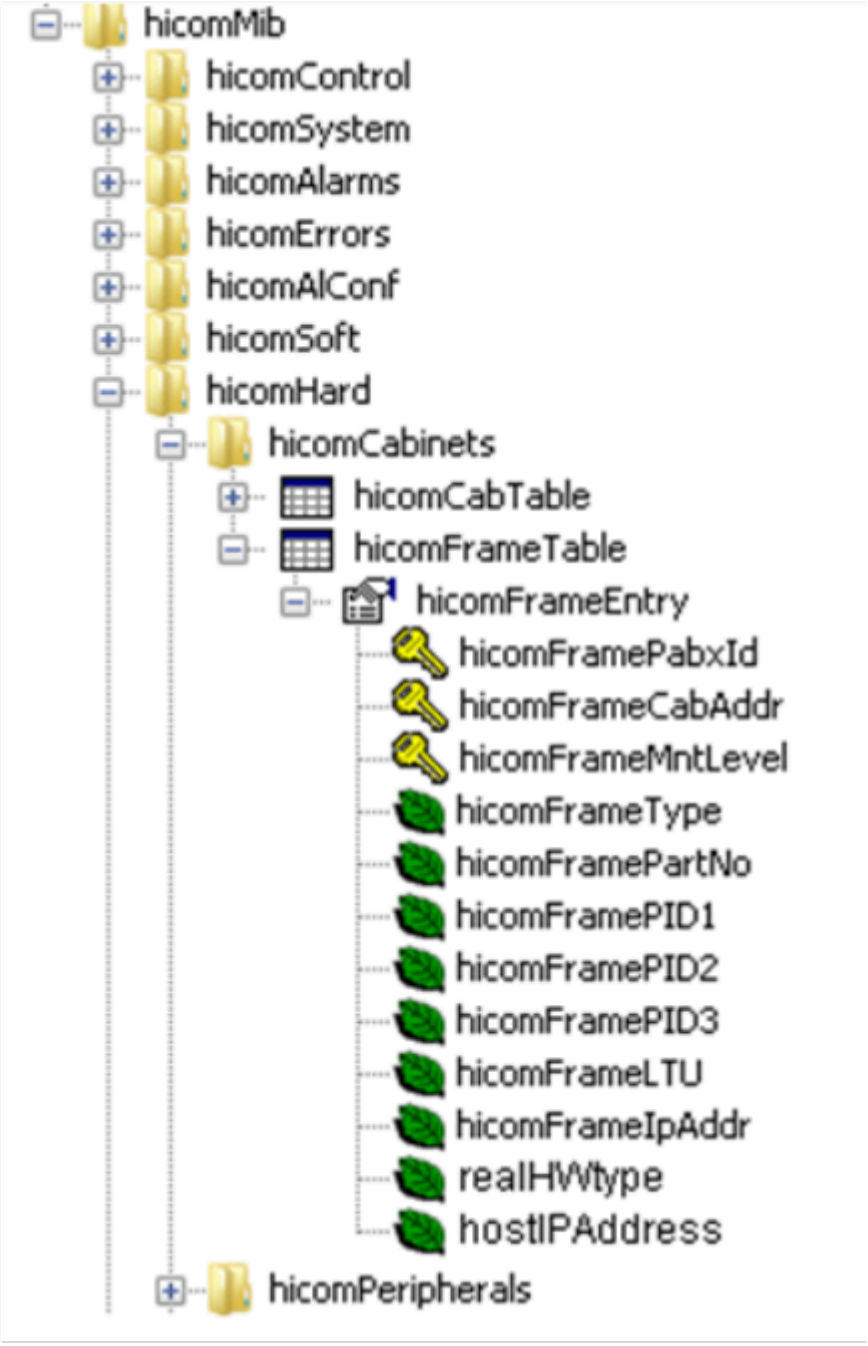

Figure 38: HPA board recognition

3.9.6 OpenScape 4000 License Management Tool

The LMT (License Management Tool) application can administer and control both OpenScape 4000 systems within a network.

Once LMT assumes license management, license verification is performed centrally by OpenScape 4000 Manager for all managed systems.

The LMT permits dynamic license transfer to one or more subsections of a system network (LMT Administration area). License Management Tool offers the following main functions:

- Records the port licenses used in all systems in the administration area
- Manage licenses in systems for which the customer requires central license management

You must obtain a network license (network code) to use this function. This network license is loaded to the OpenScape 4000 Manager via an interface that is integrated in the Web-based OpenScape 4000 Manager GUI. The system license data for the network can then be controlled and managed via the same interface.

3.9.7 OpenScape 4000 License Management

License Management controls necessary license information for each system. It offers following main functions:

1) Giving information about the Novell appliance operating system license per OpenScape 4000 System (Just enough Operating Software - JeOS)

   - Operating Software license validity
   - Amount of existing OS license (System - simplex-duplex-geo separated, Softgate, OpenScape Access 500)

   3 month before license expiration the user is informed by "message of the day info" during the login into WBM of the system.

   3 weeks before license expiration the system generates an OpenScape Assistant minor alarm. Whenever license is expired the system generates an major alarm. This alarm could be set as an SNMP trap.

License Management	
Managed ports	54
Licensed ports	5000
Grace Period	260 days
Advanced Locking ID	JMYVQKTQZWTRJ4M5YF4U2NJ
SUSE Update Appliance	0

   The following picture shows the main page.

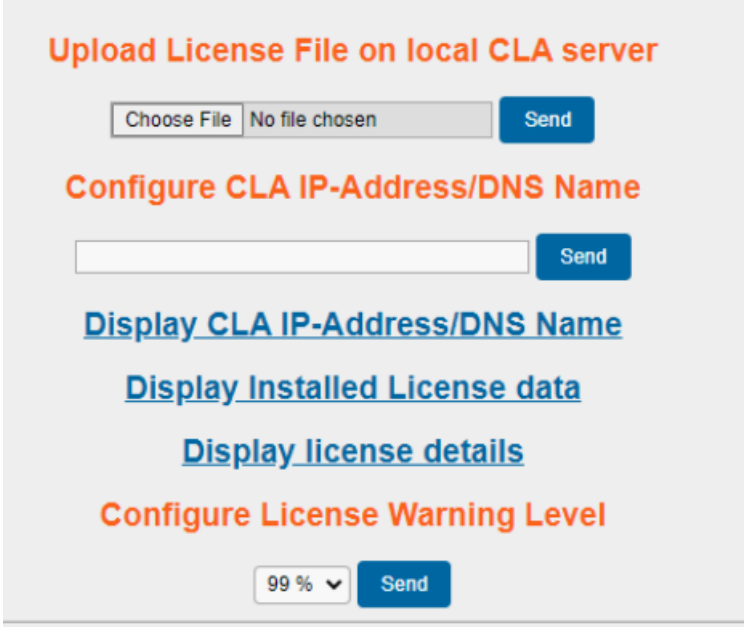

Figure 39: Main Page of License Management

The user interface can be used to accomplish the following tasks.

- Set the IP-address/ port number of the CLA When the user sets the IP-address of the CLA this IP-address will be stored internally and used to retrieve the required license data.
- Display the installed license data When this function is selected all known license fields will be displayed in a textual form.
- Display the license data supplied by LMT When this function is used a page showing the detailed license data provided by LMT will be displayed. Furthermore the data may be saved as a CSV file for later analysis.

General conditions:

- The network codeword specifies which systems are covered by LMT management.
- Network-wide system software license management is only possible with the OpenScape 4000 Manager LMT application.
- If there are several OpenScape 4000 Manager systems in a network, each OpenScape 4000 Manager application assumes license management for its own subnetwork.
- OpenScape 4000 Manager automatically verifies all systems covered by LMT management.
- As soon as the number of users in a system software license package exceeds the number of purchased licenses, the LMT generates a license alarm (type: user value, remark: purchased value) for the alarm system and an error message in OpenScape 4000 Manager. No new LMT system codeword are distributed to the systems in this administration group. The codeword on this system thus expire after 30 days. License-relevant administration is then blocked for the systems in this administration group.

3.9.8 Revision Security

3.9.8.1 Local Maintenance Access

The system is accessed on site via the browser interface of a PC integrated in the LAN. Technicians can use their own laptop or the customer's own administration terminal.

3.9.8.2 Remote Maintenance

Different connection paths can be used for remote maintenance on OpenScape 4000 Manager. These connection paths are also used for remote access to all OpenScape 4000 systems managed by OpenScape 4000 Manager.

Today, many customers run an IT infrastructure with RAS access which allows users to access the company network via the Internet or the public telephone network. Solutions, such as, OpenScape 4000 Manager in a customer LAN can also be remotely accessed via this customer-provided access point ("Single Point of Access" = SpoA).

An SpoA is a secure way of accessing the customer network. An SpoA can be an access router, for instance, which enables remote dial-in to the company network via the public telephone network. The router must be able to use NAT to translate the corresponding remote center IP address into the customer's internal address range where the connected servers are located.

All connections to customer systems are set up over secure infrastructure. This guarantees:

- central monitoring for remote support
- staff access restriction to the regions supported
- a log of all connections to customer systems
- a log of all password requests and access attempts

- support for central customer access options (central dial-in over access router and Internet VPN)
- redundant layout to ensure availability

3.9.9 Utilities

3.9.9.1 Application Programming Interface

OpenScape 4000 Manager supports an enhanced API, which in conjunction with their own database applications, enables customers to read out information from the OpenScape 4000 Manager database or output info objects of the location, display name, PIN and subscriber types. The API can be used by products or applications to synchronize subscriber data (such as cost center, location, building, room number).

The Windows-based API Import/Export Table Client is a user-friendly tool for importing ASCII files to OpenScape 4000 Manager. Import and export jobs can be automatically scheduled with Microsoft Scheduler.

OpenScape 4000 Manager provides several types of API communication:

XIE API programming interface

The C++ programming interface with its XIE API class library is directly transferred to the client PC and installed via utilities access. As a result, customers can develop their own application program by incorporating the installed class library in to their own program.

Encrypted XIE Web server Interface

OpenScape 4000 Manager/Assistant provides an encrypted Web service interface, suitable for external applications and substitutes the former XIE-API. As a Web service the software is designed to support interoperable machine-to-machine interaction. The API is defined by the Web service description language (WSDL).

Main features

- Service is running on Tomcat web server and accessible over HTTPS
- Access to interface is secured by Security Management (session cookie)
- Communication is based on exchange of XML structured messages (SOAP)
- Service is described in a Web service description (WSDL description).
- Web service client generates SOAP request messages based on WSDL description
- Received message is decoded in Web service and modified to format which is readable by XIE server.
- Modified message is sent to XIE server (dmsieproc daemon) for processing

- Response from XIE server is coded back to XML based format and sent back to client

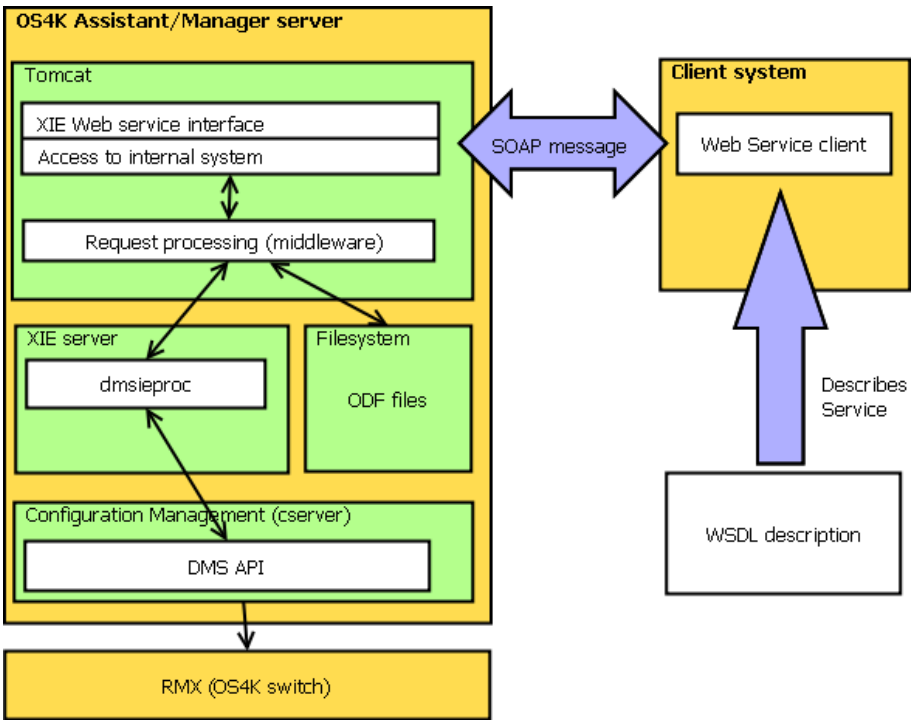

Figure 40: Architecture overview

Information about Web service description language (WSDL)

Definition of Web service interface provides the following functionality:

- Insert - Inserts the specified data record
- Update - modifies an existing data record
- Delete - deletes an existing data record
- Select - reads a data record
- Select_updates - returns modified data records and the last operation performed on these records (insert, delete or update)
- Get ODF file
- Extended Insert, Update and Delete function which are more conform to SQL style
- Additional functions based on further requirements.

Request content:

- Type of request - e.g. get ODF file, process request
- Content - ASCII formatted data
- Further instructions for XIE server

Response content:

- Return code
- Additional error description
- Result data - result is in same format as from file interface

Security

- The access to the interface is secured by Security Management. Client has to have valid session cookie.

- Authentication using one of the following methods:
- using the standard login URL
- using SecMCJ interface
- The Access to specific tables is configured inside Security Management Access Rights Group configuration.
- Data are encrypted in transmission by HTTPs.

Remarks:

- The Web Service is an API. This means that users of this feature should be application developers. Therefore no graphical user interface is supported.
- The classical XIE API still can be used.

File Interface

Data is exchanged via the SFTP protocol using request/response files.
The syntax of the request files is based on the SQL standard and contains the commands for selecting, changing, and deleting data records. Status information on each individual response file command is available in the response files.

Export Table Client

A user-friendly Windows interface with access control is available that can be directly installed on the client PC via utilities access and provides the following functions:

- Select a table from the general OpenScape 4000 Manager database
- Choose fields from the selected tables
- Define filter criteria and attributes for determining the sort sequence
- View the desired data records on the screen
- Save the data records to the hard drive on the client PC
- Import function for ASCII files
- Scheduled data import/export via Microsoft's "Task Scheduler"Login window display. The user must log on with the server name (server address), user name, and password.

Command line based api2hipath tool

As a simple import/export tool, api2hipath is the alternative to a file interface with more direct access to supported Manager database tables. The tool is stored in OpenScape 4000 Manager database directory '/opt/xie/dmsie/bin' and on the client PC in the Export Table Client installation directory after it has been installed. All necessary parameters can be directly transferred to the command line level on the tool which produces a return value which displays the status of the job and (depending on the job at hand) a result file.

3.9.9.2 Report Generator

Report Generator access is integrated as a GUI on the OpenScape 4000 Manager's welcome page. Predefined and customer-specific reports are available (via Crystal Reports). Individual reports can be displayed and sent via e-mail (formats: HTML, PDF, CSV, and XML).

Reports can be displayed, exported, and sent via e-mail from Configuration and Performance Management as well as from the Collecting Agent. All possible operations are integrated in the application GUIs.

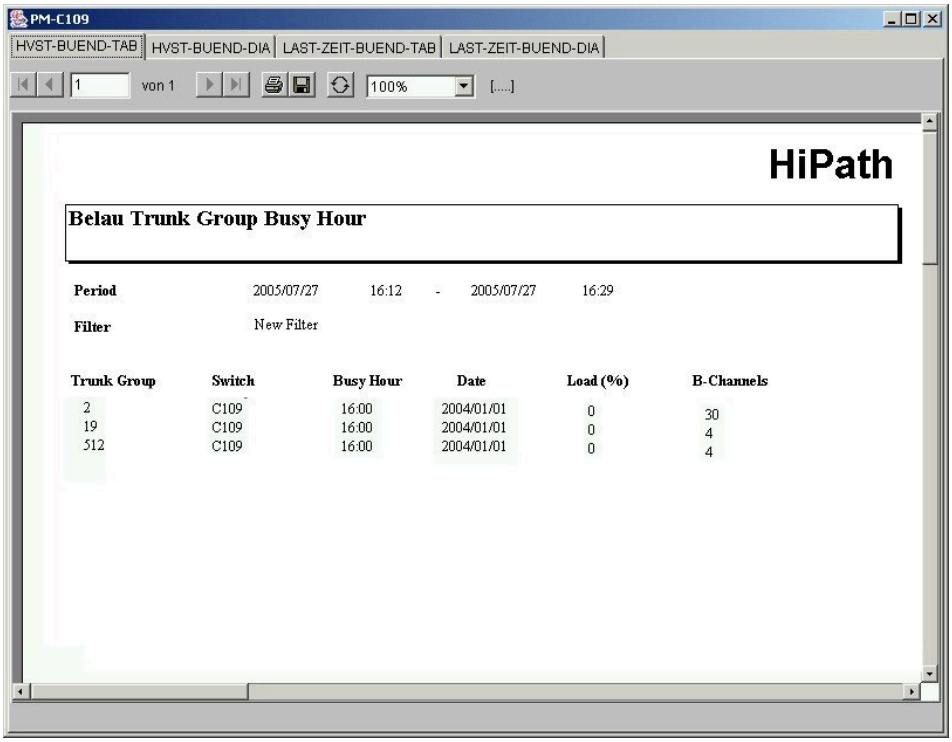

Figure 41: Report Generator

Flexible Reports: The user can generate new reports, access existing reports, and assign these to a specific shared application. The feature is only available in OpenScape 4000 Manager.

Print and Export Options: Options for displaying, printing, and exporting a report. This feature is available in OpenScape 4000 Manager and OpenScape 4000 Assistant.

E-Mail: If the user selects this option, an e-mail is sent once a report is generated and required formats exported (for example, csv or pdf). This mail can include the exported files as attachments. The feature is only available in OpenScape 4000 Manager.

Automated Reports: An application can trigger the generation, display or export of a report. This function can be used by the Collecting Agent, for example, if a CDR query fails. The feature is only available in OpenScape 4000 Manager.

Data Record Selection: RepGen (currently in CM only) is used to select whether a report displays the current data record, selected data records or all data records. This feature is available both in OpenScape 4000 Manager and OpenScape 4000 Assistant.

Report Tree: Report templates and objects are organized in a tree structure. This function can only be changed in OpenScape 4000 Manager; the function is available in Assistant for selecting predefined report templates.

The following types of access rights are available

- Default User: User with restricted account. The user can only view predefined reports. Further, this profile does not support supplementary

functions such as e-mail notification, report generation, customer-specific report display, etc.

- Access to Flexible Reports: This profile permits access to and evaluation of existing report templates. It does not support the creation of customized reports.
- Report Designer: The user has access rights to all predefined and individually created reports. He or she can create new templates and generate new reports.

3.9.10 Expert Access

In addition to Configuration Management, which permits the administration of telecommunication network subscribers via a user interface, you can use the ComWin tool for extensive OpenScape 4000 standalone system configurations, which contrary to Configuration Management, require profound knowledge of the hardware and programming.

3.9.10.1 OpenScape 4000 ComWin

The ComWin (Expert Access) program, which can be directly installed on the client PC by the OpenScape 4000 Manager server, can be used to program the system directly via AMO (Administration and Maintenance Order) commands. However, this is only required in exceptional cases or cases where customers are performing their own maintenance.

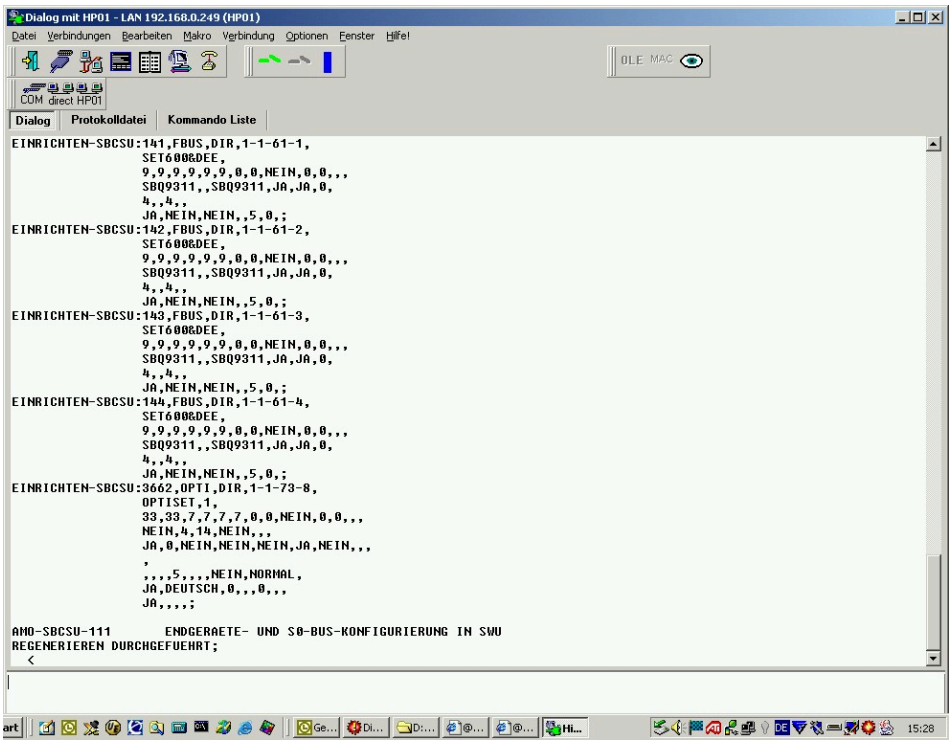

Figure 42: Expert Access

3.9.10.2 Batch Generator

The batch generator permits complex programming of OpenScape 4000 systems in the entire telecommunication network simultaneously (limited only by the number of possible simultaneous server connections). A macro/batch, for example restricting certain users from simultaneously conducting CO calls in all telecommunication systems, can be used in disasters to prevent the trunks from becoming blocked. It can also perform recurring tasks, such as regular backup of the generated data in a system on a weekly basis.

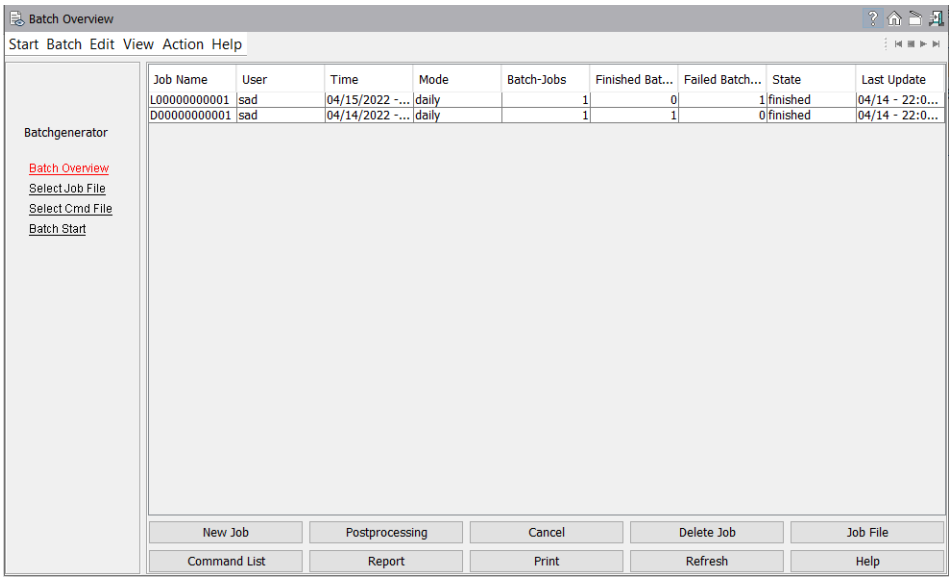

Figure 43: Batch Generator: Overview

3.9.10.3 Real time Diagnosis System (RDS)

The RDS application helps administrators analyze problems related to telephony in a OpenScape 4000 system. This feature is available in OpenScape 4000 Assistant. For further information, refer to the documentation on OpenScape 4000 Assistant.

3.9.11 Basic Administration

3.9.11.1 Logging Management

Logging Management provides a logging service for applications that run on the OpenScape 4000 Manager platform. It stores all error and event results.

In Logging Management Information, you can view the following information:

- All system activities including executed AMOs
- All activities on all systems on a particular day
- All errors transferred by an application

Error Log registers problems that occur on the OpenScape 4000 Manager platform. The logs contain the following information on the registered events:

- User account
- User profile
- IP address of the user
- System name
- Date and time of the event in the absolute time in the affected system
- Different levels, event types and other log data properties

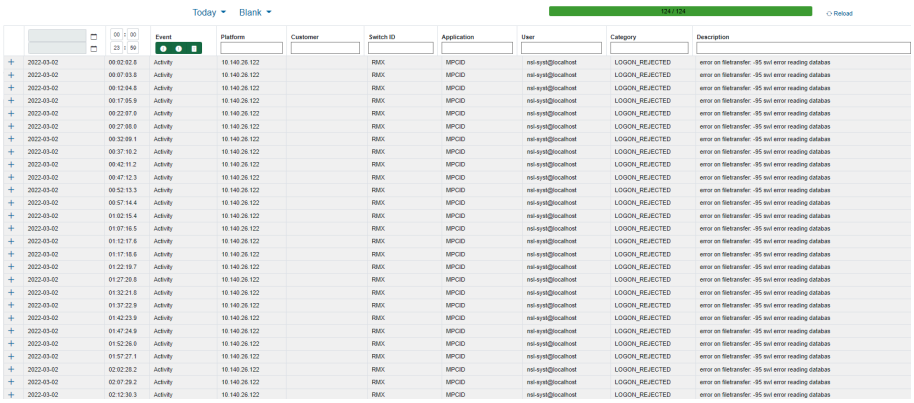

Figure 44: Logging Management: Event Log

3.9.11.2 Base Administration

Under Linux, server hardware is administered via "Webmin Base Administration" in OpenScape 4000 Manager. This access option allows you to configure system resources. Further functions, such as, system date and time or shut down and reboot are also available.

3.9.11.3 Time Synchronization

The server features the AStsync package for synchronizing the time in systems connected to OpenScape 4000 Manager.

Any administration activity required in this regard, such as setting date/time (Manager is a time server), time server sources, and time zones, can be performed.

3.9.12 System Management

Telecommunication systems running on OpenScape 4000 Manager are released for system administration with the relevant system data, connection type, version, etc. This enables access via Manager applications. System administration validates and stores this system data in the database.

The following systems can be managed:

- OpenScape 4000
- OpenScape 4000 Manager administration

4 Abbreviations

The following list explains the abbreviations used in this manual.

Abbreviation	Definition
ADP	Application and Data Processor
AM	Accounting Management
API	Application Programming Interface
CDR	Call Data Registration
CM	Configuration Management
CM	Configuration Management
COL	Collection of CDR Data
CSF	Customer specific fields
CSV	Comma-separated values
DAT	Digital Audio Tape for DAT drive for data backup
DLS	Deployment license number
DMC	Direct Media Connection
DS-WIN	Directory Service on Windows platform
DTB	Display Telephone Book
EM	Element Manager
FM	Fault Management, here HiPath Fault Management
GUI	Graphical User Interface
HIM	HiPath Inventory Management
HTML	Hypertext Markup Language
IPDA	IP Distributed Architecture
LCR	Least Cost Routing
LMT	License Management Tool
PDF	Portable Document Format
PM	Performance Management
PM E	Performance Management Enhanced
PM N	Performance Management Networking
SNMP	Simple Network Management Protocol
TDSDM	TDM Software Deployment Manager

Abbreviation	Definition
TSKA	Test Simulation of Key Function Activity
VMS	Voice Mail Server
XML	Extensible Markup Language

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