A MITEL
PRODUCT
GUIDE

Unify OpenScape Fault Management

Unify OpenScape Fault Management V13, OpenScape 4000 Plugin

User Guide
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Mitel

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Contents

1 Preface

This chapter discusses the following aspects:

- The purpose and readers of this manual
- The terminology used in this handbook
- The organization of this guide
- The conventions used in this manual

1.1 Purpose

This User Guide provides an introduction to the **OpenScape 4000 Plugin for OpenScape FM**, a platform independent tool that allows web-based PBX management. The manual covers the key concepts used and the components necessary to run the **OpenScape 4000 Plugin**. The reader should have basic knowledge about network management and about the OpenScape FM (see *OpenScape FM Desktop User Guide*).

1.2 Audience

This guide addresses end users who want to learn how to use the OpenScape 4000 Plugin for OpenScape FM.

1.3 Terminology

OpenScape FM means OpenScape Fault Management

Server means the OpenScape FM Server, i.e. the server where the OpenScape FM with the OpenScape 4000 Plugin has been installed.

Client means the OpenScape FM Client, usually a web browser where OpenScape FM has been started.

Desktop means the OpenScape FM Desktop.

1.4 Organization of This Guide

This User Guide covers some general aspects, like license key management, to enable the start of the OpenScape 4000 Plugin. Then the management of networks will be described, i.e. how to work with the automatically discovered network topology and how to modify the topology on the submaps to represent the network as best as possible. In the third part network components, like SNMP proxy agents (integrated in HiPath/ OpenScape 4000 Managers) and HiPath/OpenScape 4000 systems are described, and several ways to obtain detailed information about those systems are shown.

This guide is organized as follows:

- *Chapter 2, "Overview"* describes the basic concepts used by the OpenScape 4000 Plugin.
- *Chapter 3, "Getting Started"* tells you how to initialize the OpenScape 4000 Plugin and describes its basic functionalities.
- *Chapter 5, "Root Submap and Main Menu"* gives a short overview over the root submap and an introduction to all items of the Technologies->OpenScape 4000 menu.
- *Chapter 6, "HiPath/OpenScape 4000 Network Topology"* explains the automatic discovery of networks.
- *Chapter 7, "Symbols and Overviews"* introduces all symbols of the OpenScape 4000 Plugin.
- *Chapter 8, "Topology Configuration"* shows how the automatically discovered network topology looks like and how the target systems of trunk groups can be reassigned.
- *Chapter 9, "Device-Specific Information"* shows how specific information about HiPath/OpenScape 4000 systems, about trunk groups and about SNMP proxy agents and HiPath/OpenScape 4000 Managers can be obtained.
- *Chapter 10, "Discoveries"* shows how to obtain the relevant HiPath/OpenScape 4000 data to enable OpenScape FM to display hardware, software, topology, and alarm configuration information.
- *Chapter 11, "Search Browser"* provides an introduction to the work with the Search Browser, a tool that allows the search of the entire network for specific HiPath/OpenScape 4000 machines, alarms, errors and more.
- *Chapter 12, "The Alarm Filter Browser"* describes the usage of the Alarm Filter Browser.
- *Chapter 13, "Improved Event Handling"* explains how incoming HiPath/OpenScape 4000 traps are handled by the OpenScape 4000 Plugin.
- *Chapter 14, "The Customized Service Handbook: Alarm and Error Class Notices"* covers the configuration of the Customized Service Handbook, a tool to make personal annotations for incoming alarms.
- *Chapter 15, "FM Snapshots and Storage Configuration"* describes how to store the alarm/error state of a HiPath/OpenScape 4000 system in order to recover this state at a later date.
- *Chapter 16, "Extensions with HiPath/OpenScape 4000"* explains how to integrate the OpenScape FM client into the HiPath/OpenScape 4000 manager.
- *Chapter 17, "Activity Logging"* is a short abstract of the corresponding chapter in the *OpenScape FM Desktop User Guide*.
- *Chapter 18, "System Management Monitoring"* describes System Management Profiles that collect data from HiPath/OpenScape 4000 devices.
- *Chapter 19, "Prerequisite Hardware and Software Environment"* provides a list of hardware and software you should have to run the OpenScape 4000 Plugin.

1.5 Conventions Used in This Manual

The following font conventions are used in this document:

Bold Font: Indicates that a word is a new or important term. Bold is also used for Buttons, menu names and items

Example: **Proxy Agent** or **OK**.

Bold Computer Font: Indicates data to be entered by the user.

Example: **`java`**.

Computer Font: Indicates computer output, including UNIX prompts, an explicit directory or a file name.

Example: `prompt%`.

Italics: Indicates a reference to another manual or to a different section within the current manual.

Example: *see OpenScape FM Desktop User Guide.*

Italic type is also used for emphasis.

Example: *All* users will be affected.

2 Overview

Important Note:
In this User Guide **HiPath/OpenScape 4000 Manager** stands for **HiPath 4000 Manager** or **OpenScape 4000 Manager** and **HiPath/OpenScape 4000 system** stands for **HiPath 4000 system** or **OpenScape 4000 system**.

This chapter discusses the following aspects:

- The basics of SNMP based network management
- The scenario of managing HiPath/OpenScape 4000 systems
- HiPath/OpenScape 4000 Manager

2.1 Introduction

2.1.1 OpenScape 4000 Plugin

The OpenScape 4000 Plugin manages OpenScape 4000 systems (so called since Version 7), HiPath 4000 systems and their predecessor the Hicom 300 systems.

The Plugin uses SNMP (Simple Network Management Protocol) to collect management information. Today, almost every vendor of network components for open networks supports this standard. For HiPath/OpenScape 4000 networks an SNMP proxy agent is available, which is an integral part of the HiPath/OpenScape 4000 Manager.

The OpenScape FM consists of a server and a client component. The server collects and analyzes all network data whereas the client is the user interface – it doesn't do any network analysis itself but receives all information from the server.

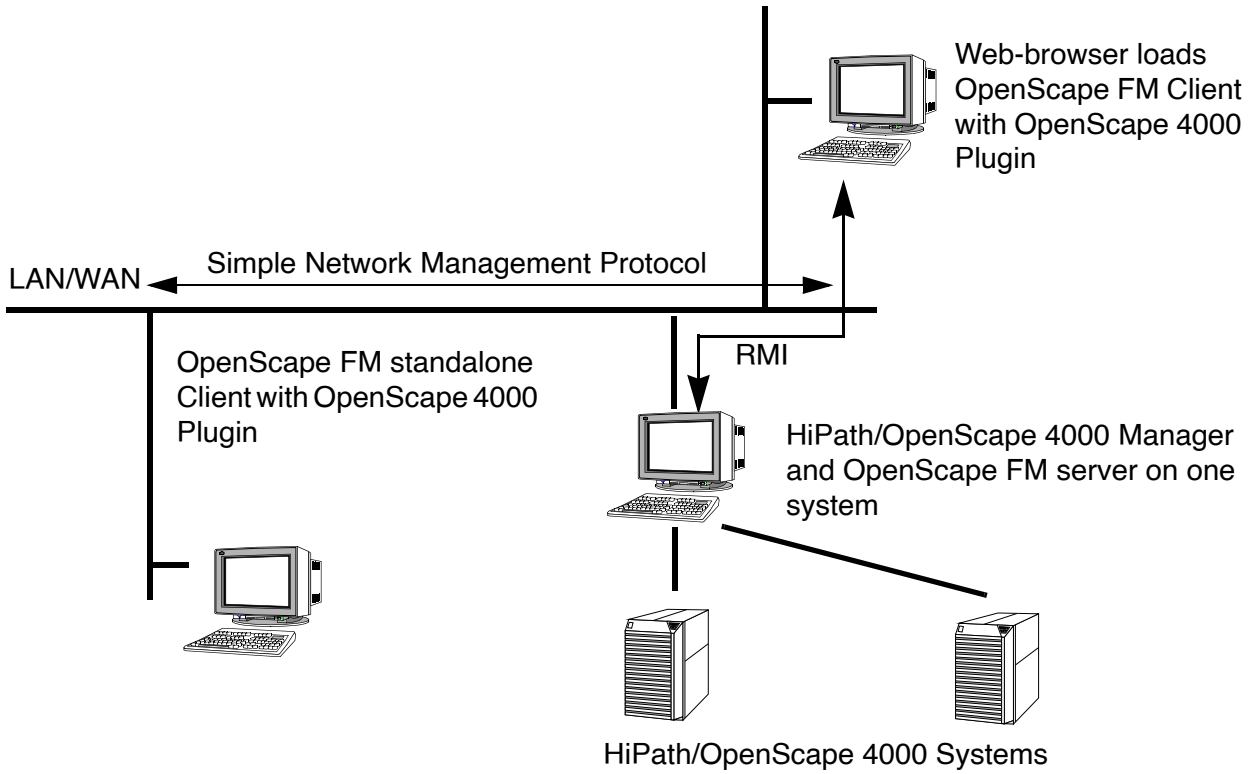


Figure 1 OpenScape FM for HiPath/OpenScape 4000 Networks

Figure 1 shows an example scenario for the use of the OpenScape Fault Management in a HiPath/OpenScape 4000 environment:

In the example, a HiPath/OpenScape 4000 Manager system runs the OpenScape FM server process, including the OpenScape 4000 Plugin. The OpenScape FM server process communicates with the SNMP proxy agent (which is an integral part of the HiPath/OpenScape 4000 Manager), to access the management information base (MIB). The management data is then analyzed and processed by the OpenScape 4000 Plugin.

The OpenScape FM client files are loaded from the HiPath/OpenScape 4000 Manager.

The communication between OpenScape FM server-component and client is done by means of RMI (Remote Method Invocation), which is a part of the Java(TM) programming language.

In the current release, the OpenScape 4000 Plugin supports the following functionalities for HiPath/OpenScape 4000 PBX systems:

- Representation of HiPath/OpenScape 4000 network topologies
- Alarm and fault management
- Alarm filters
- Customized Service Handbook for alarms/errors
- Information about the hardware, software and alarm configuration
- Search Browser for alarms, errors, hardware and software

- Management of the HiPath/OpenScape 4000 network topology
- Generation of alarm and error snapshots
- Automatic deletion of errors

2.2 HiPath/OpenScape 4000 SNMP Proxy Agent

The SNMP Proxy Agent which is part of the HiPath/OpenScape 4000 Manager comprises the following components (subagents):

- System information subagent
- Alarm information subagent
- Error information subagent
- Software information subagent
- Hardware information subagent
- Topology information subagent
- SQL subagent
- Discovery subagent

The configuration and administration of the SNMP proxy agent is described in the "*Administrator Handbuch HiPath 4000 SNMP Proxy Agent*".

For background information about systems of HiPath/OpenScape 4000 architecture, please refer to *Appendix A, "Background Information"*.

3 Getting Started

This chapter guides through the first steps with the OpenScape 4000 Plugin. Since it is a Plugin for OpenScape FM, the OpenScape FM should be familiar. More can be found in the *OpenScape FM Desktop User Guide*.

3.1 Configuration of the SNMP Proxy Agent

3.1.1 HiPath/OpenScape 4000 Manager

Hint:
The SNMP proxy agent is an integral part of the HiPath/OpenScape 4000 Manager system. Information about the configuration can be found in the administrator manual (*Administrator Handbuch HiPath/OpenScape 4000 SNMP Proxy Agent*).

It has to be kept in mind that the SNMP communities have to be identical in the SNMP proxy agent and in the OpenScape FM.

There are three pre-defined SNMP communities in the SNMP proxy agent for HiPath/OpenScape 4000:
private: write (= SNMP set)
public: read (= SNMP get)
hipath: write (= SNMP set) [only local!]

In OpenScape FM, “private: write” and “public: read” are the default values for the SNMP parameters. The communities always have to be the same on the HiPath/OpenScape 4000 machine and on the OpenScape FM server. The *IP Manager Plugin User Guide* describes how SNMP parameters can be changed in the OpenScape FM.

3.1.2 HiPath/OpenScape 4000 Assistants

A HiPath/OpenScape 4000 Assistant manages one single HiPath/OpenScape 4000 system. The configuration is done as described in to *Section 3.1.1, “HiPath/OpenScape 4000 Manager”*.

3.1.3 RG8300

A HiPath/OpenScape 4000 can be integrated into a HiPath 8000 environment with an RG8300 gateway. The configuration is done as described in to *Section 3.1.1, “HiPath/OpenScape 4000 Manager”*..

3.2 Initializing the OpenScape 4000 Plugin

The OpenScape FM has to be installed on the system in order to be able to use the OpenScape 4000 Plugin. Details about the installation can be found in the *OpenScape FM Desktop User Guide*.

To initialize the plugin, the OpenScape FM Client has to be started and the menu item **Server->Plugins->Init OpenScape 4000 Plugin** has to be selected from the main menu bar. After the initialization the menu item **Init OpenScape 4000 Plugin** will be removed from the menu **Server->Plugins**, and the new menu item **Technologies->OpenScape 4000** will appear in the main menu bar. Additionally an object representing the OpenScape 4000 Plugin is added to the hierarchy with the path **Root**–>**System->Plugins->Technologies**. The new object offers the same menu items like the OpenScape 4000 menu.

3.3 License Installation

To work with the OpenScape 4000 Plugin a valid license is necessary. More about the licensing can be found in the *OpenScape FM Desktop User Guide*.

4 Topology Structure

To determine the topology and structure of OpenScape 4000 networks, the OpenScape 4000 Plugin receives its information from various sources.

When Topology Data is available, the OpenScape 4000 Plugin refreshes the Topology View. All networks and sub networks as well as all discovered OpenScape 4000 Systems, their Components and their Connections appear.

Section 4.1 describes the various OpenScape 4000 objects detected by the OpenScape FM and their representation within the object tree.

Section 4.2 summarizes the resulting structure and the proceedings while analyzing faults.

4.1 Object Types and Structures

This section describes how the OpenScape FM identifies the individual Components of OpenScape 4000 Systems and how they are represented.

Depending on the determined IP Addresses, the collected information will shown in relation to IP Nodes (see *Section 4.1.8*) or IP Node Containers (see *Section 4.1.9*).

Detected Systems and Components like Frames or APEs and assignments to IP Nodes and IP Node Containers will be automatically arranged within the Topology Network.

Connections between Systems will be represented and aggregated within the central Topology view. Connections of local significance like APEs or VIP Alarms will be represented on the submap of the respective System.

If desired, the automatically generated Topology can be manually adjusted. More about the representation of the Topology and its manuel configuration can be found in *Chapter 8*.

Information about objects of the following types will be collected:

- Agents (see *Section 4.1.1*)
- Systems and Sub Systems (see *Section 4.1.2*)
- Frames and APEs (see *Section 4.1.3*)
- VIP Alarms (see *Section 4.1.4*)
- Hardware Unit Alarms and Hardware Unit Alarm Container (see *Section 4.1.5*)
- Trunks or Trunk Groups (see *Section 4.1.6*)
- Foreign Systems (see *Section 4.1.7*)

4.1.1 Agents

The basis for all information are the OpenScape 4000 Agents, which run on an OpenScape 4000 Manager or OpenScape 4000 Assistant. By default these will be accessed by the OpenScape 4000 Plugin using SNMP.

In addition to the SNMP access, a direct database access using JDBC can be established (see *Section 9.9.1*). This provides further information like e.g. Alarms and Error Messages.

If OpenScape 4000 Assistants without a managing OpenScape 4000 Manager are found within the OpenScape FM, they are treated corresponding to an OpenScape 4000 Manager that only manages one System.

The IP Nodes of Managers are initially placed within the Topology Network ‚*OpenScape 4000*' within the Container ‚*Manager*'. Die IP-Knoten von Assistants analog im Container ‚*Assistant*', die von RG8300-Systeme im Container ‚*RG8300*'.

The arrangement is based on the IP Discovery Filter Rules (see *Desktop User Guide*). If IP Discovery Filter Rules were configured, the initially discovered Network Topology might be different.

Additionally, for each Manager an individual Manager Container will be created that contains all relevant objects (see *Figure 2* - marked in orange).

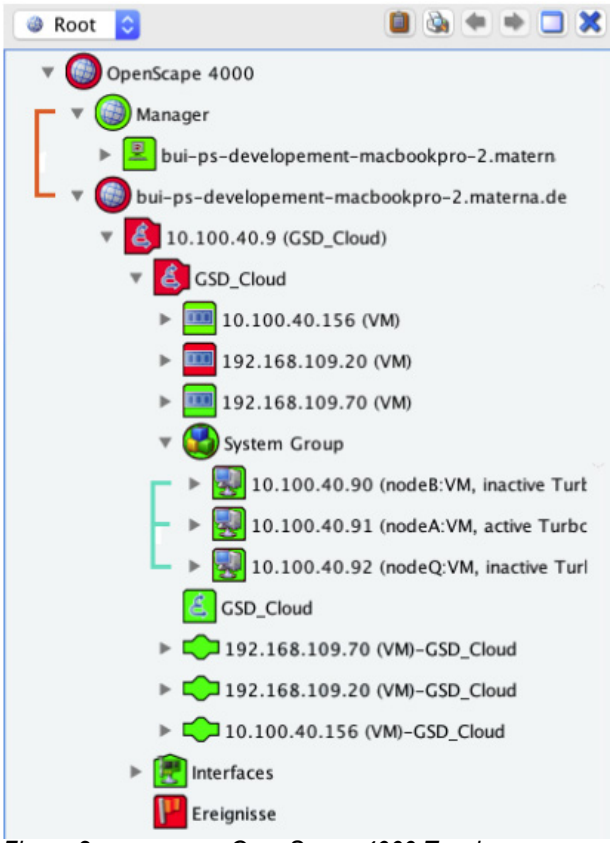


Figure 2 OpenScape 4000 Topology

4.1.2 Systems and Sub Systems

Within the OpenScape FM Identified Systems are always represented by two objects: a System object located on the submap of its Manager, and a Sub System object that is always located on the submap of the System object.

While the System object represents the actual System, the Sub System is used as the local hub for the connections of the System. By this approach the local connections to e.g. VIP Phones, CMI Base Stations or Access Points are limited to the submap of the System object, since their objects are also represented on the same submap.

Alarms that cannot be assigned to specific objects like VIP Alarms or Frames, will be assigned to the Sub System.

Because of the Status Propagation of the underlying objects, the Status Coloration of the System object in case of a problem is ensured. Additionally by opening the submap it can be promptly determined which components are affected by an Alarm.

OpenScape FM determines the Systems that should be represented by requesting the Agent or with JDBC Access to the System Tables of the OpenScape 4000 Managers/Assistants. The calculation of the status is based on the set Alarms within the Alarm table.

Alarms that relate to e.g. Trunks, VIPs, Hardware Alarms or Frames/APEs will not be used for the calculation of the Sub System‘s alarm status, but instead are directly assigned to the objects/connections to which they relate.

Orphaned OpenScape 4000 Systems

If OpenScape 4000 Systems are put into operation, they send their AFRs to the responsible OpenScape 4000 Manager. If the Manager misses the description of an OpenScape 4000 System in its database, the first AFR for this System creates an entry with an ORPH flag within the database table `chdmain`, which identifies the System as an orphaned OpenScape 4000 System.

Orphaned OpenScape 4000 Systems are although represented within the OpenScape FM, but no further information can be collected for such Systems. They are collected within a container labelled ‚*Orphan OpenScape 4000*‘, which is located on the submap of the respective Managers. Unlike normal OpenScape 4000 Systems orphaned OpenScape 4000 Systems cannot be assigned to other networks (see *Desktop User Guide*), as long as the ORPH-Flag is set within the database. If such a System gets configured at a later time, it becomes a normal OpenScape 4000 System and is placed within the normal structure.

4.1.3 Frame/APEs

Frames and APEs have in common that they are identified by an LTU Number.

This will be determined by the OpenScape FM by using the following methods:

- The Frame table, discovered by AMO discoveries, will be evaluated on the OpenScape 4000 Manager/ Assistant.
- The existence of a Frame will be derived based on the LTU part of a Port Equipment Number (PEN) even for Frames that are not represented within the Frame table.
- By scanning the System table of the OpenScape 4000 Manager, Frames with the function APE are detected. For these special APE objects are created.

Frame/APE objects will be displayed on the submap of the respective System.

If a location has been defined for the OpenScape 4000 Frame, it will be shown in the label of the frame object. The value for the location is extracted from the `snmp_ipda` database table.

Hint:
If a Frame or APE is detected to which an IP address is assigned, this Frame or APE is automatically connected to the *APP-4K-MIB*. This enables e.g. special MAR reactions to be assigned to the Frame or APE. More about MAR connections can be found in the separate Mobile Alarm Reaction User Guide.

4.1.4 VIP Alarms

For OpenScape 4000 Systems individual end devices or numbers of end devices can be monitored and configured to send an specific Alarms if a problem occurs.

The VIP Alarm Configuration is determined by the OpenScape 4000 SNMP Proxy Agents while performing its AMO Discoveries on the Systems. This Information is then be used by the OpenScape FM to display the VIP Alarms.

All VIP Alarm objects belonging to a System will be aggregated within a separate container object that can be found on the submap of the OpenScape 4000 System.

4.1.5 Hardware Unit Alarms

Hardware Unit Alarms are used to monitor one or more Hardware Units. For respective Alarms identified by the OpenScape FM, Hardware Unit Alarm objects will be created.

Hardware Unit Alarms will be detected by the OpenScape 4000 SNMP Proxy Agent while performing Discoveries. They will be discovered by using SNMP to read the table `alConfTarget`.

All Hardware Unit Alarm objects belonging to a System will be aggregated within a separate container object that can be found on the submap of the OpenScape 4000 System.

4.1.6 Trunks and Trunk Groups

The physical connections within the OpenScape 4000 environment are determined by evaluating Trunks, which can be understood as specific Connections/Ports of an OpenScape 4000. Trunks are identified by a Port Equipment Number (PEN), a combination of LTG, LTU, EBT and Trunk Number, where currently only Trunks with LTG 1 exist.

For the routing different Trunks can be aggregated to Trunk Groups. The OpenScape FM provides the option to choose a Trunk Group based or Trunk based representation of the Topology (see *Section 9.9.1*). It is highly recommended to use the die Trunk based representation.

Since the LTG of a Trunk is currently always 1, the starting point of a Trunk is always the Frame object which uses the corresponding LTU.

The Target Node Number of a Trunk is used to determine its target System. An exception are Device Types that start with ‚*HG3550*', for which the configured Target Node Number is ignored and the Trunk will be connected to the Foreign System ‚*IP Trunks*'. If the Node Number is ‚0', the Trunk will be connected to its own OpenScape 4000 Sub System.

Connections between Systems are represented on the Submap of the corresponding Manager as well as on the submap of the individual Systems:

On the Manager submap, which generally displays all monitored Systems, the concerned Systems will be connected by edges.

On the System submap connected Systems will be represented as Reference Symbols which are connected to the matching Frame.

4.1.7 Foreign Systems

Foreign System objects will be created, if no matching target object can be identified for the Target Node Number of a Trunk, and therefore no know object can be connected.

Foreign System objects will be represented on the submap of the respective System.

4.1.8 Linked IP Nodes

If an IP Address of an OpenScape 4000 System is detected, the System will be added to the submap of the respective IP Node object.

If no respective IP node exists within the OpenScape FM, a matching IP Node object will be created.

4.1.9 Linked IP Node Containers and OpenScape 4000 Clusters

The System Hosts belonging to an OpenScape 4000 System gets determined from the Manager by the OpenScape FM by using SNMP. They are collected from the table `hostBaseSysHostName`.

If the table contains matching entries, an IP Node Container will be created and all associated System Hosts will be collected on its submap (see *Figure 2* - marked in light blue). For the System Hosts the first valid IP address found in the table is used in the following order: `hostBaseSysManagIPAddr`, `hostBaseSysCustIPAddr`, `hostBaseSysIpdaIPAddr`.

Beginning with Version V10R1 of the OpenScape FM the *System Group* container is replaced by a respective *Cluster* object with the same child objects. Using a Cluster provides alarm filter mechanisms for redundant services. More about Clusters can be found within the *IP Manager User Guide*.

4.2 Monitoring of Systems

This section provides a compact overview about the proceedings while monitoring OpenScape 4000 within the OpenScape FM.

The central element for the monitoring of OpenScape 4000 objects is the Container ‚*OpenScape 4000*' which is located within the Container ‚*Network Topology*'. Its status shows whether there is currently a problem for an OpenScape 4000 Object or for the IP Node of an OpenScape 4000 Manager/Assistant.

If this is the case, the submap of the *OpenScape 4000* Container provides further information.

IP Node Problems

IP Node problems within the OpenScape FM environment may e.g. appear, if one of the Manager/Assistant IP Nodes cannot be reached by the OpenScape FM. This does not necessarily mean that there is actually a problem with the respective Manager/Assistant, but it might be a hint for a problem.

If an IP Node problem occurred, this will be shown by the Status of the container ‚*Manager*' that is displayed on the submap of the *OpenScape 4000* Container.

The submap of the *Manager* Container contains the IP Node object of every detected Manager/Assistant. Problems detected by the IP Manager Plugin will be assigned to these objects (see separate *IP Manager Plugin User Guide*).

OpenScape 4000 Problems

Within the Container *OpenScape 4000* an individual Container for every detected Manager/Assistant with the name or the IP address of the respective Manager/Assistant can found.

If a problem is detected for an OpenScape 4000 object of one of these Managers/Assistants, the status color of the affected Manager/Assistant will change accordingly.

The Submap of an Agent contains Symbols for all Systems detected for this Agent. Connections between Systems will be shown as edges between these Symbols.

If a problem for a System or a Connection has been identified (e.g. by an incoming alarm trap), a corresponding event will be created for the System and this will be shown by a matching Status coloration.

The status coloration for a System consists of two elements:

The Symbol itself shows the color that matches the worst assigned unacknowledged event. The Reachability Status the color that matches the alarm status of the System determined from the OpenScape 4000 database. If the two colors differ, the Reachability Status is displayed as a small colored dot in the upper right corner next to the Symbol.

For example, if there is a new critical alarm for a system, the status and reachability status are critical (red). If a technician works on the problem and therefore acknowledges the associated event, the status becomes normal (green), but the alarm status remains critical for the time being and a red dot is also displayed. If the processing is successful, the alarm status also becomes normal and the dot disappears.

With the help of the submap of a Symbol or Connection, the affected component (e. g. VIP Alarms, Hardware Unit Alarms, CMI Base Stations, Access Points) or the affected Trunk Group can be immediately identified.

If the Trunk based Topology representation is used (see *Section 9.9.1*), the submap of Systems additionally shows the assignment of outgoing Trunk Groups to their respective Frames.

5 Root Submap and Main Menu

5.1 The Root Submap

The root submap is the entry point of the OpenScape FM. It contains the main symbols, e.g. Network Topology. The *OpenScape FM Desktop User Guide* contains information about the main symbols (*Figure 3*). Next to the Network Topology icon is the Compound Status Indicator that shows roughly the percentage of the child objects that are in a certain state. Since the status of some objects is propagated to the parent object above it, in most cases a symbol represents the worst status that has occurred among all its child objects, i.e. a symbol changes its color to red no matter if only one of its subsystem or a hundred of its subsystems are in trouble. With the help of the compound status indicator an impression is given how many systems show a certain state (see *OpenScape FM Desktop User Guide*).

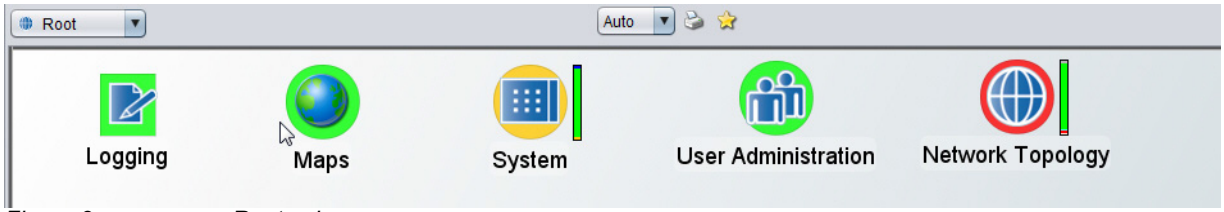


Figure 3 Root submap

5.2 Main Menu

The main menu bar contains the OpenScape 4000 menu at the position **Technologies->OpenScape 4000**. It contains the following entries:

- **List Agents:** Lists all HiPath/OpenScape SNMP proxy agents currently known by the OpenScape FM.
- **Search Systems:** Opens the Search Browser to look for certain HiPath/OpenScape systems, alarms, specific errors, boards and more. It will be covered in *Chapter 11, "Search Browser"*.
- **Alarm Class Notice:** Enables the definition of Event Browser Annotations which are automatically assigned to certain alarms that are registered in the Event Browser. It will be treated *Chapter 14, "The Customized Service Handbook: Alarm and Error Class Notices"*.
- **Error Class Notice:** Enables the definition of Event Browser Annotations concerning a certain error type for errors which are registered in the Event Browser. This will be covered in *Chapter 14, "The Customized Service Handbook: Alarm and Error Class Notices"*.

Main Menu

6 HiPath/OpenScape 4000 Network Topology

6.1 Adding HiPath/OpenScape 4000 Devices

If a HiPath/OpenScape 4000 system should be managed by the OpenScape FM, the system itself has not to be added to the OpenScape FM. Instead the manager, that is monitoring the respective HiPath/OpenScape 4000 system has to be added.

Regardless whether the manager is a HiPath/OpenScape 4000 Manager, a HiPath/OpenScape 4000 Assistant or an RG8300, it is always the IP node on which the manager is running that has to be added to the OpenScape FM.

When the IP node is added, the OpenScape FM discovers the manager on the IP node and a symbol for the respective SNMP Proxy agent will be added to the submap of the IP node. Depending on the type of manager, this symbol will be named HiPath 4000 (for HiPath 4000 Managers), OpenScape 4000 (for OpenScape 4000 Managers), HiPath 4000 Assistant, OpenScape 4000 Assistant or RG8300. Whether *HiPath* or *OpenScape* is used for the name is depending on the manager type data gathered by SNMP. The data is taken from the managers MIB.

Note:
The MIB variable `hicomProxyName` (oid: `1.3.6.1.4.1.231.7.2.1.0.1.0`) from the HiPath 4000 MIB is used to distinguish the manager type. System types are distinguished by the MIB variable `hicomSysVersion` (oid: `1.3.6.1.4.1.231.7.2.1.1.3.1.39`) from the same MIB.

The context menu of this symbol can be used to perform various HiPath/OpenScape 4000 related tasks.

When the proxy agent has been added, the OpenScape FM starts the discovery of the systems that are managed by the agent (see *Section 6.3, “Network Discovery And Topology Layout”*).

In addition, if the OpenScape FM has been configured as a trap recipient on the manager system, manager traps for events (alerts, faults) are received by the OpenScape FM and mapped to the affected system.

More about adding IP nodes, IP configuration and SNMP configuration can be found in the *IP Manager Plugin User Guide*.

The OpenScape 4000 Plugin can communicate with more than one SNMP Proxy agent / manager to obtain management information about the related HiPath/OpenScape 4000 systems. The SNMP proxy agent is an integral part of the HiPath/OpenScape 4000 Manager. See *Section 3.1, “Configuration of the SNMP Proxy Agent”*.

6.2 Avoiding Double Representation

OpenScape 4000 Managers might monitor systems that are also monitored by an OpenScape 4000 Assistant.

The OpenScape 4000 plugin prevents the redundant representation and license calculation for OpenScape 4000 Assistants and OpenScape 4000 Manager Systems. This encloses the evaluation of events, port licenses and the representation of the systems.

To decide if an OpenScape 4000 Assistant system is already managed by an OpenScape 4000 Manager, the `lnumber` values and the IP addresses are compared.

6.2.1 Representation of Assistant Systems

If an OpenScape 4000 Assistant is discovered which is managed by an OpenScape 4000 Manager that is also known by the OpenScape FM, only the OpenScape 4000 Assistant object will be shown on the IP node‘s submap. In addition the submap of the IP node contains the system object which is managed by the OpenScape 4000 Manager.

This leads to the effect that only one OpenScape 4000 system object will be shown on the submap of the IP node.

6.2.2 Avoiding Double Licensing

To prevent double counting of OpenScape 4000 Assistant ports from Assistants which are already managed by an OpenScape 4000 Manager within the OpenScape FM, discovered OpenScape 4000 Assistants are assigned to their related OpenScape 4000 Manager.

The reported license port information of the OpenScape 4000 Assistants is added to the Default Domain of their OpenScape 4000 Manager. The reported port information of the Assistants and of the related Manager in this domain are compared and the maximum reported port number will be used by the OpenScape FM for the port license check.

This procedure prevents duplicate counting of ports. Additionally the OpenScape FM shows the license port information of each Assistant in the Port Manager Domain overview.

6.3 Network Discovery And Topology Layout

When the IP manager discovers the SNMP proxy agent of a HiPath/OpenScape 4000 manager, a network symbol will be created. This symbol is used to collect all HiPath/OpenScape 4000 systems that are managed by the respective manager. The name of the network corresponds to the name of the manager node.

On the submap of this network symbol an icon is created for each HiPath/OpenScape 4000 system found (auto discovery). Additionally, the current alarm state (color) of each system is shown. When a newly detected system is added, furthermore an internal alarm event is created for each detected open alarm to initially map the current state of the system within the OpenScape FM.

Depending on the IP Discovery Filters defined for the Siemens-PN-MIB (HiPath 4000 MIB) via the IP Manager, symbols for the IP nodes on which an SNMP proxy agent for HiPath/OpenScape 4000 has been discovered, are grouped into a network. By default they are placed in a network with the name of the technology (see *OpenScape FM Desktop User Guide*), i.e. “HiPath 4000“ or “OpenScape 4000“, see also *Chapter 8, “Topology Configuration”*. This respectively applies for HiPath/OpenScape 4000 Assistants and RG8300 systems.

The topology information of the OpenScape FM server about the HiPath/OpenScape i000 systems is derived from so called topology discoveries (*Chapter 10, “Discoveries”*). During a topology discovery, the OpenScape 4000 Plugin starts a process on the SNMP proxy agent system which gathers topology data about the managed HiPath/ OpenScape systems. This information is retrieved by the manager that is sending specific AMO commands to the HiPath/OpenScape 4000 system(s) and storing the results in the SNMP proxy agent database.

Important Note:
When a new SNMP proxy agent has been set up, an initial topology discovery for each new HiPath/OpenScape 4000 system has to be started in order to enable OpenScape FM to display the HiPath/OpenScape topology.

If a topology discovery has been previously performed for the system and therefore the topology data is already available, the topology can then be constructed and displayed by using the already existing data from the database.

When a topology discovery should be started manually, this can be done from the network icon which contains the HiPath/OpenScape 4000 systems. From its context menu, the entry **HiPath/OpenScape 4000**–>**System->Discoveries** can be used. This opens the Discovery Browser.

A detailed introduction to the Discovery Browser is given in *Chapter 10, "Discoveries"*.

The Discovery Browser lists all HiPath/OpenScape 4000 systems maintained by the corresponding HiPath/ OpenScape 4000 Manager. It shows the current discovery states for each system. From this browser, a topology discovery for each system can be started. Also the other discoveries, like hardware and/or alarm configuration discoveries, can be started from here. See also *Chapter 10, "Discoveries"*.

Another method to start discoveries for a certain HiPath/OpenScape 4000 system is via its context menu entry **Discovery->Start** of the system.

7 Symbols and Overviews

This chapter introduces the symbols which OpenScape FM uses to represent the managed objects.

The OpenScape 4000 Plugin introduces some new symbols and submap types. A single managed object can be displayed by many symbols on different submaps. The managed object itself is the software-representation of a real resource to be managed, e.g. a system or a trunk group. Views (i.e. submaps and/or trees) are used to represent the object hierarchy on the graphical user interface. In addition to the default views, the user can create his/her own customized object hierarchies.

Detailed information about the basic OpenScape FM concepts and about maps/views can be found in the *OpenScape FM Desktop User Guide*.

Each symbol provides an object-specific context menu which can be invoked by a right-click. The submap context menu is opened by a right-click into the submap's background.

7.1 Topology Symbols

These symbols are part of the Topology Manager, which is a core component of the OpenScape FM.

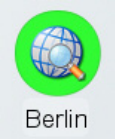
7.1.1 Network Symbol With Compound Status Indicator

The **OpenScape 4000** menu item is available in the Network symbol's context menu. This menu item can be used for so called "bulk operations", i.e. via this menu item tables are accessed, where all or several HiPath/OpenScape systems of this network can be selected. Actions can then be performed for the selected HiPath/OpenScape systems via its context menu. Since this is not part of the network topology it will not be covered here, but later on when we talk about system specific information (*Section 9.1, "HiPath/OpenScape 4000 System Bulk Operations Via Network Symbol"*).

Another example for this type of object would be a network which contains SNMP proxy agents. If it is a purely SNMP proxy agent network, the menu item **OpenScape 4000** will NOT be available. The moment a HiPath/ OpenScape 4000 system is added to this network, this will add its object characteristics, and the **OpenScape 4000** menu item will be added to the network's context menu.

The "network Id" value decides about an object's location within the object hierarchy. If a HiPath/OpenScape system has a network Id "USA", it will be found in a network with the name "USA". This network will be established if it has not existed before. A detailed description of network ids can be found in the *OpenScape FM Desktop User Guide*.

7.1.2 Subnetwork Symbol



A subnetwork symbol typically represents subset of a network. For example, a network symbol “Germany” may represent the entire network of Germany and the subnetwork symbol “Berlin” on the Germany submap all objects in the Berlin region. There aren’t any differences concerning the functionality of the network and the subnetwork symbol, but you may consider it more convenient to be able to emphasize that there are different levels. As the context menu on the subnetwork symbol is identical with the context menu of the network symbol, a description can be found in *Section 9.1, “HiPath/OpenScape 4000 System Bulk Operations Via Network Symbol”*.

A network can be structured into many networks and subnetworks, please read *Section 8.1, “Network Configuration”* for more information about that.

7.1.3 Connection Symbol

The connection symbol, an object of the Topology Manager, represents a so called “meta-connection” between two topology objects, i.e. networks and/or HiPath/OpenScape systems. The digit indicates the number of physical connections, i.e. trunk groups, which form the meta connection. A double click on the number field opens the connection’s submap to see all its trunk groups.

7.2 External System Symbols

The Topology Manager uses external system symbols to display connection end points that are no registered OpenScape FM objects, i.e. not in the database. They are located only on the Sub level.

The external system symbols do not have any specific context menu functions.

7.3 HiPath/OpenScape 4000 Specific Symbols

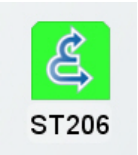
7.3.1 SNMP Proxy Agent

This icon symbolizes the Unix machine where the SNMP proxy agent is running, i.e. the HiPath/OpenScape 4000 Manager machine. The context menu offers functionalities which are related to SNMP operations and are explained in detail in the chapter *Section 9.9, “HiPath/OpenScape SNMP Proxy Agent Information”*.

7.3.2 HiPath/OpenScape 4000 System / HiPath/OpenScape 4000 Assistant / RG8300 Symbol

This icon symbolizes a HiPath/OpenScape 4000 system, a HiPath/OpenScape 4000 Assistant or a RG8300 system. After the autodiscovery, the HiPath/OpenScape system symbols are located in the networks that are selected in the IP-discovery filter configuration (default: *HiPath 4000 Assistant*, *OpenScape 4000 Assistant* und *RG8300*). The context menu offers HiPath/OpenScape 4000 specific operations and is explained in detail in chapter *Section 9.2, “Operations For a Single HiPath/OpenScape 4000 System”*.

7.3.3 SubHiPath/SubOpenScape 4000 System Symbol



The SubHiPath/SubOpenScape 4000 system is not a physical device but a logical unit which has been introduced to increase clarity of the topology views. The SubHiPath/SubOpenScape 4000 system of a HiPath/OpenScape 4000 system will be found in the submap of the HiPath/OpenScape 4000 system. It is the origin for all connections. That way connections do not have to be displayed on the HiPath/OpenScape 4000 system level where they would increase the number of devices and connections.

7.3.4 AP Symbol

The Access Points of a HiPath/OpenScape 4000 system, which has an LTU number larger than 16, will be displayed as AP symbols (Access Point). Since an Access Point is a logical part of a HiPath/OpenScape 4000 system, but may be placed in a different location, it must not necessarily be positioned within the submap of the HiPath/OpenScape 4000. It will be placed there by default, but it may be placed within any net or submap with the help of the Topology Manager (more about this can be found in the *OpenScape FM Desktop User Guide*).

7.3.5 APE Symbol

In the case of a failure of a HiPath/OpenScape 4000 system, the related Access Points Emergencies (short APEs) will take over the control for the other APs within the same emergency group. APEs will be displayed on the submap of their respective HiPath/OpenScape 4000 system. More about APEs can be found in *Section 9.6, “Access Points Emergencies”*.

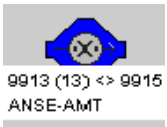
7.3.6 SoftGate Symbol

A SoftGate is primarily intended as a pure SW solution for IPDA Access Points. The focus lies on VoIP only Scenarios with HFA and SIP Subscribers, SIP trunking and SIP Provider Connectivity. SoftGates will be displayed on the submap of their respective HiPath/OpenScape 4000 system. SoftGates are differentiated into SoftGate 1000 and SoftGate 50.

7.3.7 Trunk Group Symbols

analogous

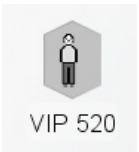
digital



special config

These symbols each represent a single trunk group. Via the respective context menu, access to the trunk group specific information is possible. This is covered in chapter *Section 9.8.2, “Trunk Group Information”*.

7.3.8 VIP Alarm Symbol



This symbol represents a VIP alarm which has been configured on a HiPath/OpenScape 4000 system. When a VIP alarm has been predefined on the HiPath/OpenScape 4000 system, any status changes of the corresponding devices can be observed on the OpenScape FM GUI, see also *Section 9.3, “VIP Alarms”*. However, it is not possible to define new VIP alarms via the OpenScape FM.

7.3.9 Hardware Unit Alarm Symbol

This symbol represents a hardware unit alarm which has been configured on a HiPath/OpenScape 4000 system. When a hardware unit alarm has been predefined on the HiPath/OpenScape 4000 system, any status changes of the corresponding devices can be observed on the OpenScape FM GUI, see also *Section 9.4, “Hardware Unit Alarms”*. However, it is not possible to define new hardware unit alarms via OpenScape FM.

7.3.10 CMI Base Station Object Symbol

This symbol represents all CMI base stations connected to a HiPath/OpenScape 4000 system. Details can be found in *Section 9.7, “CMI Base Stations”* for more details about the CMI base station object.

7.4 Overviews

If the ControlCenter plugin has been initialized, a number of ControlCenter overviews are provided for HiPath/ OpenScape 4000 objects.

The following overviews are provided:

- The last ten HiPath/OpenScape 4000 systems that changed to the status ’critical’ and that are still in that status.
- The ten HiPath/OpenScape 4000 systems with the most unacknowledged events.
- The ten recent events from category ’OpenScape 4000’ that have a worse status than ’normal’.
- The distribution of the unacknowledged events within category ’OpenScape 4000’ by status.
- The distribution of events within category ’OpenScape 4000’ by time.

The overviews can be displayed by selecting the entry **ControlCenter - Overview** within the menu **Technologies->OpenScape 4000**.

More about the ControlCenter can be found in the respective user guide.

8 Topology Configuration

This chapter discusses the options to manually influence the structure of the network topology within the OpenScape FM.

The first section handles the position of systems within the network topology. The remaining sections concern the connections between individual systems.

Information about the automatic creation of the network topology and the basic structure of its representation can be found in *Chapter 4*.

8.1 Network Configuration

The Topology Manager in combination with the OpenScape 4000 Plugin allows the fine-tuning of the representation of the network topology. There are two topics concerning network configuration.

The first is to reassign the target systems of trunk groups, if they are not set/configured correctly. This will be discussed in *Section 8.2, "Connections between HiPath/OpenScape 4000 Systems"*. The representation of connections between different IP nodes is described in detail in the *OpenScape FM Desktop User Guide.*

The second is the separation of the HiPath/OpenScape systems into networks and subnetworks to match the geographical or structural realities of the telecommunications network. The last one is especially important if networks with a large number of HiPath/OpenScape 4000 systems should be managed. Since the configuration of the network is a basic functionality of the OpenScape FM, the detailed description can be found in the *OpenScape FM Desktop User Guide*.

8.2 Connections between HiPath/OpenScape 4000 Systems

8.2.1 Node Numbers

Up to Hicom 300 EV 3.0, node numbers are used. One unique node number is assigned to each Hicom 300 and this number is used as an identifier for the Hicom 300 within a network.

In HiPath/OpenScape 4000 systems, the functionality of the Hicom 300 node numbers is replaced by one physical and any number of virtual node numbers. The distinction between 'physical' and 'virtual' node numbers has been introduced to enable enhanced Call Processing Functions.

The 'physical' node numbers are used to unambiguously identify HiPath/OpenScape 4000 systems. 'Virtual' node numbers are not unambiguously assigned to HiPath/OpenScape 4000 systems and they can actually reference any number of systems. For each HiPath/OpenScape 4000 system one, none or some 'virtual' node numbers can be assigned.

The AMOs TDCSU, TACSU and TSCSU are used to determine the node numbers that identify the target systems of the trunk groups. If the AMO KNTOP is enabled, it will gather information which systems are connected by a trunk. To achieve this, the physical node number of the neighboring systems will be acquired for the trunk. Depending on the output of the AMOs TDCSU, TACSU and TSCSU, it cannot be distinguished whether the connected node numbers are ’physical’ or ’virtual’ node numbers.

To determine a node number for a trunk group, the information from the AMOs TDSCU, TACSU and TSCSU will be analyzed by the HiPath/OpenScape 4000 SNMP Proxy Agent. To operate a HiPath/OpenScape 4000 network, the following conditions have to be met:

- The ’physical’ and ’virtual’ node numbers have to be distinct from each other.
- Each ’physical’ node number may only be assigned for a single system.
- A node number which has been used as a ’physical’ node number may never be used as a ’virtual’ node number.

By employing the AMO KNDEF, the ’virtual’ node numbers of a HiPath/OpenScape 4000 system can be obtained. These ’virtual’ node numbers can be used within the OpenScape FM to assess the graphical representation of the topology. The ’virtual’ node numbers will also be used when the AMO KNTOP has been deactivated for the HiPath/OpenScape 4000 systems. If the AMO KNTOP is deactivated, the representation in the topology is solely based on the ’virtual’ node numbers.

The AMO KNTOP can be configured to acquire the neighboring nodes of a trunk automatically. In some cases it can be helpful to use the option of the KNTOP to manually add entries. In this case it has to be considered that topology changes have to be updated in the KNTOP manually. These manual entries are meant to be used for systems which are not designed to be part of the automatic KNTOP discovery procedure (e.g. foreign nodes, exchange, old systems).

For some HiPath/OpenScape 4000 functions, it is necessary, that identical ’virtual’ node numbers are assigned to a number of systems. This can be done with the help of the AMO KNDEF. All ’virtual’ node numbers that are assigned to a HiPath/OpenScape 4000 system can be obtained by this AMO.

If a Hicom 300 system will be migrated to a HiPath/OpenScape 4000 system, it’s former node number will generally be assigned as the virtual default node number.

In OpenScape FM, it can be configured how the ’virtual’ node numbers shall be used for the graphical representation within the OpenScape FM. Depending on the network topology, it may be reasonable to utilise all, none or only the default ’virtual’ node numbers. Further details can be found in *Section 9.9.1, “HiPath/OpenScape 4000, SQL Connection...”*. To enable OpenScape FM to display an accurate topology, the following conditions have to be met:

- In AMO TDCSU, TACSU and TSCSU, the virtual default node number will be used to identify the associated system.
- Virtual default node numbers are unique.
- If a virtual node number is used as a virtual default node number, it may not be used for other systems as a virtual default node number.

The ’physical’ node number of a HiPath/OpenScape 4000 system or the node number of a Hicom 300 can be displayed by using the menu item **System Info** from the context menu of the system. A comfortable way to retrieve the physical node numbers of all HiPath/OpenScape 4000 systems of one HiPath/OpenScape 4000 Manager

system is to open the HiPath/OpenScape 4000 Manager's SNMP proxy agent context menu and select **OpenScape 4000->System**–>**Systems...**: the opened table contains the column "Node No.", which contains the 'physical' node number.

To enable the access to the 'virtual' node numbers, an SQL connection has to be set. When an SQL Connection is active, the menu item **Topology/Trunks->KNDEF...** will be available on a HiPath/OpenScape 4000 system. Selecting this menu item will open an info browser listing all 'virtual' node numbers configured for this HiPath/ OpenScape 4000 system.

Important Note:
Next to the HiPath/OpenScape 4000 specific node numbers, OpenScape FM offers another mechanism to identify a system: the so called Node Id. The Node Id is independent of the technology type and therefore allows to draw connections between different technologies.

It has to be kept in mind, that the configuration of such a Node Id is only specific for the OpenScape FM and will only manipulate the OpenScape FM database. It will not effect the database of the Proxy Agent. A detailed description about the configuration of Node Ids will be found in the *OpenScape FM Desktop User Guide*.

8.2.2 Example Topology Representations with Virtual Node Numbers

Example 1:
For the OpenScape 4000 system "System 3" with the Target Domain Id "Spain" a new trunk group with the target node number 11 has been created. In our network exist three OpenScape 4000 systems with the node number 11 (physical or virtual): "System 2", "System 1" with the same Target Domain ID and "System 4" with the Domain ID "Italy". Since connections will only be drawn between systems with the same Target Domain ID only the systems "System 1" and "System 2" will be connected with the OpenScape system "System 3", see *Figure 4*.

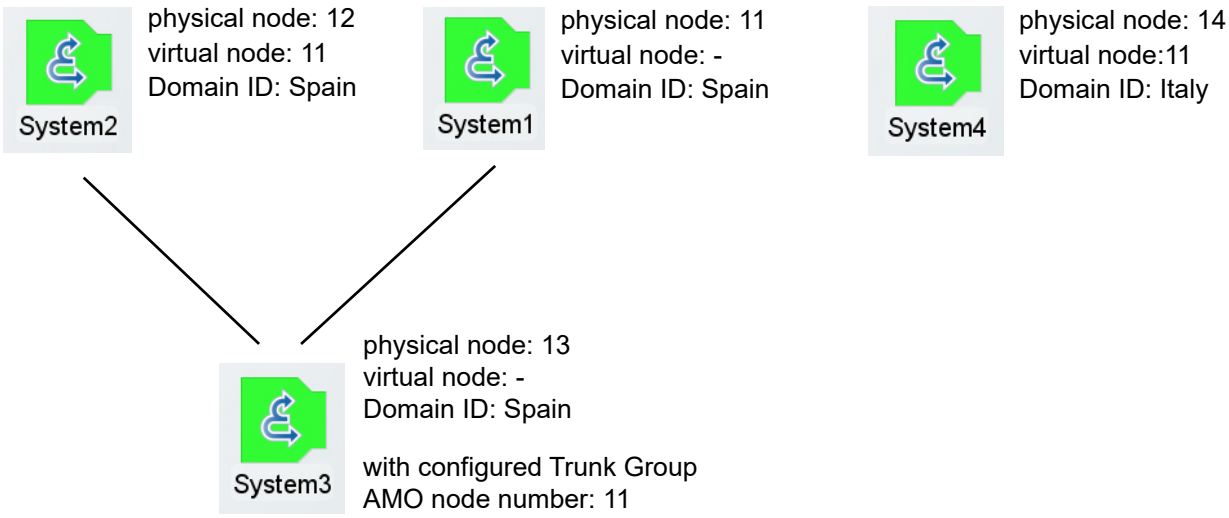


Figure 4 *Connections between HiPath/OpenScape 4000 systems*

Trunk group definitions are bound to a HiPath/OpenScape 4000 system. Therefore normally if two such systems are connected via a trunk group, two trunk group objects will be found on the view of the meta connection, representing both configurations.

Example 2:
OpenScape 4000 Sys1 has a trunk group with target OpenScape 4000 Sys2, and reverse. In this case, the OpenScape 4000 Plugin shows two trunk groups: one from 1 to 2, and one from 2 to 1. This is useful because the connection's alarm state is monitored separately for OpenScape system 1 and 2. This makes it possible to see which OpenScape 4000 system reported an alarm for its trunk group. Both trunk groups will be integrated in the meta-connection that represents the connections between the two corresponding networks (see Open*Scape FM Desktop User Guide*).

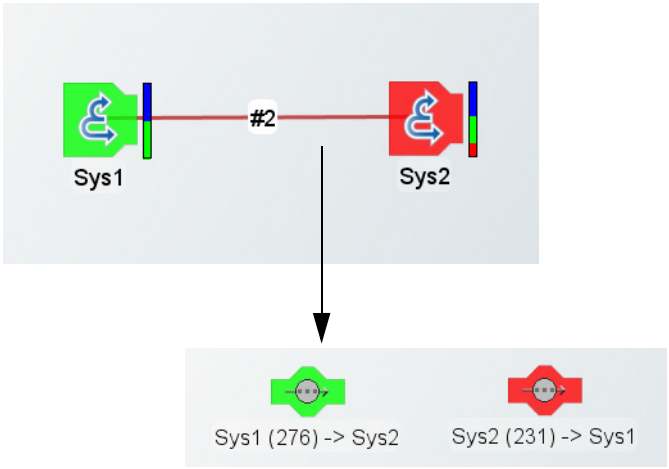


Figure 5 Trunk Groups of one Connection

8.2.3 Setting Target System of HiPath/OpenScape 4000 Trunk Group

For the trunk group configuration two parameters are important: the AMO node number and the configured node number. Both are to be found in the Informix database on the HiPath/OpenScape 4000 Manager machine. The "AMO node number" in OpenScape FM, defines the node number of the partner node to which the trunk group is connected. The "Configured node number" in OpenScape FM, is optional and can be modified. If the "Configured node number" has been set, it **overwrites** the "AMO node number" i.e. when the "Configured node number" has been set it is taken as target node number instead of the "AMO node number".

If the discovered node number (AMO node number) can not be changed on the HiPath/OpenScape 4000 system, the OpenScape FM mechanism "**Configure Node No. ...**" can be used to set the configured node number of the trunk group manually:

Hint:
This mechanism is only available when the **Trunk Group Topology** view was selected for the respective OpenScape 4000 Manager (see *Section 9.9.1, "HiPath/OpenScape 4000, SQL Connection..."*).

- Location of the trunk group symbol. Selection of **Configure Node No. ...** in the context menu of the trunk group.
- This opens a dialog where the configured node number for the selected trunk group can be entered (*Figure 6*). Pressing **Apply** commits the operation. The value will be entered in the informix database.

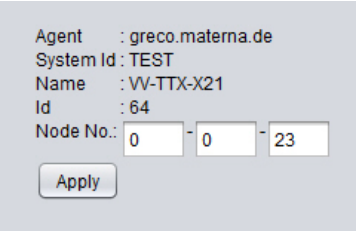


Figure 6 Setting a new Target Node for a Trunk Group

The OpenScape 4000 Plugin will now adjust the topology concerning the new target system chosen for the trunk group. The update can take several seconds, depending of the current workload. If no update takes place, one reason may be that the target system's topology has not yet been discovered. In this case it has the node number 0. The discovery browser can be used to start a topology discovery for the HiPath/OpenScape 4000 system.

8.2.4 Resetting Trunk Group Target:

To reset the target of a trunk group, the procedure described in *Section 8.2.3, "Setting Target System of HiPath/ OpenScape 4000 Trunk Group"* can be used. The target node number just has to be set to "0". The trunk group will then get the target system defined by the "AMO node number".

8.3 IP Nodes as Trunk Group Targets

To display the connections of a HiPath/OpenScape 4000 system to a RG 2500 or HG3550 Gateway the trunk group name may be defined in a specific way. The respective trunk group name must follows a certain syntax: "`IPe:<IP address|node name>`" or „`IPi:<IP address|node name>`," whereby IPe stands for an external system, and IPi stands for an internal system. The registration of this parameter is case-insensitive, e.g. "IPE:" or "IPI:" would also be possible. An external system will be placed in the corresponding IP network, whereas an internal system will be placed on the HiPath/OpenScape 4000 system's submap. In both cases, the connection from the HiPath/OpenScape 4000 system to the target device will be drawn automatically.

8.4 IP-Trunk Representation

IP-trunks do not have a destination trunk as normal physical trunks have. An IP-Trunk may have a relation to many other trunks, therefore is does not make sense to connect them to other HiPath/OpenScape 4000 Systems.

The manager's HiPath/OpenScape 4000 proxy agent gathers the information to identify the IP trunks from the field „GER" of the AMO TDCSU. It will be stored within the database table `saetze`.

OpenScape FM fetches this value and checks if it matches a type that is defined to belong to IP-trunks. For IP-trunks an external system object will be created as a target with the value of 'IP-Trunk'. The IP-trunk will be connected to this external system object.

This will result in the following representation:

<HiPath System>----<Frame>----<Trunk>---<Ext.System IP-Trunk>

9 Device-Specific Information

9.1 HiPath/OpenScape 4000 System Bulk Operations Via Network Symbol

A HiPath/OpenScape 4000 network's context menu offers some bulk operations (i.e. concerning all HiPath/ OpenScape 4000 systems of a network) for different kinds of data. The operations are performed on the set of HiPath/OpenScape 4000 systems that belong to the network.

The respective functions are found in the submenus of the context menu **OpenScape 4000**.

They are related to **System**s (see *Section 9.1.1*), **Fault**s (see *Section 9.1.2*) and **Hardware** (see *Section 9.1.3*).

Important Note:
The Search browsers described in this chapter will only list the HiPath/OpenScape 4000 systems for which an SQL-connection is configured.

9.1.1 OpenScape 4000, System

- **Systems** : This menu entry opens a list that provides an overview over all HiPath/OpenScape 4000 systems of the current network view. The list contains information about the current alarm states of the systems, the number of alarms set (minor/major/device), the node numbers, the different network Ids, the system names and mnemonics, pabx_ids and the hostname where the responsible HiPath/OpenScape 4000 Manager is running.

  Note:
  Sorting the list by the column **L-Number** provides an overview about the relations between the Host Systems and their APEs. The first of all entries with the same **L-Number** is then always the Host System followed by its APEs.

  From each entry of the list, further information about the corresponding HiPath/OpenScape 4000 system can be displayed by using the respective context menu. Each context menu offers the same menu items as the context menu of the respective HiPath/OpenScape 4000 system symbol.

- **Discoveries** : With this entry the discovery states of all HiPath/OpenScape 4000 systems of the current network view can be checked. Discoveries have to be performed to get information about topology, alarm configuration, software and hardware. For each HiPath/OpenScape 4000 system, the current discovery state is displayed (busy/done/error) and the date/time of the last discovery is shown. Discoveries can also be started or stopped from this list. System-related information from the HiPath/OpenScape 4000 systems can be accessed through the context menu of the list-entries. See also *Section 6.3, "Network Discovery And Topology Layout"*.

- **Configuration:** This menu entry provides access to the Discovery Configuration GUI, to allows the configuration of the time intervals for the execution of automatic master discoveries.

9.1.2 OpenScape 4000, Fault

- **Alarms** : Selecting this menu entry opens he Alarm Search GUI (*Figure 7*), a tool to analyze the alarm state of the current HiPath/OpenScape 4000 system network view. This browser also allows the deletion of alarms in the HiPath/OpenScape 4000 database. Initially, for each HiPath/OpenScape 4000 system, the current alarm state and the numbers of the minor, major and device alarms are shown. Additionally, a search pattern to find specific alarms for a specific interval of time can be entered. In detail, the following search criteria can be entered:

  Time Interval (Recent Days or From <date/time> To <date/time>)
  Priority
  State
  Module
  Name
  Group
  Class

  Two radio buttons provide the options **Search** or **Delete**, i.e. besides of looking for particular alarms, bulks of alarms can also be deleted in a very comfortable way.

  A detailed introduction to the Alarm Search Panel, can be found in *Section 11.1.1, "Finding Alarms"*.

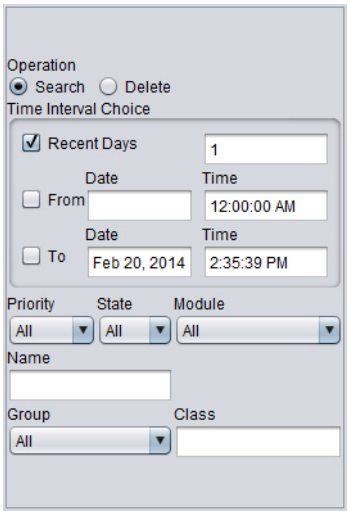


Figure 7 Alarm Search GUI

- **Errors** : With this entry, the Error Search GUI (*Figure 8*) is opened, where specific errors can be searched at the current HiPath/OpenScape 4000 system network view. The Error Search browser allows detailed search pattern to find errors. In detail, the following criteria can be searched:

  Time Interval (Recent Days or From <date/time> To <date/time>)
  Message Id
  Priority
  Event
  Error Subevent
  Error module
  Card Reference
  Board version

Firmware
Action
Error class
Error group

Two radio buttons provide the options **Delete** or **Search**" i.e. besides to look for particular errors, great bulk of errors can be deleted in a very comfortable way.

A detailed introduction to the Error Search Panel can be found in *Section 11.1.2, "Finding Errors"*.

Note:
Error messages will only be forwarded to the OpenScape FM when they are different to already sent messages **in the eye of the AFR**. Errors classified as duplicates by the AFR will be ignored.
By default the AFR configuration is set to forward only HiPath/OpenScape 4000 errors that differ within the first line of the error message. To see all error messages, a reconfiguration of the AFR might be necessary.

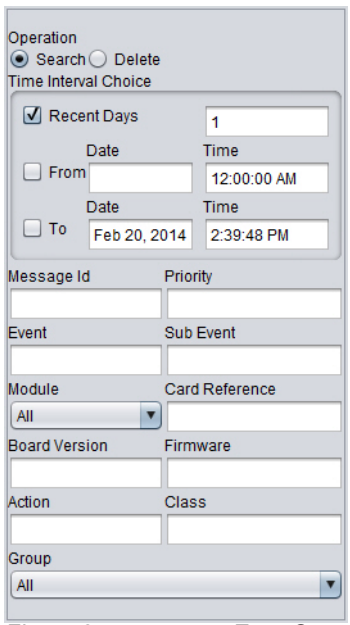


Figure 8 Error Search GUI

9.1.3 OpenScape 4000, Hardware

There are four different hardware browsers. All of them allow the search for specific pieces of hardware in the entire HiPath/OpenScape 4000 system network of the current view. A search can be performed on data gathered with the aid of the AMOs BCSM, BCSU, CDSM and CDSU. The search patterns that can be defined depend on the type of data that should be queried. In detail, the following criteria can be searched:

- **BCSM:**

  Module

  Slot

  Configured board

Installed board

Firmware

Code

Status

Version

Section 11.1.3, "Find Systems With Particular Hardware" explains how to find hardware information.

- **BCSU:**

  LTG

  LTU

  Slot

  Configured board

  Installed board

  Firmware

  Code

  Status

  Version

  Section 11.1.3, "Find Systems With Particular Hardware" explains how to find hardware information.

- **CDSM:**

  Cabinet

  Shelf

  Slot

  Part Id

  Firmware

  Installed Board

  Version

  Section 11.1.3, "Find Systems With Particular Hardware" explains how to find hardware information.

- **CDSU:**

  Cabinet

  Shelf

  Slot

  Part Id.

  Firmware

  Installed Board

Version

Section 11.1.3, “Find Systems With Particular Hardware” explains how to find hardware information.

9.2 Operations For a Single HiPath/OpenScape 4000 System

By using the context menu of individual HiPath/OpenScape 4000 symbols or HiPath/OpenScape 4000 list elements, detailed information can be obtained and administrative tasks can be performed. The specific options are described in the following sections:

9.2.1 HiPath/OpenScape 4000 System-Specific Events

Events that are specific for a system can be displayed by using a restricted event browser. The browser is opened by using the entry **Events->View** from the context menu of a HiPath/OpenScape 4000 system object, The entry opens an event browser that only contains events that have been created from the respective HiPath/OpenScape 4000 system.

9.2.2 Managing HiPath/OpenScape 4000 Systems

A HiPath/OpenScape 4000 system can be *managed* / *unmanaged* via the corresponding menu entries in the **Edit** submenu. An unmanaged system will be displayed by OpenScape FM, but its data will be ignored. All its topology data, like connections, will be removed and the alarm state is no longer displayed. All configuration depending objects like VIP, CMI Base Station and Access Point objects will be removed, too. When the system is set back to “*managed*“, the deleted objects will be rediscovered and displayed again.

9.2.3 System Info

The menu entry **System Info...** provides general information about the HiPath/OpenScape 4000 system. It brings up a browser which displays data like system Id, contract number, location, node number and so on.

Hint:
The “Topology...”, “Hardware...”, “Software...” and “Alarm Configuration...” information is only available if the corresponding discoveries have been performed.

9.2.4 Topology/Trunks

The menu **Topology/Trunks** contains the following entries:

- **Trunk Groups** shows all trunk groups defined at the HiPath/OpenScape 4000 system. It displays information like the trunk group ids, names, devices and types. Information about the trunks assigned to a trunk group can be displayed.

- **Trunks** provides a list of all trunks configured at the HiPath/OpenScape 4000 system. It shows information about trunk types, numbers, names, devices and more.
- **KNDEF** (only available if the JDBC Connection is active) provides a list of all virtual node numbers configured for the HiPath/OpenScape 4000 system.

9.2.5 Hardware

The menu **Hardware** contains the following entries:

- **Cabinets** shows a list of all cabinets the HiPath/OpenScape 4000 system consists of. Information about the frames and CDSM/CDSU data for each cabinet can also be accessed.
- **Frames** displays a list of all frames of the HiPath/OpenScape 4000 system. The CDSM/CDSU data for each frame of the list can also be displayed.
- **Peripherals** provides an overview of the peripheral devices of the HiPath/OpenScape 4000 system like hard drives or MODs.
- **BCSM** provides information about all modules of the servers ADS, TCS and VMS for the HiPath/OpenScape 4000 system.
- **BCSU** shows data about all installed or configured boards for the HiPath/OpenScape 4000 system.
- **CDSM** displays information about the server modules installed at the different frames and shelves.
- **CDSU** displays information about the SWU-CCs (Switching Units, Common Control) installed at the different frames and shelves.
- **IPDAs** displays the data from the "`snmp_ipda`" table. An existing JDBC connection to the OpenScape 4000 Manager informix database is required for the display, else the menu item is deactivated.

9.2.6 Software

The menu **Software** contains the following entries:

- **APS** provides information about the software installed at a HiPath/OpenScape 4000 system.
- **Patches** displays all patches applied to a HiPath/OpenScape 4000 system.

9.2.7 Fault

The menu **Fault** contains the following entries:

- **Alarms On** opens the Alarm Browser (*Section 9.2.7.1, “The Alarm Browser”*) which displays all alarms of the selected HiPath/OpenScape 4000 system that currently are in state “On”.

- **Alarms Off** opens the Alarm Browser (*Section 9.2.7.1, "The Alarm Browser"*) which displays all alarms of the selected HiPath/OpenScape 4000 system that currently are in state "Off".
- **Errors** opens the Error Browser (*Section 9.2.7.2, "The Error Browser"*) which presents a list of all errors of the selected HiPath/OpenScape 4000 system. If a large number of errors exist, this operation might take a little while. The original error message of the system from this list can also be accessed.
- **Error Messages** opens the Error Browser which displays a list of the original HiPath/OpenScape 4000 system error messages. If a large number of errors exist, this operation might take a little while.
- **Alarm Configuration** shows the alarm configuration of the HiPath/OpenScape 4000 system. This data is based on a snapshot taken during the last alarm configuration discovery. To get current data, a new discovery can be started manually.
- **Alarm Filters** opens the Alarm Filter Browser. Alarm filters can be set or deleted on the HiPath/OpenScape 4000 Manager system. More about the alarm filter browser can be found in *Chapter 12, "The Alarm Filter Browser"*.
- **Get Alarm Mirror** initiates an alarm upload for the selected HiPath/OpenScape 4000 system, i.e. a list of the current alarms is sent to the HiPath/OpenScape 4000 Manager. It performs a synchronization between the stored alarms in the database and uploaded alarms from the HiPath/OpenScape 4000 system.

9.2.7.1 The Alarm Browser

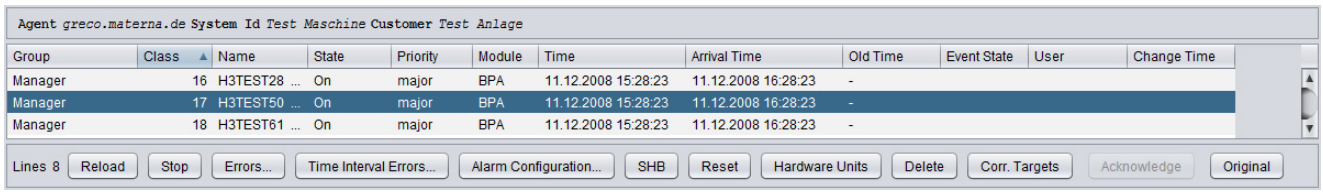


Figure 9 Alarm Browser

The Alarm Browser consists of two parts (see *Figure 9*).

The lower part consists of a number of buttons which will invoke functions explained in *Section 9.2.7.3* to *Section 9.2.7.10*. .

The upper part is a list of single alarms, which contains the following information:

Group and **Class** define the type of the alarm. The respective column contains the alarm group and the alarm class.

Name simply states the name of the alarm.

State displays whether the alarm is currently active ("On") or resettet ("Off").

Priority and **Module** state the priority of the alarm and the name of the module in which the alarm occurred.

Time is the moment when the last set or reset was generated by the HiPath/OpenScape 4000 for this alarm.

Arrival Time is the moment when the last set or reset was noticed by the HiPath/OpenScape 4000 Manager.

Old Time is the moment when the pre last set or reset was generated by the HiPath/OpenScape 4000. E.g. when the alarm is currently resettet. Time shows the moment of the resetting. And Old Time shows the moment of the setting.

Event State displays either an empty field, stating that the alarm is not listed in the event list, an unchecked box, stating that the alarm is in the event list and currently unacknowledged, or a checked box, stating that the alarm is in the event list and currently acknowledged.

User and **Change Time** shows the name of the user that was the last to acknowledge or unacknowledge the alarm and when this was done.

9.2.7.2 The Error Browser

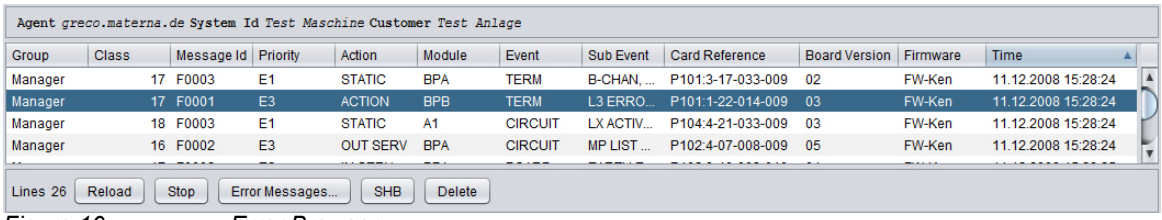


Figure 10 Error Browser

The Error Browser consists of two parts (see *Figure 10*).

The lower part consists of a number of buttons which will invoke functions explained in *Section 9.2.7.3* and *Section 9.2.7.9*. .

The upper part is a list of single errors, which contains the following information:

Group and **Class** displays the alarm group and class of the alarm connected to the error.

Message Id shows the message id of the error.

Priority and **Module** state the priority of the error and the name of the module in which the error occurred.

Action states the required HiPath/OpenScape 4000 system action.

Event and **Sub Event** is the event that led to the creation of the error.

Card Reference states a reference to the affected HiPath/OpenScape 4000 board.

Board Version and **Firmware** are the board and firmware version of the affected HiPath/OpenScape 4000 board.

Time is the moment when the error was generated by the HiPath/OpenScape 4000.

Note:
Error messages will only be forwarded to the OpenScape FM when they are different to already sent messages **in the eye of the AFR**. Errors classified as duplicates by the AFR will be ignored.
By default the AFR configuration is set to forward only HiPath/OpenScape 4000 errors that differ within the first line of the error message. To see all error messages, a reconfiguration of the AFR might be necessary.

9.2.7.3 SHB (Service Handbook):

All lists of alarms or errors contain the button **SHB** (for an example, see *Figure 9*). This button is a link to the HiPath/OpenScape 4000 Service Manual, which can be consulted for the respective alarm or error. After the selection of an alarm or error, the button has to be pressed. This will open the explanation for the error number within the HiPath/OpenScape 4000 Service Manual. Since the manual is written in HTML, the pages will be displayed within a web browser.

9.2.7.4 Correlated Target Alarms:

When Target Alarms, i.e. alarms for trunk groups, have occurred, it may be of interest, if the target alarm is related to others. For this question, OpenScape FM offers the option "**CorrTargets**, a button found in all alarm browser windows (see for example *Figure 9*):

To find target alarms which might be correlated to another alarm, this alarm has to be selected in the alarm browser list and the button **CorrTargets** has to be pressed. This opens a list with all potentially correlated target alarms.

What are correlated target alarms?
An example is displayed in *Figure 11*:

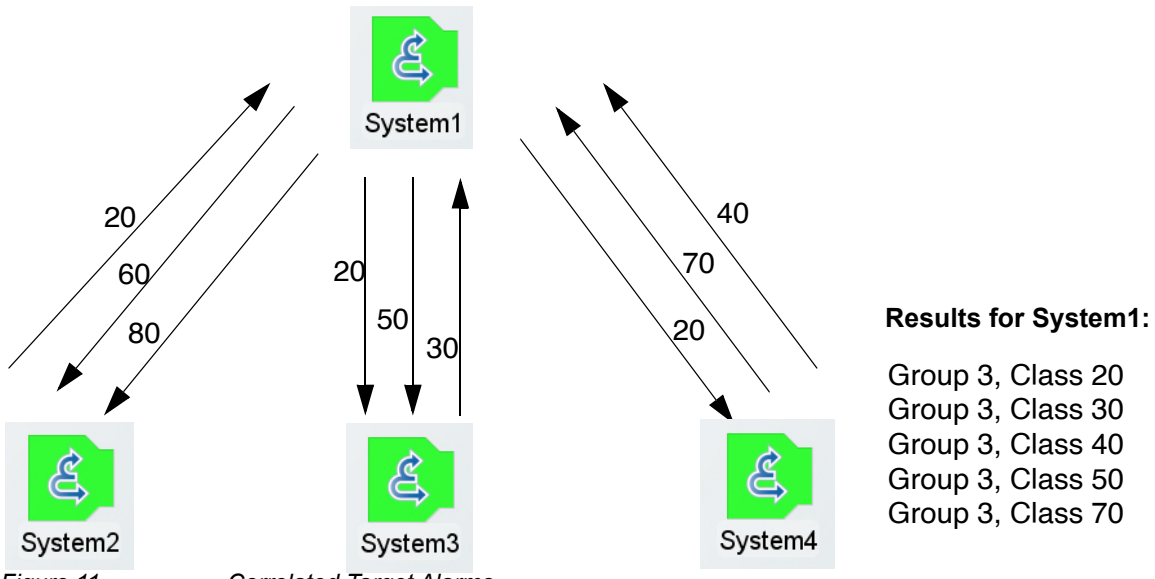


Figure 11 Correlated Target Alarms

Presumedly, different target alarms are defined for the trunk groups to the systems 2, 3 and 4 that are starting at the HiPath/OpenScape 4000 System1. It should be determined, if target alarms exist that are correlated to alarm 20. (since all alarms for trunk groups (target alarms) belong to group 3, here the alarms are only distinguished by their alarm class)

To identify the correlated target alarms, OpenScape FM searches for all connected HiPath/OpenScape 4000 systems that are the target system of a trunk group which has a definition for the selected alarm (20) and which starts at the source system (System1) .

In the example the matching target systems are System3 and System4.

After this, OpenScape FM searches for alarms with the status „on“ for all connections between the source system (System1) and the previously determined matching target systems (System3, System4).

These alarms are displayed in the list of the correlated target alarms:.

In the example, the classes 20, 30, 40, 50 and 70 would be displayed. The classes 60 and 80 would not be displayed, since System2 is not in the list of the target systems.

9.2.7.5 Time Interval Errors

The button **Time Interval Errors...** is only available when a JDBC-Connection to the HiPath/OpenScape 4000 Manager is configured. It opens the Error Browser which list the errors of the alarm occurring in a specific time interval around. This time interval is defined by the value entered in the fields **Pre-Time (Min.)** and **Post-Time (Min.)**. **Pre-Time** and **Post-Time** are related to the Timestamp of a selected Alarm. The default of Pre- and Post-Time is set to 5 minutes.

9.2.7.6 Delete or Reset Alarms

If an SQL-Connection is configured (*Section 9.9.1, “HiPath/OpenScape 4000, SQL Connection...”*) the Alarm Browser contains the Button “**Delete**” (*Figure 9*). Thus, the Alarm Browser provides the option to delete or to reset one or more selected alarms.

The deleted alarms will be deleted from the database of the HiPath/OpenScape 4000 Manager. That does not change the state of this alarms on the HiPath/OpenScape 4000 systems.

All deletions are recorded in the `activity.log` (see *Chapter 17, “Activity Logging”*).

The button **Reset** can be used to reset alarms on the HiPath/OpenScape 4000 system. The info browser displays whether the alarm is resettable or if the reset operation has been started or not.

The reset action tries to reset the selected alarms on the respective HiPath/OpenScape 4000 systems by using the SNMP proxy agent and AMO commands. This is not possible for all alarms.

9.2.7.7 Acknowledgement of Alarms

The Alarm Browser contains the button **Acknowledge**. This button will be active when at least one alarm is selected from the displayed alarm list, and when all selected alarms are unacknowledged. When the button is pressed, all selected alarms get acknowledged.

9.2.7.8 Original Alarm Messages

The Alarm Browser contains the button **Original**. This button will be active when at least one alarm is selected from the displayed alarm list. When the button is pressed the original alarm messages for the selected alarms will be displayed.

9.2.7.9 Delete Errors

If the SQL User for the corresponding SNMP proxy agent has been set (*Section 9.9.1, "HiPath/OpenScape 4000, SQL Connection..."*), the Error Browser contains the Button **Delete**. By using this button, one or more selected errors can be deleted in the database of the HiPath/OpenScape 4000 Manager.

A delete removes the selected errors from the database on the HiPath/OpenScape 4000 manager.

All delete operations will be logged in the `activity.log` file; *Chapter 17, "Activity Logging".*

9.2.7.10 Hardware Units

The Alarm Browser contains the button **Hardware Unit**. This button is active when at least one alarm is selected from the displayed list of alarms. When the button is pressed, all hardware units will be displayed, for which at least one of the selected alarms is defined.

9.2.8 Discovery

Important Note:
For U.S. Hicoms with the Version „R6.5“ or „R6.6“ the Discovery functionality is not supported, therefore the menu entry **Discovery** is not available for these HiPath 4000 Systems. Which version a HiPath 4000 System has, can be viewed by using the menu entry **System Info** (see *Section 9.2.3, "System Info"*).

Discoveries are necessary to acquire detailed information about a HiPath/OpenScape 4000 system (*Chapter 10, "Discoveries"*). During a discovery, sets of AMOs (Administration Maintenance Operations) are executed directly on the HiPath/OpenScape 4000 system and the output is analyzed by the SNMP proxy agent. All gathered information is stored in the HiPath/OpenScape 4000 Manager database and is accessible via the SNMP protocol.

Important Note:
The real-time observation of HiPath/OpenScape 4000 system fault status is not affected by discoveries. Assumed that the SNMP proxy agent in the HiPath/OpenScape 4000 Manager is up and running, the alarm state shown by OpenScape FM is always up to date with the current state of the network – even if no discovery has been performed. The fault status of connections, i.e. trunk groups, depends on discoveries, therefore no topology information can be displayed without a discovery; thus the fault status of connections cannot be indicated either.

In detail, discoveries are needed to get information about topology, hardware, software and the alarm configuration of a HiPath/OpenScape 4000 system. If this data is retrieved from the OpenScape FM, it shows the information from the point of time when the last discovery was finished successfully. Since the data may be out of date, a discovery should be started when the data is needed and may have been changed. For this purpose, the following menu entries are available in the menu **Discovery**:

- **Start:** This entry starts all discoveries (hardware, software, topology, alarm configuration) for the selected HiPath/OpenScape 4000 system. If only one type of discovery should be started, this can be done by using the network container symbol.
- **Stop:** This entry stops the discovery process for the selected HiPath/OpenScape 4000 system.
- **Status... :** This entry displays the current discovery status of selected HiPath/OpenScape 4000 system.

The discovery states for all HiPath/OpenScape 4000 systems of a network, can be displayed by using the context menu of the PBX network symbol (*Section 9.1, "HiPath/OpenScape 4000 System Bulk Operations Via Network Symbol"*). From there, discoveries for multiple HiPath/OpenScape 4000 systems can be started at once.

9.2.9 Manager Web Access...

Manager Web Excess... allows direct access to the HiPath/OpenScape 4000 Manager start page.

9.2.10 Manager Login

This menu entry can be used to log in on the HiPath/OpenScape 4000 Manager to get direct access to the HiPath/OpenScape 4000 Manager, i.e. to get additional menu entries. More information about the direct access can be found in *Chapter 16, "Extensions with HiPath/OpenScape 4000"*.

9.3 VIP Alarms

VIP alarms are alarms of group 3, with a class number larger than 519. They can be defined on a HiPath/OpenScape 4000 system for a single phone or for a group of phones. If a VIP alarm has been defined for a phone and it is out of order, the corresponding symbol (see *Section 7.3.8, "VIP Alarm Symbol"*) on the HiPath/OpenScape 4000 system submap turns red.

VIP alarms can not be defined via the client user interface.

The symbol offers an object-specific context menu: from there the **Alarm Configuration** or the current **Alarms** can be displayed for the VIP alarm.

9.4 Hardware Unit Alarms

Hardware unit alarms are alarms of group 3, which can be assigned to a single or multiple hardware units or to an entire LTU. If such a hardware unit alarm occurs, the symbol will be displayed according to the alarm priority (see *Section 7.3.9, "Hardware Unit Alarm Symbol"*) on the HiPath/OpenScape 4000 system submap. A hardware unit alarm object does not represent a single hardware unit, it represents the configured alarm.

A hardware unit alarm cannot be created via the client user interface.

The symbol offers an object specific context menu: from here the **Alarm Configuration**, the current alarms (**Alarms On**) or the assigned **Hardware Units** can be displayed in an info browser.

- **Alarms On...:** If this menu entry gets selected, an info browser will open, which displays all alarms which are currently pending for the alarm object. The information displayed by the info browser will be explained in *Section 9.2.7.1, "The Alarm Browser"*.

- **Alarm Configuration...:** If this menu entry gets selected, an info browser will open, which displays the configuration of the hardware unit alarm. The **Hardware Unit** button of this info browser can be used to switch to another info browser. This new browser displays all hardware units, for which the selected configured alarms are defined.
- **Hardware Units...:** The selection of this menu entry opens an info browser, which displays all hardware units, that are configured for the hardware unit alarm. A hardware unit alarm can be assigned for a special hardware unit or for an entire LTU. The info browser displays the following information:
  - **PEN (LTG, LTU, Address):** The Port Equipment Number of the hardware unit.
  - **Conf. Board:** The configured hardware unit.
  - **Inst. Board:** The installed hardware unit.
  - **Code:** Abbreviation for the hardware unit.
  - **Version**
  - **Firmware**
  - **State**
  - **Alarm State:** The alarm state of the hardware unit. If more than one alarm exists for a hardware unit, the alarm with the highest priority determines the overall state of the hardware unit.
  - **Conf. Alarms (HU/TR):** This column displays the hardware unit alarms (HU) resp. trunk alarms (TR) configured for the hardware unit. The hardware and trunk alarms are divided by a '/'. If there is more than one hardware unit alarm or more than one trunk alarm configured, they are divided by commas.

9.5 Access Points

Access Points (APs) are HiPath/OpenScape 4000 shelves, which may be locally independent from the HiPath/ OpenScape 4000 system Main Cabinet, that is managing them. They are discovered using the AMO “DISPLAY CONSY” and are recognized by their specific LTU number which has to be greater than 16.

If no IP address is configured, or if the associated IP network does not exist within the OpenScape FM, per default an Access Point is placed on the submap of its HiPath/OpenScape 4000 system (*Figure 12*). If a valid IP address is configured for an Access Point and if the associated IP network is handled by OpenScape FM, then the Access Point will be additionally displayed below the corresponding IP node.

If a location is configured for an Access Point in the format „HiPath:/<network>/<subnet_1>/../<subnet_n>“, this configuration will be evaluated by the OpenScape FM for the placement of the Access Point. The corresponding networks and subnetworks will be created by OpenScape FM and the Access Point object will be placed accordingly.

Access Points may be placed within any net or subnet within the topology. The location of an Access Points objects can by managed by using the menu entry **Properties** and the tab **Topology->Configuration**. If e.g. a HiPath/ OpenScape 4000 system is installed in Berlin, and an Access Point belonging to this system is located in Potsdam,

two different subnetworks (’Berlin’ and ’Potsdam’) can be created. The first subnetwork containing the HiPath/ OpenScape 4000 system and the second containing the Access Point. Connections between the objects will be generated automatically.

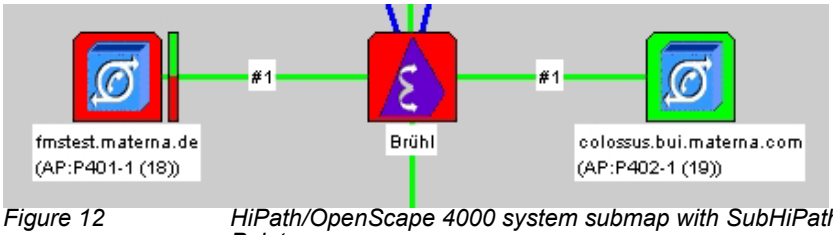


Figure 12 HiPath/OpenScape 4000 system submap with SubHiPath/SubOpenScape 4000 system and Access Points

By using the menu entry **Errors...** a list of all errors that are currently registered for the respective Access Point will be displayed. If the menu item **Location...** is selected, an info browser displaying the location of the Access Point will be opened.

The SQL connection has to be defined for the corresponding SNMP proxy agent in order to perform database queries (e. g. the list of errors of an Access Point). If the SQL connection has not been defined, the menu items **Errors...** and **Location...** will not be displayed.

9.6 Access Points Emergencies

Access Points Emergencies (APEs) are a special case of the Access Points described in the last section. In the case of a failure of the HiPath/OpenScape 4000 System, the APEs provide the additional ability to provide functionalities for the APs within an emergency group, which will allow to sustain the control of the APs.

APEs are managed within the system tables like HiPath/OpenScape 4000 systems.

The OpenScape FM distinguishes APEs from HiPath/OpenScape 4000 systems, attaches the APEs to their respective HiPath/OpenScape 4000 system, and displays them within the submap of the respective HiPath/ OpenScape 4000 system.

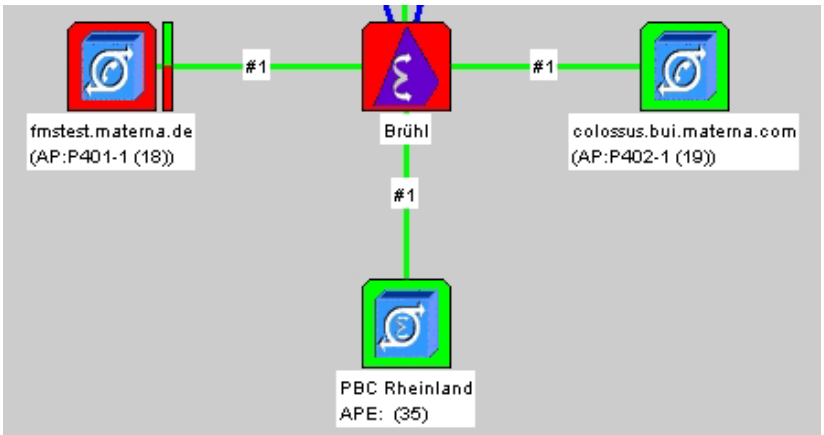


Figure 13 HiPath/OpenScape 4000 submap with SubHiPath/SubOpenScape 4000, Access Points and one Access Point Emergency

Figure 13 shows an excerpt of the submap of a HiPath/OpenScape 4000 system. In the middle the SubHiPath/ SubOpenScape 4000 object is located. To it's left and right two Access Points and below one APE object belonging to the system are displayed.

The context menu of an APE object contains the following entries, which are also available for HiPath/OpenScape 4000 system objects: **System Info...** (see *Section 9.2.3, "System Info"*), **Fault...** (see *Section 9.2.7, "Fault"*) and **Manager Web Access...** (see *Section 9.2.9, "Manager Web Access..."*).

9.7 CMI Base Stations

CMI base stations can be considered as remote shelves. They are the basic devices for the HiPath/OpenScape cordless voice communication. In detail HiPath/OpenScape cordless is a multi cellular system that can be adapted to the size of a company at any time. The system comprises a mobile switching center and radio cells formed by base stations. Each radio cell has a range of about 50 meters inside buildings and about 300 meters outside. By positioning the base stations to create overlapping radio cells, an area providing full coverage of almost any size can be created.

CMI base stations are connected to HiPath/OpenScape 4000 systems. The HiPath/OpenScape 4000 system knows which base stations are connected. The fault state of the CMI base stations is covered by the HiPath/ OpenScape 4000 alarm concept. In detail, a specific alarm definition (Group Number 2, Class Number 8) signals the occurrence of a fault of a connected base station. All fault error messages of a CMI base station are handled like HiPath/OpenScape 4000 error messages.

9.7.1 Auto Discovery of CMI Base Stations

In order to access the data for the CMI base stations an SQL connection to the HiPath/OpenScape 4000 Manager has to be established (see *Section 9.9.1, "HiPath/OpenScape 4000, SQL Connection..."*).

For each HiPath/OpenScape 4000 system, for which entries in the CMI database table are found, **one** CMI base station object will created on the submap of the corresponding system. This CMI base station object represents **all** physical CMI base stations connected to this system. If no entry in the CMI database table via JDBC is available, no CMI base station objects are created.

Note:
If the JDBC connection to the HiPath/OpenScape 4000 Manager gets disabled, the previously discovered CMI base stations will be deleted.

9.7.2 Manual Discovery of CMI Base Stations

If a JDBC connection to the HiPath/OpenScape 4000 Manager is enabled the discovery of CMI base stations can be started manually. Because the discovery of base stations is fully embedded into the hardware discovery for the corresponding HiPath/OpenScape 4000 system, the context menu **Discovery...->Start** or the access via the corresponding HiPath/OpenScape 4000 network symbol can be used (*Chapter 10, "Discoveries"*) to discover new CMI Base Stations.

9.7.3 CMI Base Station Objects

All CMI base stations connected to a single HiPath/OpenScape 4000 system will be represented by one CMI base station object on the submap of that system.

Figure 14 CMI base station icon

The CMI base station symbol offers a context menu which is divided in two parts; the upper part contains the general OpenScape FM menu entries, whereas the lower part provides one object specific menu entry:

- **List CMI Base Stations...**: Activating this entry opens an info browser which lists all base stations of this HiPath/OpenScape 4000 system. In this browser it is also possible to view all CMI base stations errors, see *Section 9.7.4.1, "List CMI Base Stations Errors"*). The Info Browser shows the following information:
  - **Pen**: The Port Equipment Number.
  - **Location**: The location for the given CMI Base station. This information is important for the service technician or administrator in the case of CMI base station failures.
  - **Telephone Number**: The telephone number for the CMI base station.
  - **State**: This field reflects the state of a CMI base station. The states Unknown, Normal, Warning, Minor, Major, and Critical are used.
  - **Off Date**: This field reflects the time and date of a change to the state Unknown or Normal from one of the states Warning, Minor, Major or Critical.
  - **On Date**: This field indicates the time and date of a change to a state different than Unknown or Normal.

9.7.4 Alarms of CMI Base Stations

The HiPath/OpenScape 4000 Systems and the HiPath/OpenScape 4000 Managers monitor the CMI base stations. If a base station does not react, a base station alarm will be generated. The base station alarm by its nature is not assigned directly to one specific base station. When such an alarm occurs, it means one or more of the CMI base stations have a problem.

The state of the CMI object is calculated from the highest priority of the base station's active alarms. When a CMI base station alarm is pending, the state of the corresponding object will be set according to the alarm priority shown in the following table (see *Appendix A, "Background Information"*):

alarm priority	state
Device	Warning
Minor	Minor

Table 1 Alarm priority mappings

alarm priority	state
Major	Critical

Table 1 Alarm priority mappings

The occurrence of a base station alarm also causes a status change of the corresponding HiPath/OpenScape 4000 system symbol.

9.7.4.1 List CMI Base Stations Errors

The List CMI Base Stations Info Browser offers the button **Error...**. This button may be used to query all CMI base stations errors. It is also possible to perform a search operation for multiple selected base stations at the same time.

The List CMI Base Stations Info Browser shows the following information:

- **Pen**: The Port Equipment Number which identifies the CMI base station the error message belongs to.
- **Error Message**: The error message for the selected base station.

Each entry of the Error Info Browser offers the context menu of the corresponding CMI Node.

9.8 Connection Information

9.8.1 Meta Connection Information

A Meta Connection, i.e. a logical connection symbol between two objects, is a Topology Manager component. When the context menu of the meta connection is opened, a list of all objects which form that meta connection is displayed. In the case of HiPath/OpenScape 4000 connections, the objects are trunk groups. Each of the meta connection's menu entries offers a sub menu with the same items as the respective trunk group. *Section 9.8.2, "Trunk Group Information"* contains information about the data of trunk groups.

9.8.2 Trunk Group Information

The trunk group symbol represents a trunk group between two HiPath/OpenScape 4000 systems or between a HiPath/OpenScape 4000 system and an external system. Each HiPath/OpenScape 4000 system defines its outgoing trunk groups. Therefore, the OpenScape 4000 Plugin displays a trunk group symbol for each "direction" of a trunk group.

Additional information about a trunk group can be obtained by using the symbol's context menu.

9.8.3 Trunk Group Info

This menu entry shows a detailed description of the trunk group, including ID, type, name, device etc.

9.8.4 Trunks

This menu entry opens an info browser providing a list of all trunks assigned to a trunk group.

9.8.5 Alarm Configuration

This menu entry opens an info browser displaying the alarms configured for a trunk group.

9.8.6 Alarms

This menu entry opens an info browser showing all alarms for a trunk group.

9.8.7 Configure Node No.

If the target node number of a trunk group has not been configured properly on the HiPath/OpenScape 4000 system itself or if it has not been configured at all, this option can be used to set it manually. With this entry, the “Configured Node Number” is set, which is then used to establish the topology (see *Section 8.2.2, “Example Topology Representations with Virtual Node Numbers”*).

9.9 HiPath/OpenScape SNMP Proxy Agent Information

During the discovery process, for the HiPath/OpenScape 4000 SNMP proxy agent, a proxy agent object is created. The color represents the current state of the agent. If it is red, the agent or one or more of its subagents is not responding.

The object representing the SNMP Proxy agent is displayed with the label **HiPath/OpenScape 4000**. The agent symbol’s context menu provides the following entries:

9.9.1 HiPath/OpenScape 4000, SQL Connection...

The OpenScape 4000 Plugin can perform search operations on HiPath/OpenScape 4000 system data. These operations are executed on the HiPath/OpenScape 4000 Manager database using SQL requests. Several parameters have to be specified within the OpenScape FM to enable remote login and database access on the HiPath/OpenScape 4000 Manager, HiPath/OpenScape 4000 Assistant, RG8300 machine.

Per default, a JDBC driver is installed on the HiPath/OpenScape 4000 manager. Therefore “JDBC” is used as the connection type in HiPath/OpenScape 4000 environments. JDBC provides a very quick and efficient database access. The port number and protocol and the name of the active database are pre-defined. Topology Synchronization can be performed via SNMP or JDBC.

If JDBC is selected for the synchronization, the KNDEF-Options can be used to determine which of the virtual node numbers should be considered for the topological display. None, all or only those that are evaluated as default by the AMO KNDEF may be displayed. Further details can be found in *Section 8.2.1, “Node Numbers”*.

Important Note:
The selection of the value „Default“ for the KNDEF-Options is only supported beginning with agent version „ASsnmp V2.0.x“.

The username/password pair which the OpenScape FM can use for an authorized access to the database has to be entered on the HiPath/OpenScape 4000 Manager machine. This has to be a valid Unix/Linux AND Informix account!

The selection **Trunk Group Topology** defines, whether the trunk based or the trunk group based topology should be used.

Pressing **Set** stores the entered values in the OpenScape FM.

Encrypted JDBC Connections

To improve security, database connections to OpenScape 4000 Managers that do support SSL can be opened using encrypted JDBC.

Note:
Generally Informix Servers beginning with version 11.50 do support SSL. OpenScape 4000 Assistants generally do not support SSL, since they use a limited light version of Informix (InformixSE).

To activate encrypted JDBC for an OpenScape 4000 Manager, the following steps have to be performed:

1. The OpenScape 4000 Manager‘s database has to be configured properly by a service technician to support secure communication via SSL.
2. The OpenScape 4000 Manager‘s database SSL Certificate has to be imported into the OpenScape FM. This can be done by using the entry **Server->Administration->SSL Certificates->Import Cert. from Server** from the main menu **Server**. On the opened page, the **Hostname** and the connection **Port** (default 1524) have to be entered.
3. The OpenScape FM Server has to be restarted.
4. The JDBC Connection to the OpenScape 4000 Manager has to be configured within the OpenScape FM. The configuration is performed as usual (see above).
   To activate SSL, the checkbox **Use SSL connection to database** has to be selected.
   The fields **JDBC Server** and **Port No.** have to be changed according to the configuration of the SSL connection within the OpenScape 4000 Manager. E.g. the **JDBC Server** has to be changed from `Online` to `JDBC_ssl` and the **Port No.** from `1527` to `1524`.

9.9.2 HiPath/OpenScape4000, Systems...

displays a list of all HiPath/OpenScape 4000 systems maintained by the SNMP proxy agent. A right click on a list entry provides access to all kinds of HiPath/OpenScape 4000 information.

9.9.3 HiPath/OpenScape 4000, Manager Web Access

this menu entry opens the start page of the HiPath/OpenScape 4000 Manager.

9.9.4 HiPath/OpenScape 4000, Alarms On

Shows all alarms at state “ON” for all HiPath/OpenScape 4000 systems maintained by the SNMP proxy agent.

9.9.5 HiPath/OpenScape 4000, Alarms Off

Shows all alarms at state “OFF” for all HiPath/OpenScape 4000 systems maintained by the SNMP proxy agent.

9.9.6 HiPath/OpenScape 4000, State

The HiPath/OpenScape 4000 SNMP proxy agent consists of different modules called *subagents (Section 3.1, “Configuration of the SNMP Proxy Agent”).* The state of the different subagents can be checked here. Full functionality of the OpenScape FM is only available if all subagents are running (*Figure 15*) and the corresponding system is reachable. The proxy agent symbol changes its’ color state according to the run states of the subagents:

- **System** subagent and/or **Alarm** subagent not running: red (critical)
- **Error** subagent not running: yellow (minor)
- **Topology** subagent and/or **Discovery** subagent not running: orange (major)
- **Software** subagent and/or **Hardware** subagent not running: light blue (warning)

Agent	Status
System	Running
Alarm	Running
Hardware	Running
Software	Running
Topology	Running
Error	Running
SQL	Running
Discovery	Running

Figure 15 status of all subagents of SNMP proxy agent

Note:
OpenScape FM receives the information about the missing subagents through traps from the master agent. Therefore the OpenScape FM server has to be registered as a trap receiver for the SNMP proxy agent.

9.9.7 HiPath/OpenScape 4000, FM Snapshots

Hint:
SQL Connection must be set!

This menu is used to create and manage backups for alarms and errors.

It contains two entries:

Manage: this opens the FM Snapshot GUI (see*Section 15.1, "FM Snapshots"*).

Storage Configuration this opens the Storage Configuration GUI (see *Section 15.2, "Storage Configuration")*.

9.9.8 CMI Nodes

Important Note:
SQL Connection must be set!

The menu item **CMI Nodes...** opens an Info Browser which shows all CMI Base station objects for the HiPath/ OpenScape 4000 systems managed by this HiPath/OpenScape 4000 Manager.

Note:
In the following sections the term node and object means exactly the same.

The CMI Nodes Info Browser offers the following information:

- **Label:** The icon label for the CMI base station.
- **State:** The current state of the CMI base station object. The states Normal, Warning, Minor and Critical are possible.
- **Major:** The number of major alarms currently set.
- **Minor:** The number of minor alarms currently set.
- **Device:** The number of device alarms currently set.

From each entry of the list, further information about the corresponding CMI base station object can be displayed (see *Section 9.7.3, "CMI Base Station Objects"*) with a right mouse click. This context menu offers the same menu items as the CMI base station symbol context menu does.

9.10 Continuous Monitoring

By using the System Management Plugin (see *System Management User Guide*) and its predefined monitor, HiPath/OpenScape 4000 Systems can be monitored continuously.

Various system parameters, like memory usage or the available disk space, can be checked automatically and events can be generated if specific parameters exceeds a defined threshold.

More about the System Management monitoring of HiPath/OpenScape 4000 objects can be found in *Chapter 18*.

10 Discoveries

10.1 What Are Discoveries?

Some management information displayed by the OpenScape 4000 Plugin is always up-to-date with the current situation of the HiPath/OpenScape network. One example is the alarm state. If configured correctly, every HiPath/OpenScape 4000 system of the network sends its alarm messages to the HiPath/OpenScape 4000 Manager, and the SNMP agent “forwards” them to the OpenScape FM. The corresponding SNMP traps are shown as events in the Event Browser of the OpenScape FM.

Some data that is not updated automatically. This has mainly three reasons:

1. The HiPath/OpenScape 4000 system does not report this kind of data.
2. The data is not expected to change very often.
3. The data acquisition is relatively expensive in respect of the workload at the HiPath/OpenScape 4000 Manager and of telephone charges.

The affected areas are **topology** (trunk groups, trunks, ...), **hardware** (boards, shelves, peripherals, ...), **software** (patches, APS) and **alarm configuration** (target alarms, VIP alarms, ...). The data acquisition for these areas has to be performed by running **discoveries**,

The so called “**master discovery**” is a process which starts the retrieval of information for all four areas.

The master discovery can be started manually, but it is also started automatically after a certain period of time in order to keep the data up-to date. The time intervals can be configured via the Discovery Configuration GUI (*Section 10.3, “Configuration dialog”*).

The following limitation has to be considered: when a discovery is started, the OpenScape FM first checks the type of the PBX system which is encoded in the database of the HiPath/OpenScape 4000 manager. Only if the type is “*H300*”, a discovery is started. (In the database, there are also entries with type “NM”, i.e. HiPath/OpenScape 4000 Manager in function as Network Management Server, and for applications which are identified by different other values.)

The topology/alarmconfig/hardware/software information shown by the OpenScape FM is a snapshot from the point of time when the last discovery for the respective data finished successfully.

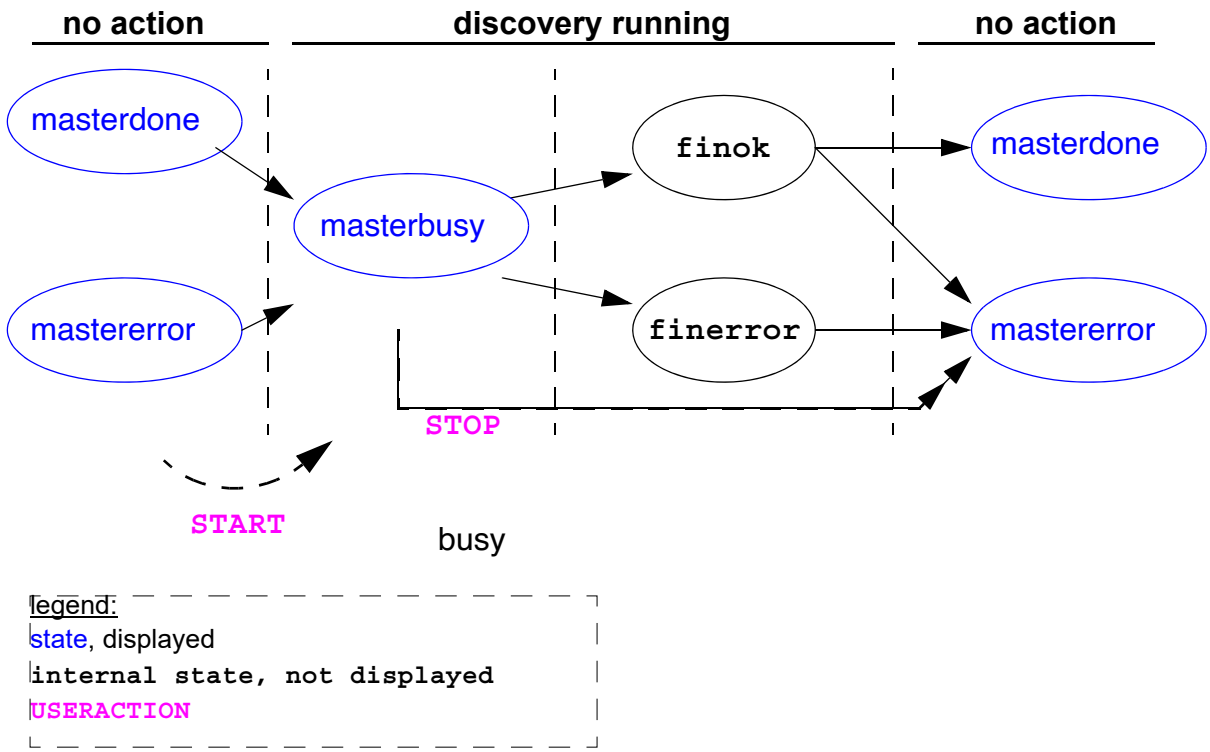


Figure 16 Discovery States during Discovery Process

The *Figure 16* shows the different action states of a discovery.

When a discovery is started, the discovery state of that data (e.g. the alarm configuration data for a certain HiPath/ OpenScape 4000) can be either "*masterdone*", i.e. the last discovery has been performed successfully, or it can be "*mastererror*", which means that a problem occurred during the last dicovery process and the discovery could not be completed successfully.

By pressing "*Start*" a new discovery for exactly this data can be started and the state changes to "*masterbusy*".

From "*masterbusy*", the state changes either to "finok" or to "finerror" which are both internal states and should not be seen by the user in the OpenScape FM user interface.

If no problems occurs during the discovery process, the state changes from "finok" to "*masterdone*" which is displayed in the OpenScape FM user interface and which represents a successful completion of the discovery.

If a problem occurs, the internal state will be "finerror" which changes to "*mastererror*". This state is displayed in the OpenScape FM user interface and indicates that the discovery could not be completed. The final "*mastererror*" state will also appear if any problem occurs during the end of the process, i.e. when the internal state "finok" had been reached, but a problem crops up later.

When a discovery is manually stopped while it is in the "*masterbusy*" state, the final state will also be "*mastererror*".

Generally there are three states which are displayed in the discovery browser: "*masterbusy*", "*masterdone*", and "*mastererror*".

In certain cases, the state "finok" will be displayed. This should not happen when the discovery is performed correctly. In such cases the system might be stuck and it should be checked for internal problems.

10.2 Discovery Browser

Important Note:
For U.S. Hicoms of Version “R6.5“ and “R6.6“, the Discovery functionality is not supported, therefore these Hicoms are not displayed in the Discovery Browser.

The discovery browser can be used to start new discoveries or to check the status of discoveries (e.g. to see the point in time of the last successful or non successful execution). The window can be opened for a single system through the context menu of the respective HiPath/OpenScape 4000 system or for a network through the context menu of a network symbol and the subnet menu. The entry **Discovery->Status** or **OpenScape 4000->System->Discoveries...** has to be selected.

The **discovery browser for individual systems** lists the ‚current‘ status of the four sub discoveries. For each sub discovery, it displays when it was last discovered successfully and not successfully. The status is displayed with the same values as in the discovery browser for networks.

The discovery browser for networks contains one row for each HiPath/OpenScape 4000 system. Among the columns are four for the discovery types:

- Topology discovery
- Hardware discovery
- Alarm configuration discovery
- Software discovery

For every discovery type, the current state and last success/error date are displayed. The displayed state can have the following values:

- *masterbusy*
  A discovery of that type is currently running. Depending on the size of the HiPath/OpenScape 4000 system, this may take up to 30 minutes. MasterBusy means that a HiPath/OpenScape 4000 system discovery is currently running for all four areas of HiPath/OpenScape system data.
- *mastererror*
  A problem has been occurred during the last discovery process. The discovery could not be completed successfully.
- *masterdone*
  The discovery for this HiPath/OpenScape 4000 system finished successfully at the given time stamp.

The Discovery Browser has three buttons located at the right side of the window which can be used to start or stop discoveries for selected HiPath/OpenScape 4000 systems (by choosing between **All**, **Hardware**, **Software**, **Topology**, and **Alarm Configuration** and pressing the **start/stop** button).

All means that a master discovery consisting of the hardware, software, topology and alarm configuration data will be executed.

The errors which are detected during the discovery process are displayed in the Event Browser.

10.3 Configuration dialog

The discovery configuration dialog can be used to define how often discoveries should be performed for the individual HiPath/OpenScape 4000 Systems.

The dialog is opened from the context menu of a network which contains HiPath/OpenScape 4000 systems. Within the menu the entry **HiPath/OpenScape 4000->System->Configuration**. has to be selected.

The left-hand side of the window lists the managed HiPath/OpenScape systems. The SNMP proxy agent name, the HiPath/OpenScape 4000 system's SystemId, the Agent Version, the Auto Discovery Timeout, and the AFR forwarding are shown.

The AFR forwarding is only relevant when used in connection with trouble ticketing systems (e.g. H3CKMon) and will not be treated here.

On the right-hand side, the auto discovery parameters can be configured: the **Auto Discovery** (Check Box) and the **Age Time** in hours can be defined for each single HiPath/OpenScape 4000 system or for a multiple selection at once. The default value for the Auto Discovery Timeout is a week (entered as 168 hours). As the biggest time interval 65535 hours can be entered. In order to change the **Auto Discovery** value, the according check box has to be checked, and the button **Set** must be pressed after the desired value has been entered.

11 Search Browser

The Search Browser of the OpenScape FM provides comfortable methods to retrieve information about HiPath/ OpenScape 4000 systems.

The browser is opened by using the main menu entry **Technologies->OpenScape 4000->Search Systems**.

The user interface of the search browser consists of three different parts (*Figure 17*): the HiPath/OpenScape 4000 Search Panel, the Alarm/Error Search Panel, and the Result Panel.

To work with the Search Browser, a valid SQL user/password pair has to be entered for the respective HiPath/ OpenScape 4000 Manager systems (*Section 9.9.1, "HiPath/OpenScape 4000, SQL Connection..."*). The menu **Host** within the Search Browser shows only those HiPath/OpenScape 4000 Manager systems for which a valid authentication has been entered.

The different searches will be performed only for the data that belong to the HiPath/OpenScape 4000 Manager, HiPath/OpenScape 4000 Assistant or RG8300 system selected within the **Host** selection menu.

If the menu entry **All** is selected, then a search uses all systems that belong to any HiPath/OpenScape 4000 Manager, HiPath/OpenScape 4000 Assistant and RG8300 system for which a valid SQL connection via JDBC has been configured.

Generally it can be configured within the Search Browser whether all HiPath/OpenScape 4000 systems managed by a certain HiPath/OpenScape 4000 Manager should be searched, or only a preselected subset of HiPath/ OpenScape 4000 systems. For the latter, the checkbox **Filter** has to be selected and the Search Criteria has to be entered in the HiPath/OpenScape 4000 Search Panel (*Figure 17*). The systems obtained by the search are the scope for the following alarm/error search.

If alarms and/or errors should be searched on all HiPath/OpenScape 4000 systems of the selected HiPath/ OpenScape 4000 Manager system, the checkbox **Filter** has to be deselected. In this case, the text fields for the HiPath/OpenScape 4000 search criteria disappear (*Figure 17*).

Each delete operation of alarms and/or errors and each reset alarm operation is logged in the activity log. More about the logging can be found in the *OpenScape FM Desktop User Guide*.

11.1 Finding HiPath/OpenScape 4000 Systems

The HiPath/OpenScape 4000 Search Panel is the upper part of the Search Browser. To find a particular HiPath/ OpenScape 4000 system, **System** has to be selected in the **Search** selection menu. The search criteria has to be entered in the according text fields and **System Search** has to be pressed. It can be searched for the following parameters. The corresponding database fields of the table `chdmain` (HiPath/OpenScape 4000 Manager) are given in square brackets.

- **System Id:** Unique Identification of a HiPath/OpenScape 4000 node [`mnemonic`]
- **System Number:** Unique HiPath/OpenScape 4000 system number [`l_number`]
- **Version:** HiPath/OpenScape 4000 version [`version`]

- **Network:** a specific subnetwork can be entered to narrow the search to the machines in this net. The name of one of the PBX networks has to be entered to use this feature
- **Last FM older:** sets the threshold for HiPath/OpenScape 4000 alarms/errors that reach the HiPath/OpenScape 4000 system. Only days can be entered here.
- **Customer:** Customer Name [`cust_name`]
- **Location:** specified in `chdmain` in the HiPath/OpenScape 4000 Manager database [`location`]
- **Established** [`establ`]
- **Contract:** HiPath/OpenScape 4000 contract number [`con_no`]
- **PosNo:** Third part of contract number [`pos_no`]

A result list will be obtained in the Result Panel. If **System** has been chosen in the **Search Type** selection menu, the result list with the retrieved HiPath/OpenScape 4000 systems fills the entire lower part of the Search Browser. The following data is displayed for each HiPath/OpenScape 4000 system:

Agent
System Id (indicates the mnemonic; if a different `l_number` is available, this is indicated in brackets)
Managed
Customer
System Number
Established
Contract
PosNo
Version
Location
Last FM
Network

As in all OpenScape FM Info Browsers, the list can be sorted according to each column; the column title has to be clicked for that. By pulling the columns‘s header, the columns can be displayed in a new order. In addition, every line in the list offers the same context menu as the HiPath/OpenScape 4000 symbol, i.e. all information about the desired system can be obtained directly from the Search Browser.

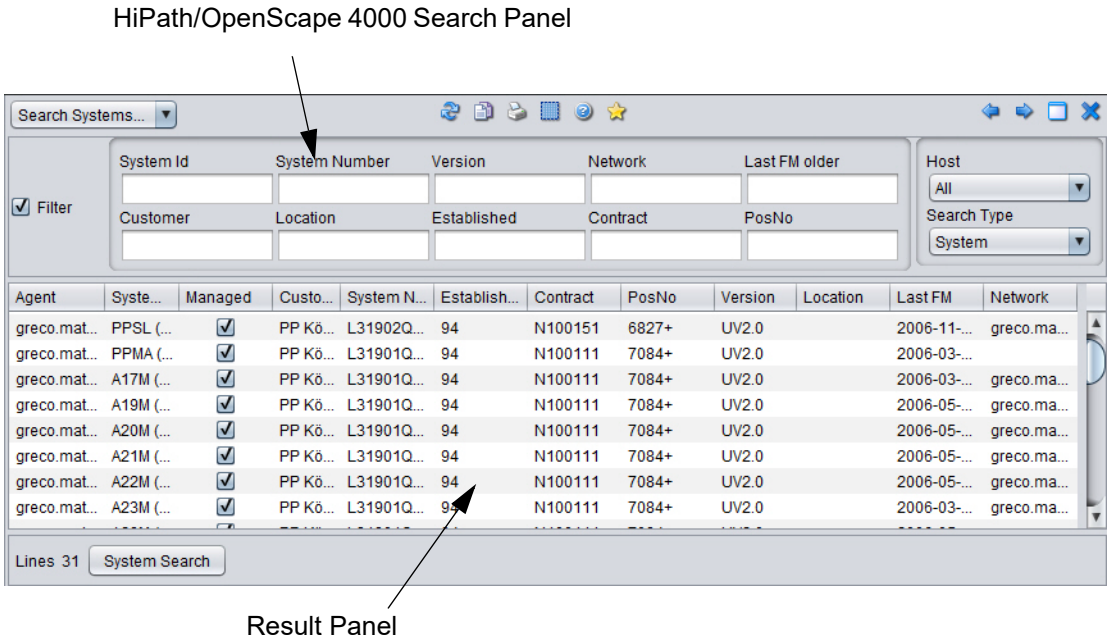


Figure 17 The Search Browser 1: HiPath/OpenScape 4000 System Search

11.1.1 Finding Alarms

When **Alarm** gets selected in the **Search** selection menu, the Alarm Search Panel is opened (*Figure 18*). This panel enables searches on alarms stored in the HiPath/OpenScape 4000 Manager‘s database. It can be decided, if a search on all HiPath/OpenScape systems of a given HiPath/OpenScape 4000 Manager system should be performed. or if only a preselected subset should be searched. It is also possible to search all HiPath/OpenScape systems of all HiPath/OpenScape 4000 Managers, HiPath/OpenScape 4000 Assistants and RG8300 systems. In this case, the alarms will be displayed/deleted for managed HiPath/OpenScape 4000 systems only. The column **Managed** in the HiPath/OpenScape system list provides the information if a system is managed or not (compare *Figure 17*). When the Alarm Search is started by opening the Alarm Search panel, only managed HiPath/ OpenScape systems will be displayed in the HiPath/OpenScape system list!

Furthermore, selected alarms can be deleted from the HiPath/OpenScape 4000 Manager database. This can be done on all HiPath/OpenScape 4000 systems managed by a certain HiPath/OpenScape 4000 Manager or on a preselected subset.

Several parameters can be specified to characterize the alarms that should be found. All entered criteria are evaluated with a logical AND expression. The following search criteria can be entered:

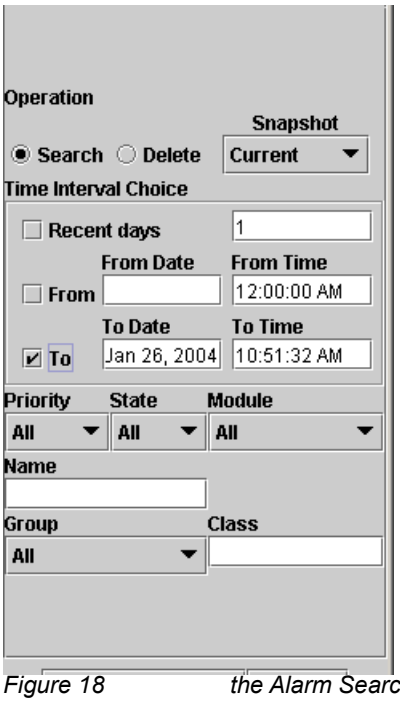


Figure 18 the Alarm Search Panel

Operation Panel: defines whether the results should be displayed, or if all alarms matching the given criteria should be deleted. If **Delete** is selected, the result set will not be displayed, but it will be requested if <number of found alarms> alarms should be deleted. This option can be used to delete multiple alarms at the same time.

For security reasons, the default setting is **Search**.

Search Constraints:

Time Interval: Searches can be constrained to a certain period of time. All alarm searches restricted by a time interval are always performed on the last status change time, which is the column `tim_dat` in the alarm table.

1. Enter the number of **Recent Days** or
2. enter the dates; either only the "**From Date**" date/time or only the "**To Date**" date/time or both can be specified.

Date or time data can be entered by using the pop-up calendar and the pop-up clock of the OpenScape FM by clicking the respective field.

Priority: Selection of "Minor", "Major", "Device" or "All".

State: Selection if all alarms should be obtained, or only alarms which are "on" or only alarms which are "off".

Module: Selection if alarms from all HiPath/OpenScape 4000 system modules should be found, or only from BPA, or only from BPB.

Name: Specifies the alarm name.

Group: Selection of the group of alarms that should be obtained: All, Central (1), SWU Peripheral(2), SWU Logical(3), SM Peripheral, or Element Manager.

Class: Selection of the alarm class.

Snapshot: One of the active FM Snapshots can be selected here. The search will then be performed based on the selected snapshot. More about FM Snapshots can be found in *Chapter 15, "FM Snapshots and Storage Configuration"*.
If a search over all HiPath/OpenScape 4000 Manager/Assistants/RG8300 systems should be performed, this menu is not available. Since there are no consistant Alarm Mirrors for all Managers/Assistants/RG8300 systems, the search can only be performed using the current mirror.

Pressing **Search Alarms...**starts the operation. This button is only active when one or more HiPath/OpenScape 4000 systems have been selected in the HiPath/OpenScape 4000 system list.

Clear will erase the alarm search parameters.

11.1.2 Finding Errors

If **Error** is selected in the **Search** selection menu, the Error Search Panel is opened (*Figure 19*). This panel enables searches on errors stored in the HiPath/OpenScape 4000 Manager's database. It can be decided, if all HiPath/OpenScape 4000 systems managed by a given HiPath/OpenScape 4000 Manager should be searched, or if only a preselected subset should be searched. The errors will be displayed/deleted for managed HiPath/OpenScape 4000 systems only. The column **Managed** in the HiPath/OpenScape 4000 system list provides the information if a system is managed or not (compare *Figure 17*). When the Error Search gets started by opening the Error Search panel, only managed HiPath/OpenScape 4000 systems will be displayed in the HiPath/OpenScape 4000 system list! Furthermore, selected errors can be deleted from the HiPath/OpenScape 4000 Manager's database. Again this can be done for all HiPath/OpenScape 4000 systems of a HiPath/OpenScape 4000 Manager or for a preselected subset.

Several parameters to characterize the searched errors can be specified. All criteria are evaluated in a logical AND expression.The following search criteria can be entered:

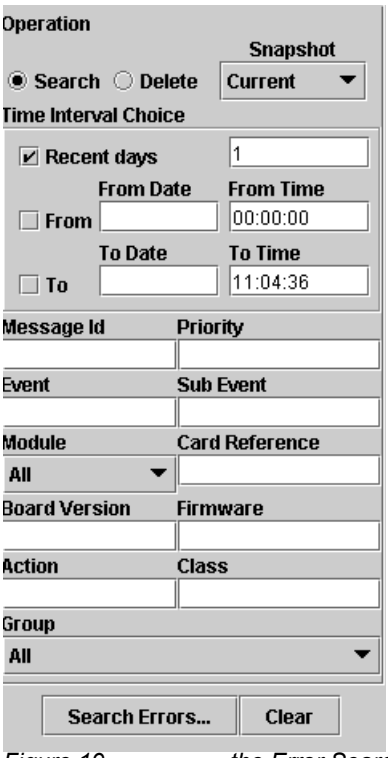


Figure 19 the Error Search Panel

Operation Panel: defines whether the results should be displayed, or if all errors matching the given criteria should be deleted. If **Delete** is selected, the result set will not be displayed, but it will be requested if <number of found errors> errors should be deleted. This option can be used to delete multiple errors at the same time.

For security reasons, the default setting is **Search**.

Search Constraints:

Time Interval: Searches can be constrained to a certain period of time. All error searches restricted by a time interval are always performed on the last status change time, which is the column `tim_dat` in the alarm table.

1. Enter the number of **Recent Days** or
2. enter the dates; either only the "**From Date**" date/time or only the "**To Date**" date/time or both can be specified.

Date or time data can be entered by using the pop-up calendar and the pop-up clock of the OpenScape FM by clicking the respective field.

Message Id: error type Id

Priority: the search will be restricted to errors greater/equal to the indicated number

Event and SubEvent: textual information about error condition

Module: All, BPA or BPB

Card Reference: the location of the port where the error originated

Board Version: board version

Firmware: firmware

Action: action of the HiPath/OpenScape 4000 concerning this error

Class: alarm class

Group: alarm group

Snapshot: One of the active FM Snapshots can be selected here. The search will then be performed based on the selected snapshot. More about FM Snapshots can be found in *Chapter 15, "FM Snapshots and Storage Configuration"*.
If a search over all HiPath/OpenScape 4000 Manager/Assistants/RG8300 systems should be performed, this menu is not available. Since there are no consistent Alarm Mirrors for all Managers/Assistants/RG8300 systems, the search can only be performed using the current mirror.

Pressing **Search Errors...**starts the operation. This button is only active when one or more HiPath/OpenScape 4000 systems have been selected in the HiPath/OpenScape 4000 system list.

Clear will erase the error search parameters.

11.1.3 Find Systems With Particular Hardware

When **BCSM**, **BCSU**, **CDSM**, or **CDSU** gets selected in the **Search** selection menu, a Hardware Search Panel is opened. Several parameters can be entered to characterize the hardware that should be found (Figure 20). All criteria are evaluated in a logical AND expression. Pressing **Search** starts the operation. The results will be displayed for managed HiPath/OpenScape 4000 systems only. The column **Managed** in the HiPath/OpenScape 4000 system list provides the information if a system is managed or not (*Figure 17*). When the Hardware Search is started by opening the Hardware panel, only manage HiPath/OpenScape 4000 systems will be displayed in the HiPath/OpenScape 4000 system list!

It can be searched for the following parameters:

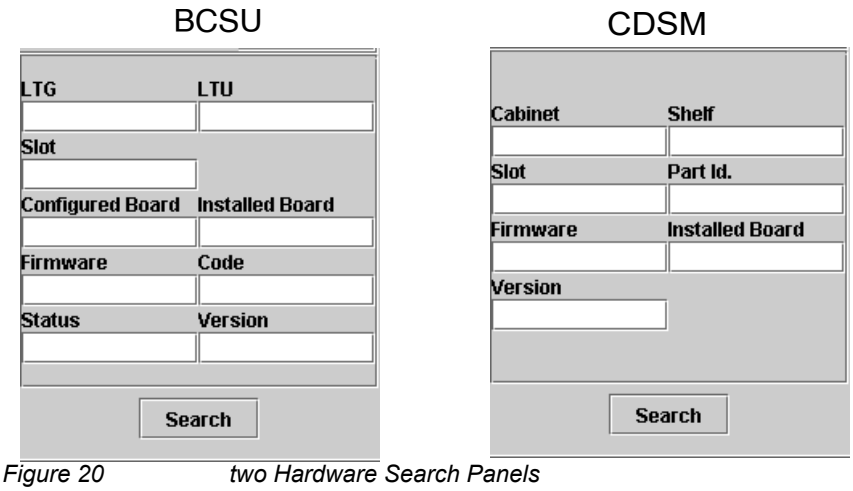


Figure 20 two Hardware Search Panels

BCSM Search Panel:
Module: module the board is attached to
Slot: slot where the board is installed
Configured Board: board configured in the database
Installed Board: actually installed board
Firmware: firmware of the board
Code: code of the board
Status: board status
Version: board version

BCSU Search Panel:
LTG: identifier of the Line Trunk Group
LTU: identifier of the Line Trunk Unit
Slot: slot where the board is installed
Configured Board: board configured in the database
Installed Board: actually installed board
Firmware: firmware of the board
Code: code of the board
Status: board status
Version: board version

CDSM Search Panel:
Cabinet: address of the cabinet the board is installed in
Shelf: frame (shelf) the board is installed in
Slot: slot address of the board
Part Id: unique part identifier
Firmware: firmware of the board
Installed Board: actually installed board
Version: board version

CDSU Search Panel:
Cabinet: address of the cabinet the board is installed in
Shelf: frame (shelf) the board is installed in
Slot: slot address of the board
Part Id: unique part identifier
Firmware: firmware of the board
Installed Board: actually installed board
Version: board version

12 The Alarm Filter Browser

If alarms of a specified group, class and priority should not be sent by the HiPath/OpenScape 4000 Manager (with SNMP proxy agent) to the OpenScape FM server, alarm filters can be set. This filters can be set within the OpenScape FM user interface. If an alarm filter has been set, an AFR notification sent by a HiPath/OpenScape 4000 system does not result in an SNMP trap from the HiPath/OpenScape 4000 Manager to the OpenScape FM server, i.e. no entries are made to the Event Browser, neither does the HiPath/OpenScape 4000 system changes its state when the alarm has occurred.

OpenScape FM supports the creation of alarm filters on HiPath/OpenScape 4000 systems by using the Alarm Filter Browser. The browser can be opened by using the entry **Fault->Alarm Filters...** within the context menu of the respective HiPath/OpenScape 4000 system (*Figure 21*).

To create an alarm filter, the alarm group has to be selected and the alarm class has to be entered in the field **Class**. After the alarm priority is selected, the button **Create** has to be pressed. The data is then transferred to the HiPath/OpenScape 4000 Manager and the corresponding alarm filter patterns are set in its database.

All alarm filters are displayed in the alarm filter table with the following columns:

Group: alarm group

Class: alarm class

Priority: alarm priority

Switch: status of alarm filter: switched on or off

An alarm filter can be deleted, by selecting it in the alarm filter list and pressing **Delete**.

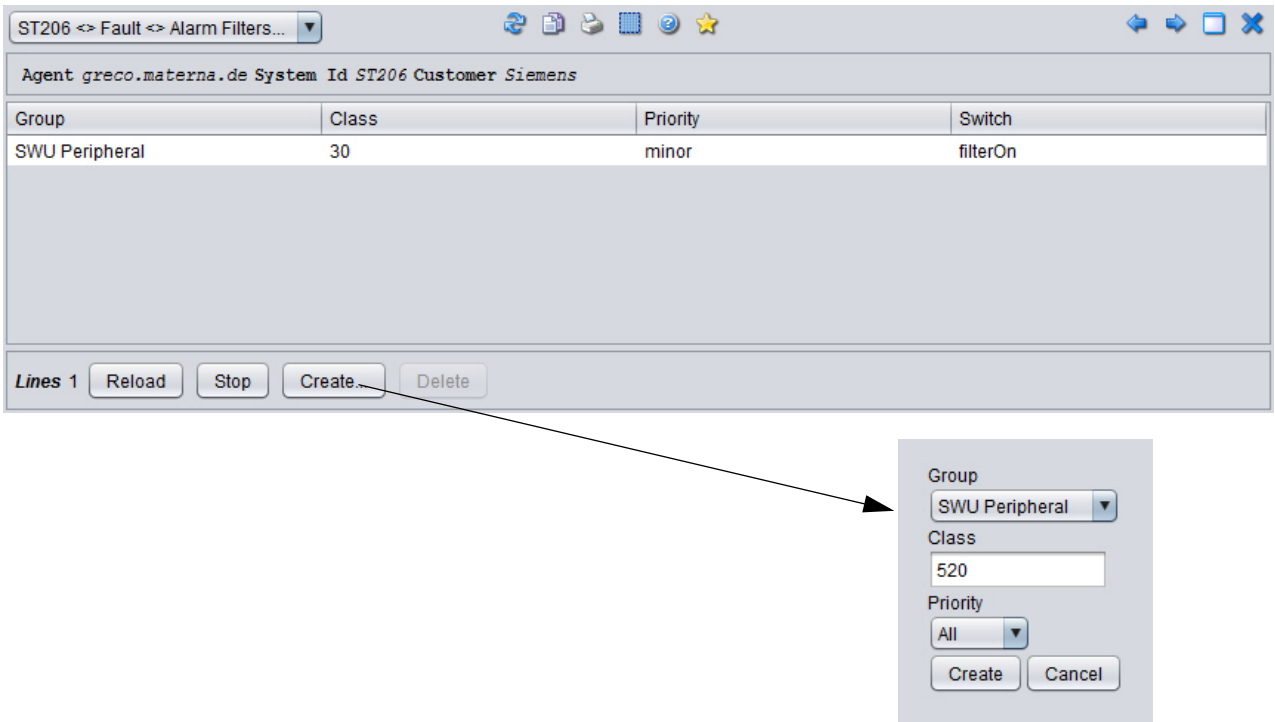


Figure 21 the Alarm Filter Browser

13 Improved Event Handling

Generally, if SNMP traps are received by the OpenScape FM from a known technology, a respective event is displayed within the event browser of the OpenScape FM.

These events contain the content of the trap itself, and usually no further information is provided.

In case of OpenScape 4000 traps, special functions are provided:

- **OpenScape 4000 Workflow Package**: HiPath/OpenScape 4000 Events are enriched with additional information and Service Workbench Tickets can be created for incoming events (see *Section 13.1*).
- **Lost Alarm Traps**: HiPath/OpenScape 4000 Alarm information that has been missed (e.g. because a trap has been lost) is recovered by checking the HiPath/OpenScape 4000 Manager‘s database (see *Section 13.2*).
- **Avoidance of Duplicate Traps**: Traps from additional sources that describe the same problem are suppressed (see *Section 13.3*).

13.1 ECE Package OpenScape 4000 Workflow

Concerning HiPath/OpenScape 4000 traps, the predefined ECE Package *OpenScape 4000 Workflow* provides a number of features that enhance the information displayed in the Event Browser or that create information within a connected Service Workbench (SWB). The features are described in the following subsections:

- **Alarm/Error Tickets**: SWB Tickets can be automatically created for OpenScape 4000 Alarm and Error traps (see *Section 13.1.2*).
- **Information Gathering**: Original error messages for alarms and the trunks that are affected by alarms are displayed (see *Section 13.1.3*).
- **Oscillating Alarms**: Alarms that are repeated in short succession are aggregated into a single SWB Ticket (see *Section 13.1.4*).

Important Note:
A sufficient Event Correlation Engine Plugin license is needed to use the functions provided by the *OpenScape 4000 Workflow* package.

13.1.1 Configuration of the Workflow Package

The following steps have to be performed to enable the features offered by the ECE Package *OpenScape 4000 Workflow*:

- **Connecting OpenScape 4000 Managers**:
  To collect the data needed for the Information Gathering (see *Section 13.1.3*), a JDBC database connection has to be configured for the respective OpenScape 4000 Managers (see *Section 9.9.1*).

- **Connecting a Service Workbench**:
  A connection to a Service Workbench has to be established to create or modify Tickets.
  Usually a Service Workbench is automatically installed and started on the system on which the OpenScape FM is installed. To use it and to actually create Tickets, it has to be identified and confirmed within the OpenScape FM.

  If the Service Workbench is identified on an IP node (usually the system on which the OpenScape FM has been installed), an entry that represents the Service Workbench‘s HTTPS interface can be found on the submap of the respective IP node object. Since the SWB uses port 3080 an entry like `HTTPS 3080` should be displayed. If the entry is not displayed and the SWB is running on the system, an IP discovery (menu entry **IP->Discovery**) can be performed to identify the SWB.

  The context menu entry **Configure** on the interface object opens the configuration window for the connection.

  On the tab **HTTP Connection Parameters** the connection to an HTTP server object can be defined.

  Initially the SSL certificates are accepted automatically. They can be viewed on the tab **Certificate** and, if desired, revoked by unchecking the checkbox **Accept Certificate**.

  With the initial acceptance a new symbol with the label `WebService Service Workbench` appears on the submap. The context menu entry **Configure** of this new symbol can be used to define the login that is used to connect to the SWB. It will automatically be set to the default fault management account and generally has not to be changed.

- **Configuring of the *OpenScape 4000 Workflow* Package**:
  Some properties have to be configured within the ECE *OpenScape 4000 Workflow* Package.

  The ECE submap can be opened by using the entry **Open Submap** from the main menu **ECE**.

  The *OpenScape 4000 Workflow* package is located within the container *Automation Workflow (OSFM triggered)*. The entry **OpenScape 4000 Workflow Configure** from the context menu of the *OpenScape 4000 Workflow* symbol opens the configuration window with the following tabs:

  - The tab **Service Workbench Use** is used to activate the creation and modification of tickets within the SWB. To activate the connection, the key `scope.SWB` has to be set to `true`.
  - The tab **Service Workbench Target** is used to select the SWB that should be used. The local SWB should already be configured by default.
  - The tab **Interval Configuration** is used to configure parameters that are used by the package:

    The parameters `scope.pretime` and `scope.posttime` are used to define the intervals used for the Information Gathering (see *Section 13.1.3*). They define the time range that is used to search for matching errors.

    The parameter `oscillationtime` is used for Oscillating Alarms (see *Section 13.1.4*) and defines the time interval during which similar alarms are aggregated.

13.1.2 Alarm and Error Tickets

If the Service Workbench connection is activated (see *Section 13.1.1*), OpenScape 4000 Alarm and Error traps initiate the creation of SWB Tickets in addition to their appearance in the OpenScape FM Event Browser.

13.1.3 Information Collector

The Information Collector delivered by the ECE package *OpenScape 4000 Workflow* improves the support process for resolving OpenScape 4000 system problems by providing additional information for OpenScape 4000 alarms. This additional problem related information is not contained in the alarm message itself, but is collected by separate data retrieval actions (queries over multiple database tables) from the OpenScape 4000 Manager or Assistant.

The additional problem related information will be added to the annotation of the respective events listed in the event browser.

If the Service Workbench is used, tickets for OpenScape 4000 alarms that contain the collected additional information, will be automatically created.

Note:
While the events and tickets are created when an alarm trap is received, the additional information has to be collected from the respective manager‘s database and will be added with a delay.

The Information Collector provides the features described in the following subsections:

13.1.3.1 Original Error Messages

If a new OpenScape 4000 alarm (SNMP trap) is received by the OpenScape FM, an event will be created and displayed in the event browser.

For alarms, the related original error messages are automatically collected and displayed as event annotations. If the Service Workbench is used, they are displayed as additional ticket information within an attachment to the ticket.

These error messages can provide information about the cause of the alarm and the affected components. Therefore, the automated collection of this additional information will accelerate the problem handling and solving process.

Error messages might still be collected within the OpenScape 4000 Assistant or Manager for an alarm for which a trap has already been delivered. Therefore these additional error messages would not be displayed within the OpenScape FM, if errors were to be collected at the moment when the alarm is received by the OpenScape FM.

Within the ECE package *OpenScape 4000 Workflow* two time intervals can be configured (see *Section 13.1 - Configuration*). The parameters `scope.pretime` and `scope.posttime` define the time intervals before and after the alarm is received. In relation to the alarm time itself, these two intervals define the time interval for which matching original errors are collected for the respective alarm.

While the alarm event or alarm ticket is immediately created when the alarm trap is received, the ECE package *OpenScape 4000 Workflow* delays for the time interval *scope.posttime*. It then collects the matching original error messages from the OpenScape 4000 Assistant or Manager.

Matching errors in this context are all errors that match to the corresponding alarm and that were received not more than *scope.pretime* before the alarm was created, and not later than `scope.posttime` after the alarm was created.

13.1.3.2 Trunk Names

For Trunk Group Alarms (group 3, class 8 to 519) it is useful to know which of the trunks are affected by the respective alarm, since this information can speed up the process to find common properties of affected trunks.

If configured accordingly, the provided ECE package *OpenScape 4000 Workflow* collects this information and displays it within the event annotation of the respective alarm event.

If the Service Workbench is used, this information is also displayed as an attachment to the according ticket.

Since this feature uses the Original Error Messages that have been collected for an alarm (see *Section 13.1.3.1*), the same configuration parameters apply.

13.1.4 Oscillating Alarms

Sometimes similar alarms are created by a system in rapid succession. These alarms often have the same problem as their cause, and it is useful to aggregate them into a single SWB ticket.

OpenScape 4000 Alarms are considered similar, when they are for the same OpenScape 4000 system, have the same priority and are of the same alarm group, alarm class and module. They are not identical, because they might have a different time stamp and different error messages.

An already known alarm is called oscillating, if a similar alarm is detected within a configured time interval (see *Section 13.1.1*). The parameter `oscillationtime` defines the time during which a similar alarm has to be received to be considered oscillating.

If the Service Workbench is used, similar alarms that are oscillating are accumulated within a single ticket within the Service Workbench to avoid the creation of a probably large number of similar tickets.

When an OpenScape 4000 alarm oscillates for which a ticket already exists within the Service Workbench, the respective ticket will be modified accordingly.

The ticket displays how often the alarm has oscillated (field **Alarm Counter** on the tab **Extensions**) and the additional information that was collected (e.g. additional original error messages) in attachments.

13.2 Lost Alarm Traps

Network problems or temporary deactivation of the OpenScape FM might lead to lost traps and missed alarm events. In the case of OpenScape 4000 Alarm traps the information that is lost with a failed trap is still available in the database of the OpenScape 4000 Manager.

To recognize and avoid information losses, the OpenScape 4000 database is checked regularly, to detect discrepancies between the alarms known by the OpenScape FM and the alarms stored in the database.

For alarm traps that are identified as missed, events will be created retroactively and handled by the same methods within the OpenScape FM as events that are triggered by traps.

Important Note:
To collect the data needed for the recovery of Lost Alarm Traps, a JDBC database connection has to be configured for the respective OpenScape 4000 Managers (see *Section 9.9.1*).

13.3 Avoidance of Duplicate Events

It is possible that an OpenScape 4000 Assistant monitors a system that is also monitored by an OpenScape 4000 Manager. Since both can be configured to send traps to the OpenScape FM, it is possible, that in such cases the OpenScape FM receives two alarm traps for the same alarm.

The OpenScape FM Event Handling provides a mechanism that can suppress such duplicates (see *OpenScape FM Desktop User Guide*).

The OpenScape 4000 plugin configures the respective event types accordingly to ensure that in such cases only one event and one ticket will be created. Even if the SNMP trap log contains two respective traps.

14 The Customized Service Handbook: Alarm and Error Class Notices

The menu items **Alarm Class Notice** and **Error Class Notice** in the main menu of the OpenScape FM (main menu bar **Technologies->OpenScape 4000->Alarm Class Notice** and main menu bar **Technologies->OpenScape 4000->Error Class Notice**) open the configuration tools of the Customized Service Handbook.

This tool allows the definition of notices concerning certain types of alarms and/or errors and to have these notices correlated automatically to alarms of the Event Browser where these notices appear in the annotations of the concerned alarms.

When a new alarm or error is received by OpenScape FM and displayed in the Event Browser, the matching alarm or error class notice (if one exists) is assigned automatically to the alarm and can be accessed via the Event Browser context menu **Event->Annotate...**. This is HiPath/OpenScape 4000 independent, i.e. every alarm/error, no matter from which HiPath/OpenScape 4000 system, will be annotated with the texts from the Customized Service Handbook – provided one has been defined.

No configuration has to be done in the Event Browser. Only the add alarm and/or error class notices in the dialogs covered in the next two chapters has to be performed.

14.1 Alarm Class Notice

To configure alarm class notices, the main menu entry **Technologies->OpenScape 4000-> Alarm Class Notice** has to be selected. This opens the Alarm Class Notice dialog (*Figure 22*).

On the right-hand side, are two text fields: the white “Note Field” at the top, where new notices can be entered, and the grey “Defined Notes Field” at the bottom, where defined alarm class notices are displayed.

Below the two text fields is the “Alarm Type Selection Area”, where the alarm class, group and priority can be selected, for which the notice should be added. Below are the **Save** and **Delete** buttons.

The left-hand displays the list with all alarms for which alarm class notices have been assigned.

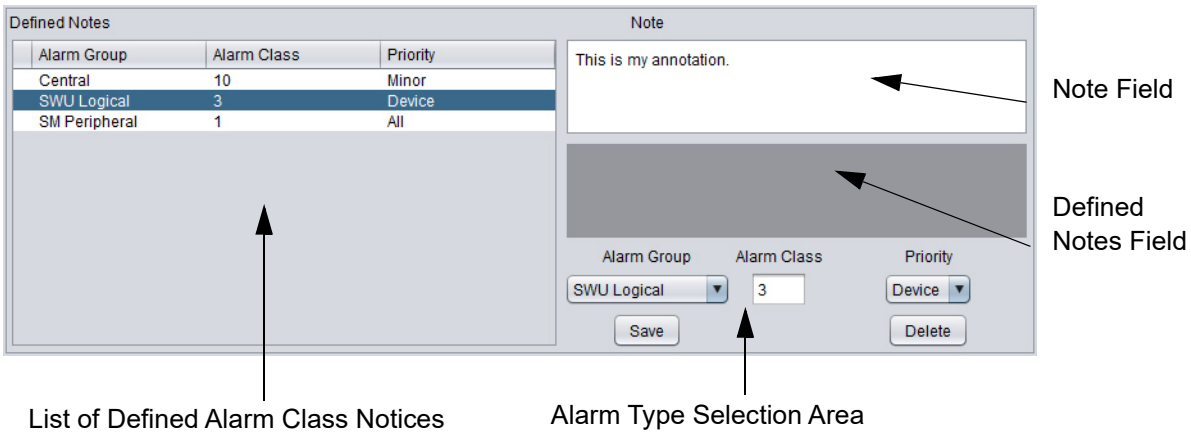


Figure 22 Alarm Class Notice Dialog

14.1.1 Adding a New Alarm Class Notice

If a new alarm class notice should be added, first the class, the group and the priority of the alarm has to be selected in the Alarm Type Selection Area. Then the text of the notice can be entered in the white Note Field. When the button **Save**. is pressed, the notice will be stored and displayed in the grey Defined Notes Field.

If more than one alarm were defined, the “Defined Notes Field “on the right-hand side always displays the information of the alarm which is marked in the list of defined alarm class notices on the left.

When the dialog is opened, the leftmost column is empty. When the annotation text of an entry gets changed, this column will contain an asterisk. If an annotation text gets deleted, the column will contain a dash. After a reopen of the dialogue the column will be empty again.

The newly defined new alarm class notice will be used instantaneously to insert the respective annotations into the Event Browser.

More about annotations for events in the Event Browser can be found in the *OpenScape FM Desktop User Guide*.

If an alarm class notice has been defined for a certain alarm group/class/priority combination, i.e. for a certain type of alarm, the corresponding notice will be added automatically to a new alarm of that type.

14.1.2 Modifying an Alarm Class Notice

If the text of an alarm class notice should be changed, the notice must be selected on the left side of the window. The current notice for the alarm combination will than be displayed in the grey Defined Noted Field. The notice will be changed to the text entered in the white Notes Field, when the button **Save** is pressed.

Note:
In the Event Browser all alarms which already have been annotated with the “old” alarm class notice, will not be updated. Every alarm that comes in after the change will of course be annotated with the new text.

14.1.3 Deleting an Alarm Class Notice

To delete an alarm class notice, the alarm has to be selected in the list – the currently defined text is displayed in the grey Defined Noted Filed – pressing **Delete** removes the alarm class notice.

In the Event Browser all events which had been annotated with this alarm class notice will keep the corresponding annotation, but there won't be any new annotations of that type.

14.2 Error Class Notice

Hint:
Not all errors will cause SNMP traps, only a predefined subset of all errors.

To configure error class notices, the main menu entry **Technologies->OpenScape 4000-> Error Class Notice** has to be selected. This opens the Error Class Notice dialog (*Figure 23*).

On the right-hand side, are two text fields: the white "Note Field" at the top, where new notices can be entered, and the grey "Defined Notes Field" at the bottom, where defined error class notices are displayed.

Below the two text fields is the "Message Id Selection Area", where the error class can be selected, for which the notice should be added. Below are the **Save** and **Delete** buttons.

On the left-hand side is the list with all alarms for which error class notices have been assigned.

14.2.1 Defining an Error Class Notice

Instead of the alarm group/class/priority, errors are defined by their message Id. Therefore the characteristic message Id for the error that should be annotated has to be entered. After this, the new text must be entered in the white Note Field. Pressing **Save** confirms the notice. The new note will appear in the Defined Notes list on the left-hand side of the Dialogue Window.

How to work with the **Note** field and the **Defined Notes** list is described in *Section 14.1, "Alarm Class Notice".*

The Error notes will also appear in the Event Browser – see above.

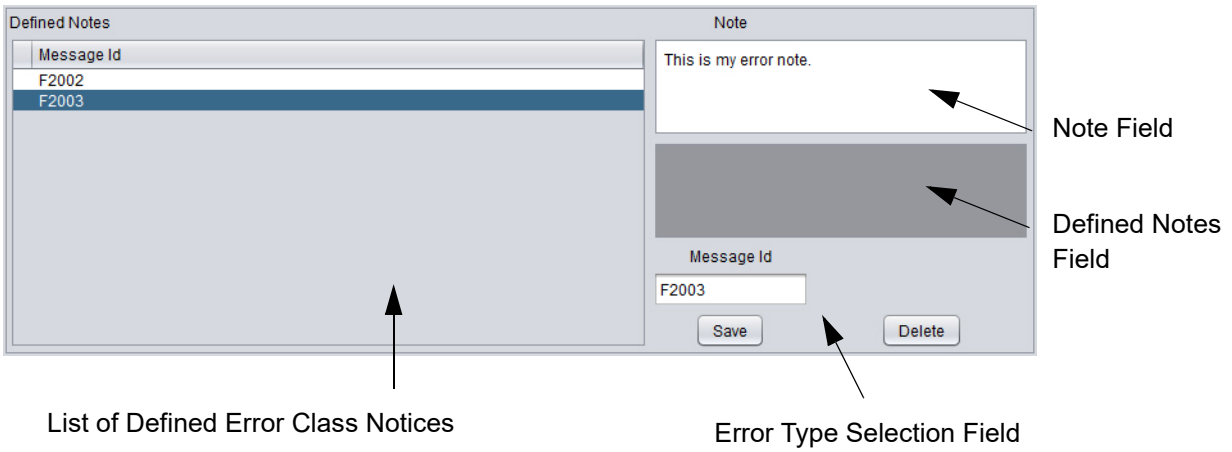


Figure 23 Error Class Notice

14.2.2 Modifying an Error Class Notice

If the text of an error class notice should be changed, the notice must be selected on the left side of the window. The current notice for the error class will then be displayed in the grey defined Note Field. The notice will be changed to the text entered in the white Notes Field, when the button **Save** is pressed.

In the Event Browser all errors which already have been annotated with the “old” alarm class notice, will not be updated. Every error that comes in after the change will be annotated with the new text.

14.2.3 Deleting an Error Class Notice

To delete an error class notice, the error has to be selected in the list – the current text is displayed in the grey Defined Noted Filed – pressing **Delete** removes the error class notice.

In the Event Browser all events which had been annotated with this error class notice will keep the corresponding annotation, but there won’t be made any new annotations of that type.

15 FM Snapshots and Storage Configuration

Sometimes it is necessary to reproduce the alarm/error state of a HiPath/OpenScape 4000 system for a specific point in time. E.g. to see which alarms were “ON” one week ago, one month ago, or maybe a year ago. The OpenScape FM Snapshot functionality provides this option.

A snapshot consists of three date-specific copies of HiPath/OpenScape 4000 Manager database tables: `alarm`, `lerror` and `erroralarmmap`. If a snapshot is created, the current `alarm` table is copied into a table called `alarm_`<current date as integer>, the `lerror` table is copied into a table called `lerror_`<current date as integer>, and the `erroralarmmap` table is copied into a `erroralarmmap_`<current date as integer>. <current date as integer> are the seconds since 1970. All current snapshots are registered in a database table called `snapshots`, so when a snapshot is created, an entry in the `snapshots` table is made.

There are active and inactive snapshots: active snapshots are to be found as tables in the database, whereas inactive snapshots consist of files which have been unloaded from the corresponding database tables. These files are stored in the `/opt/hipath_agents/snapshots/dbfiles` directory.

When an active snapshot is exported, the three corresponding tables are unloaded into three files, and when an inactive snapshot is imported, the data from the three files is loaded into database tables again.

To dispose the necessity to manually create safety copies on a daily or weekly basis, OpenScape FM provides the Storage Configuration functionality for an automatic snapshot production. This module can also be used to delete errors automatically.

There are two places where FM Snapshots can be handled:

Within the dialog FM Snapshot Management (see *Section 15.1*) and within the Storage Configuration (see *Section 15.2*), which are treated in this chapter. This functions create and manage the snapshots

On the other hand, FM Snapshots can be handled by the search browser. This will be treated in *Section 11.1.1, “Finding Alarms”* and *Section 11.1.2, “Finding Errors”* (see parameter **Snapshot**).

15.1 FM Snapshots

The context menu of the *HiPath/OpenScape 4000 Manager SNMP Proxy Agent* contains the entry **FM Snapshots->Manage**. This entry opens the FM Snapshot dialog in which all current snapshots are listed. The list shows the creation date and the state (active or inactive) of the snapshots (*Figure 24*).

Important Note:
A JDBC database connection has to be configured (see *Section 9.9.1*).

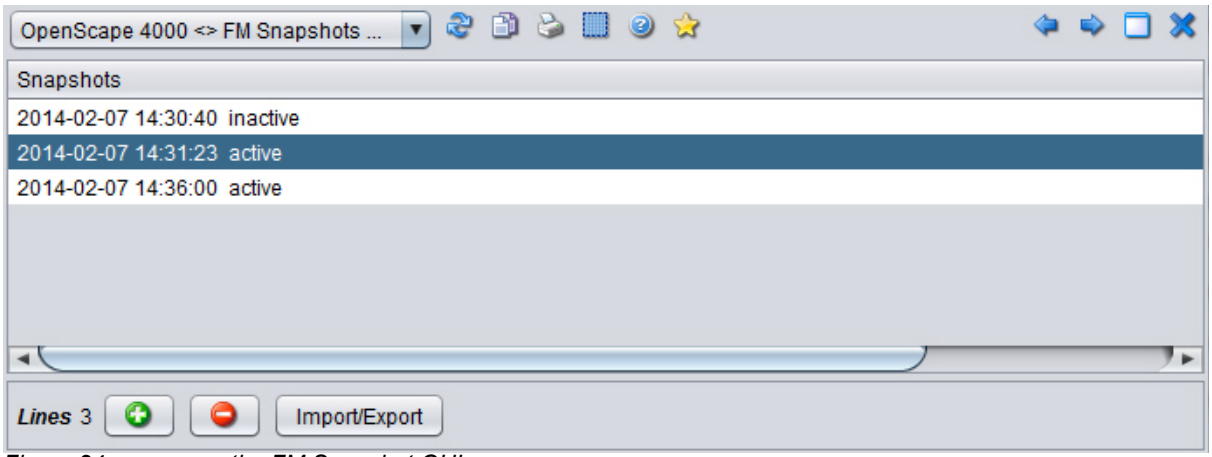


Figure 24 the FM Snapshot GUI

To create a new snapshot, the + button has to be pressed. OpenScape FM then immediately copies the three alarm/error tables as described in the preceding paragraph.

To delete a snapshot, it has to be selected in the list mark and the – button has to be pressed. For active snapshots, the tables are deleted; for inactive snapshots, the three dbfiles are deleted.

If an active snapshot should be exported, it has to be selected in the list and **Import/Export** has to be pressed. The three database tables are then downloaded into the three corresponding dbfiles. An inactive snapshot can be selected and **Import/Export** can be clicked to copy the data back into the tables. Since only active snapshots can be exported and only inactive snapshot can be imported, there is only one button necessary for the import and export operation.

15.2 Storage Configuration

Important Note:
For this feature a JDBC connection to the database of the manager/assistant has to be configured (see *Section 9.9.1*).

The Storage Configuration dialog is opened through the context menu of the *HiPath/OpenScape 4000 Manager SNMP Proxy Agent*. by selecting the entry **FM Snapshots->Storage Configuration**.

This dialog configures the time intervals for the automatic creation snapshots of the alarm- and error table in the manager/assistant database. The same interval can also be used for the automatic deletion of errors.

All configuration parameters are stored in a database table called `storeconfig`. When the Storage Configuration dialog is opened, the values of this table are displayed. Two checkboxes can be used to decide whether the automatic creation of alarm/error snapshots should be switched on or off and whether the automatic deletion of errors should be active. In the field below the checkboxes, the time interval in days can be selected when the snapshots are to be produced and when the errors are to be deleted.

Snapshot deletion interval can be used to configure a time interval after which snapshots should be automatically deleted to hold the size of the database under control. If `0` is entered into this field, snapshots will *not* be deleted automatically.

The automatic snapshot generation and error deletion is managed via a cron job on the HiPath/OpenScape 4000 Manager system and executed at midnight.

In the example shown in the figure above, snapshots of the alarm and error tables are generated every day. Errors will never be deleted. Snapshots older than 30 days are deleted.

16 Extensions with HiPath/OpenScape 4000

Hint:
These features are available with HiPath/OpenScape 4000 Managers only.
To use additional HiPath/OpenScape 4000 Manager menu items (see *Section 16.1, "Direct Access To HiPath/OpenScape 4000 Functions"*), the client PC has to be prepared. All details of the steps which have to be performed are explained on the HiPath/OpenScape 4000 Manager public area. This area can be searched from the HiPath/OpenScape 4000 Manager's web interface. The login page of the HiPath/OpenScape 4000 Manager (e.g. `https://<ip address of HiPath/OpenScape 4000 Manager>`) contains a link to get into the client preparation area.

16.1 Direct Access To HiPath/OpenScape 4000 Functions

The OpenScape FM is able to display menu entries and call actions from all managed HiPath/OpenScape 4000 Managers. This means that there is a direct access to HiPath/OpenScape 4000 Manager menu entries via the context menu of HiPath/OpenScape 4000 systems which are managed by any HiPath/OpenScape 4000 Manager known to the OpenScape FM Server. To get these additional menu entries, a connection object for the HiPath/OpenScape 4000 Manager is needed. This connection object can only be created if a valid login user/password pair exists for this HiPath/OpenScape 4000 Manager. If no connection object and no login exists there will be the menu entry **Manager Login** in the context menu of every HiPath/OpenScape 4000 System belonging to this HiPath/OpenScape 4000 Manager.

After selecting this menu entry a login window is opened to enter in a valid user/password pair to log in to the HiPath/OpenScape 4000 Manager (see *Figure 25*).

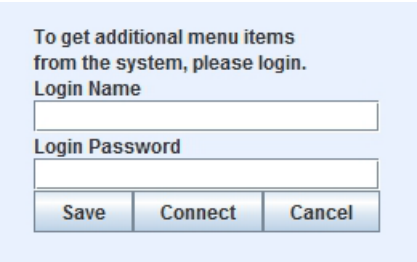


Figure 25 HiPath/OpenScape 4000 Manager login mask

The button **Connect** uses the entered data to connect to the HiPath/OpenScape 4000 Manager.

If the button **Save** is used, the connection data will be saved for the current user and manager. If the client is started again by the same user and the context menu is opened for a HiPath/OpenScape 4000 system belonging to the current HiPath/OpenScape 4000 Manager, then the stored data will be used to perform an automatic login. This will be notified in the message log.

If the automatic connection should be deactivated, this can also be done with the button **Save**. In this case no data (like in *Figure 25*) should be entered.

After a valid connection object has been created additional menu entries provided by this HiPath/OpenScape 4000 Manager are integrated into the context menu of HiPath/OpenScape 4000 Systems belonging to this HiPath/OpenScape 4000 Manager. The additional menu entries can be different depending on the HiPath/OpenScape 4000 System (e.g. the menu entry **Direct Access->HICOM Standard Startpage** appears).

The menu entry **Manager Login** is replaced with the entry **Change Manager Login** to change the user/password pair.

For each HiPath/OpenScape 4000 Manager one connection object is needed, i.e.a login has to be performed for each HiPath/OpenScape 4000 Manager.

The possibility to get additional HiPath/OpenScape 4000 menu items for all HiPath/OpenScape 4000 Systems belonging to different HiPath/OpenScape 4000 Manager is called multi HiPath/OpenScape 4000 Manager capability and this feature can be used irrespective of the machine where the client has been loaded from.

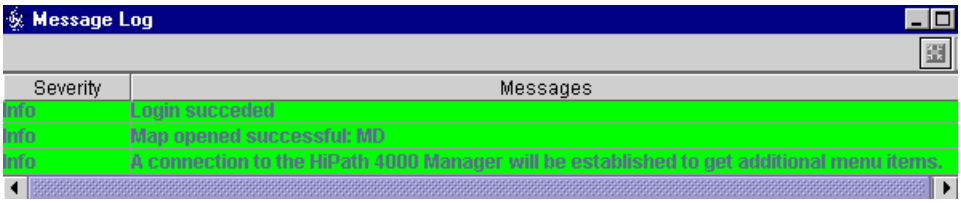


Figure 26 Connection information.

17 Activity Logging

All delete operations in the HiPath/OpenScape 4000 alarm (`alarm`) and/or error (`lerror`) table will be recorded on the OpenScape FM server in the `<OpenScape FM homedir>/server/logging/activity.log` file. Each entry consists of the date, user name and the type of operation which has been performed. More about log files can be found in the *OpenScape FM Desktop User Guide*.

18 System Management Monitoring

This chapter describes functions that collect HiPath/OpenScape 4000 specific data by using the OpenScape FM System Management.

The monitor described in the following section and its collected data can be viewed, queried and reported as every other System Management monitor (see *System Management User Guide*).

As usual, thresholds can be defined for the monitored parameters. If a threshold is exceeded, an event will be generated and displayed in the Event Browser.

Reports for the respective monitoring profiles can be generated by using the Report Manager (see *Report Manager User Guide*).

18.1 OS4K-HW-Appliance

The System Management contains standard SNMP monitors which can be used to monitor an OS4K hardware appliance. This monitor collects hardware and system parameters in HiPath/OpenScape 4000 environments. The statistics values (SNMP Counter) are requested by the monitor from the MIBs HOST-RESOURCES and UCD-SNMP-MIB which are supported by the `net-snmp-package` and available on the Linux operating system running on the HiPath/OpenScape 4000 device. Once gathered, the values are internally processed to calculate the results over time. The collected values can be accessed in monitor parameter charts.

In detail the monitors collect the following data:

From **HOST-RESOURCES-MIB**:

- System
  Number of current users and processes
- Device
  Information about CPUs und network interfaces
- Processes
  Currently running processes
- Storages
  Information about RAM and disk usage

From: **UCD-SNMP-MIB**:

- Detailed information about CPU usage, swap space and I/O

The template of the *OS4K-HW-Appliance* monitor can be found within the template container `Protocols/SNMP`. Since the monitoring is based on SNMP, the correct read community has to be configured on the related IP node. Select „Configure“ from it‘s popup menu and navigate to the tab „IP Parameter/SNMP Parameter“ to check this.

Within the OpenScape FM navigation tree the monitor is assigned to the HiPath/OpenScape 4000 IP Node that was selected for monitoring.

19 Prerequisite Hardware and Software Environment

A list of all hardware and software requirements for the OpenScape FM and the OpenScape 4000 Plugin can be found in the *OpenScape FM Desktop User Guide*.

A Background Information

If not stated otherwise, the following information affects the HiPath/OpenScape 4000 systems as well as the legacy Hicom 300 systems.

A.1 Alarms

For the HiPath/OpenScape 4000 system versions 3.3+, there are a number of **strictly** defined alarms. These alarms can be attached to the components of the logical system model. System versions 3.3+ additionally provides freely configurable alarms.
The freely configurable alarms are divided into three categories:

- Target Alarms:

  Target alarms provide control over groups of tie lines or exchange lines.

- Hardware Unit Alarms:

  Hardware Unit Alarms are assigned to one or more hardware units or to an entire LTU.

- Personal Alarms:

  Personal alarms may be used for devices which can be identified by a telephone number. A maximum of 64 personal alarms can be configured.

Generally an alarm contains the following information:

- Alarm Group Name:

  The alarm group name associates an alarm with a group number. The following five groups are distinguished:

  Group 1: Central.

  Group 2: SWU Peripheral.

  Group 3: SWU Logical.

  Group 5: SM Peripheral.

  Group 7: Element Manager.

- Alarm Number:

  The alarm number is the unique, group specific identifier of an alarm.

- Alarm Name:

  The alarm name is a symbolic name of an alarm.

- Alarm Priority:

  There are three alarm priorities, called *device*, *minor* and *major*. They are distinguished by predefined levels of configurable threshold values.

- Alarm State:

  The alarm state shows whether an alarm is still active.

- Alarm Module:

  The hardware module that has detected the alarm.

- Alarm Date and Time:

  Date and time when the alarm has occurred.

The table in *Appendix C, "System Alarm Messages"* shows group numbers, alarm numbers, alarm names and their attachment to a component of the logical model.

An alarm will be generated by the system if a predefined threshold value of related system errors is reached and that value does not fall below the threshold value for a specific time interval. An alarm will be reset if the value falls short of the threshold value for a specific time interval. That way alarms are only generated when an important event has occurred.

The individual definition of thresholds and time intervals can be configured for each alarm. The parameters of the alarm configuration depend on the specific alarm groups:

Central Alarm Group:

- Threshold 1:
  The threshold for the generation of a minor alarm. The value is defined as an absolute counter of errors.
- Threshold 2:
  The threshold of errors for the generation of a major alarm. The value is defined as an absolute counter of errors.
- Time 1:
  The time interval in seconds for holding the threshold 1 of errors.
- Time 2:
  The time interval in seconds for holding the threshold 2 of errors.

SWU Peripheral, Logical and Server Peripheral Groups:

- Base Absolute:
  The base value of errors. The value is defined as an absolute counter or as a percentage of errors.
- Threshold 1:
  The threshold of errors for the generation of a minor alarm. The value is defined as a percentage of the errors base counter.
- Threshold 2:
  The threshold of system errors for the generation of a major alarm. The value is defined as a percentage of the errors base counter.

- Time 1:
  The time interval in seconds for holding the threshold 1 of errors.
- Time 2:
  The time interval in seconds for holding the threshold 2 of errors.

As mentioned before, alarms are generated if predefined thresholds of errors are reached and held for a predefined time. Therefore, every error is associated with a alarm. Errors are the base of the system PBX fault management. Every error has certain fields:

- Error Identifier:
  The unique identifier for a error.
- Error Priority:
  The priority of errors has a range from 1 to 8. Additionally, errors are marked to be unique (E) or not unique (M).
- Error Action:
  The predefined system action for a error.
- Error Module:
  The system module which generates the error.
- Error Event and Subevent:
  The classification of a error.
- Error Date and Time:
  Date and time when the error has occurred.

Details concerning alarms, alarm configuration and errors are handled in the *HiPath/OpenScape 4000 Service Manual*.

A.2 Topology Concept

Initially, the basic terminology and topology concepts of the HiPath/OpenScape 4000 network topology will be introduced.

The topology of a HiPath/OpenScape 4000 network is represented by the following objects:

- Trunks
- Trunk Groups
- Hicom Nodes
- External System
- Telecom Network

The following basic technical terms are used to describe HiPath/OpenScape 4000 networks:

- Node Number:
  The node number was defined with the introduction of system version 3.3. It is assigned through the configuration of the HiPath/OpenScape 4000 system and has to be unique in the network. A node number is defined in dash-notation based on 10^3 steps. The value 0 means that no node number has been assigned. A node number can be assigned to nodes and virtual nodes.
- Virtual Node Number:
  To every external HiPath/OpenScape 4000 system connected to a system (router, local telecom provider or external PBX system), a unique virtual node number must be assigned.
- Source Node Number:
  The source node number is used in conjunction with trunks. If a connection over a trunk is established starting at an external system, the configuration of the trunk must contain the virtual node number of the external system as the source node number of the trunk.
- Target Node Number:
  Trunk groups are defined on a HiPath/OpenScape 4000 system. The starting location of a trunk group is defined as the HiPath/OpenScape 4000 system on which the trunk is configured. The ending location of a trunk group is defined by the target node number.
- Trunk:
  Trunks are used to establish connections between systems. A trunk can be one of the following types:
  - Digital: used for digital connections.
  - Analog: used for analog connections.
  - Special: used for special devices.

  The channels of digital S2 trunks are divided into channel groups, which can be assigned to different trunk groups.
  The physical position of a trunk is described by four values of the format “gg-uu-bbb-ss”:
  - gg: Line Trunk Group,
  - uu: Line Trunk Unit,
  - bbb: Slot,
  - ss: Slot Number.
- Trunk Groups:
  Trunks which are used for incoming-only or incoming and outgoing connections must be assigned to a trunk group. A trunk group contains a number of trunks with the same type. The type of a trunk group is derived from the contained trunks. If a trunk group is empty, i.e. there are no trunks assigned to it, the type is undefined. A single trunk can only be assigned to one trunk group.

  Trunk groups are the basic components needed to allow a HiPath/OpenScape 4000 system to route connections within the network. If a system has to establish a connection to another system, it will consult its routing information to determine a trunk group which can be used for the connection.

  Trunk groups are used in different logical contexts. For a better understanding of these contexts we have defined five classes of HiPath/OpenScape 4000 system trunk groups. The classes B1 and B2 are distinguished by their device type.

- HiPath/OpenScape 4000 System Nodes:
  This is the main object of the topology. It contains the trunks and the trunk groups. A node is uniquely identified through its mnemonic name.
- External Systems:
  External systems are also called virtual nodes, because they have a virtual node number assigned. This is important, because for networking reasons a HiPath/OpenScape 4000 system must know from which node an incoming connection is established. Between systems, this node number is transmitted at the beginning of a connection. Because external systems do not know anything about these node numbers, this number is configured in the trunk connected to the external system.
- Telecom Network:
  Trunks of class B2 end in virtual nodes which can be described as gateways to the network of your local telecom provider.

A.3 Hardware Data

The OpenScape FM provides access to valuable information about the hardware equipment of a system network. The hardware information will provide customers with a consolidated view on their equipment. It will enable them to establish a centralized system hardware inventory management, providing a basis for maintaining and upgrading the hardware configuration of their HiPath/OpenScape 4000 systems.

For a better understanding of the subsequent chapter the basic hardware components constituting a HiPath/OpenScape 4000 system will be described first. A HiPath/OpenScape 4000 network is made up of HiPath/OpenScape 4000 systems and each system can consist of one ore more cabinets. The system architecture falls into a range of hardware models and a variety of related cabinet types (details see *HiPath/OpenScape 4000 Service manual*). A HiPath/OpenScape 4000 cabinet is composed of shelves which are mounting positions for frames. A frame houses boards, the basic function modules like processor, memory, communication and line boards etc.

There are specific frame types. A line trunk unit (LTU) frame may house only SLM, DIU or TM line boards. A common control shelve (CCS) or an integrated service extension frame (ISEC) contains boards serving control and administration tasks. Additional hardware resources are storage peripherals like disks, tapes etc.

On request of the OpenScape FM (Discoveries, *Chapter 10, “Discoveries”*) the SNMP Proxy Agent extracts the current hardware information from a HiPath/OpenScape 4000 system using specific commands of the native administration and maintenance (AMO) interface of the system. AMO commands offer a direct interface to a system to perform various maintenance and configuration tasks. In *Figure 27* the categories of hardware information that can be extracted using the AMO interface are shown.

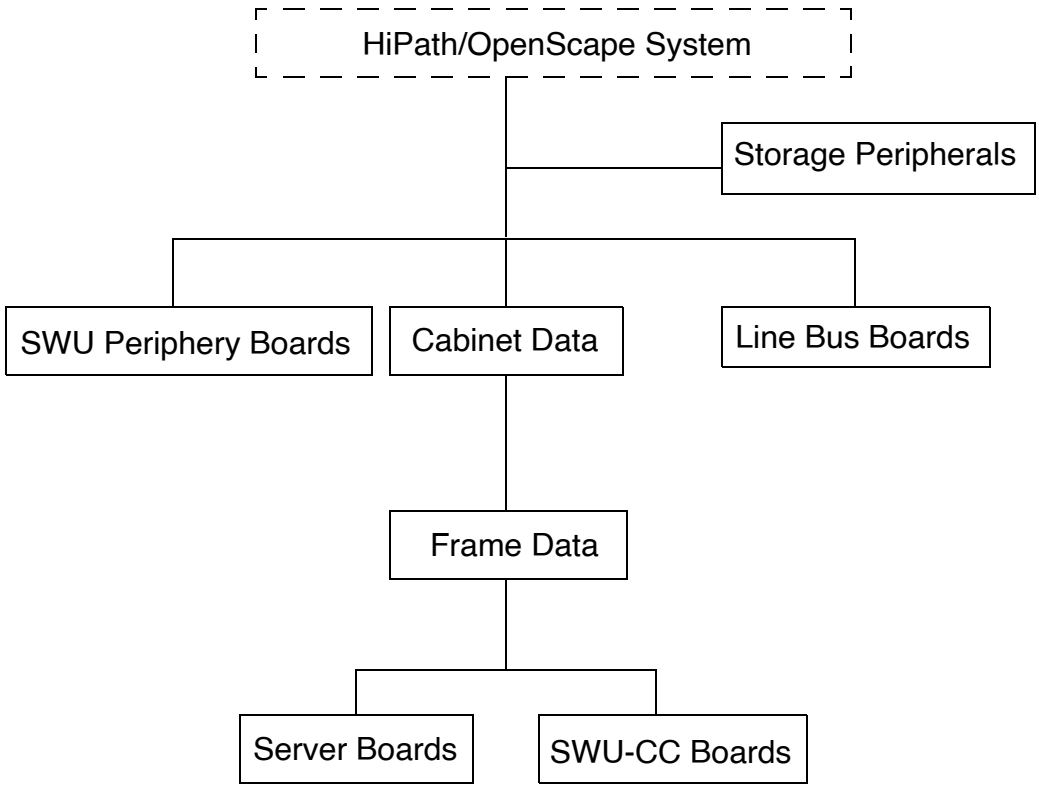


Figure 27 HiPath/OpenScape 4000 system Hardware Information

Cabinet Data:
Provides information on all installed cabinets. For each cabinet, its type code, part number and the number of shelves are listed.

Frame Data:
Contains the installed frames for each cabinet, and for each frame its mounting position (shelf Id), type Id, part Id, LTU, and usage.

Cabinet and Frame Data provide an overview on the usage of the cabinets and the room available for extensions.

From a logical point of view, the system architecture falls into two major function units, the switching unit (SWU) and the administration and data server (ADS) unit. In addition to the ADS unit, a system may have voice mail (VMS), telecommunications (TCS) and call charge server units installed. The board-related AMO queries CDSM, CDSU, BCSM and BCSU organize their results according to this architecture.

Server Boards:
This information is generated using the AMO query CDSM (cabinet display system server modules). CDSM retrieves all server module related boards. Each board is identified by cabinet address, shelf number and its mounting position (slot address) within the shelf/frame. Additional information are the part number, board name and firmware identification.

SWU Common Control Boards:
This information is generated using the AMO query CDSU (cabinet display system switching unit). CDSU retrieves boards of the switching unit, serving common control functions. Such type of boards are processor (DPxx), memory (MEM), interface processor (IP), data communication link (DCL) boards etc. The format of the information is the same as for CDSM.

SWU Periphery Boards:
This information is generated using the display function of the AMO query BCSU (board configuration switching unit). The display function of this command retrieves all periphery boards of the switching unit. Such boards are subscriber line modules (SLM*), digital interface units (DIU*), trunk module (TM*) boards etc. SWU periphery boards are organized into line trunk groups (LTG) and line trunk units (LTU). Consequently, each board is identified by its LTG and LTU number and its mounting position within the LTU frame. Additionally, for each board the board name, the part number of the configured board, the part number of the actually installed board, the firmware identification and the status of the board are provided. The SWU Periphery Board information indicates if there are inconsistencies between the planned (configured) and found (actual) frame equipment. Furthermore, the board status field indicates whether a board is “ready” or “locked” because of an error or an operator action.

Line Bus Boards:
This information is generated using the display function of the AMO query BCSM (board configuration server module). The display function of BCSM generates line bus and line control boards used in ADS, TCS and VMS servers. This information may partly overlap with the Server Board information. The Line Bus Board table, however, will show more detailed information: configured board, board status and related server module.

Storage Peripherals:
This information is generated using the AMO query DDSM (display devices server modules). For each server type (ADS, VMS, CCS and TCS), DDSM generates a list of the installed storage peripherals (hard disks, tapes, cartridges, DAT and flash memory), including capacity and formatting characteristics.

Using the discovery function of the OpenScape FM; hardware discovery for a certain system can be initiated. The actual discovery operation is carried out by the system SNMP Agent. For each hardware object (Server Boards, SWU Periphery Boards etc.), the agent issues the related AMO queries and stores the results in its database. When all AMO commands have been performed, the agent sends a trap to the OpenScape FM indicating the success of the discovery. If the discovery was successful the user can review the latest hardware information of the discovered system.

For each hardware object, all instances found can be browsed. It is shown what type of cabinets there are, which shelves are being used, what types of frames are mounted and which boards are installed in a frame. This information can be stored in a file and it can be subsequently used with other management and analysis tools. It is further possible to search within a system for a certain board type, e.g. a SLMB board. In this case, the OpenScape 4000 Plugin will list only all instances of this board type.

In summary, the OpenScape 4000 Plugin provides the users with valuable information on their HiPath/OpenScape 4000 systems. Particularly, large HiPath/OpenScape 4000 system networks with geographically distributed systems can be managed in a more comfortable way. The hardware information provided by the OpenScape FM will be very useful for preparing service operations and hardware upgrades. It is also a prerequisite for setting up a central system hardware inventory management.

A.4 Software Data

There are many different HiPath/OpenScape 4000 system variants of system software, divided into modules (APS: Software subsystem of the system; each APS represents an autark entity; originally: “Anlagen Programm System”). The software of each system variant differs in some of these specific modules.

In detail, the HiPath/OpenScape 4000 system software is divided into three groups:

- Software modules which contain resident programs (corresponding to the hardware modules):
  - SWU (Switching Unit).
  - ADS (Administration and Data Server).
  - VMS (Voice Mail Server).
  - TCS (TeleCommunication Server).
- Software modules with reloadable programs:
  - SWU-AMOs (Administration and Maintenance Operation).
  - Server-AMOs.
- Software modules with country-specific messages:
  - SWU (Switching Unit).
  - VMS (Voice Mail Server).
  - TCS (TeleCommunication Server).
  - SWU-AMOs
    Server-AMOs.

The software is installed on each system individually from a cartridge tape or DAT.

The OpenScape 4000 Plugin retrieves this data from the Proxy Agent using SNMP requests and provides it to the user in a simple, human-readable way.

Each part of the HiPath/OpenScape 4000 system software is identified by an APS-Id and a part number. This part number contains several coded pieces of information. In detail, the structure of a part number is as follows:

Part Number: P30252-Baa bb-cd ee-ff

The meanings of the letters are:

- aa: System Variant.
- bb: Language.
- c: Product.
- d: Type.
- ee: Release.

- ff: Correction Version.

For example, the part number P30252B3600A00109 will be converted to

- System Variant: SP300-V3.3.
- Language: neutral.
- Product: AMO-IHS.
- Type: HiPath 4000.
- Release 1
- Correction Version: System release 9.

The OpenScape FM provides both the original part number and the decoded values.

In addition to the different software modules, there may be patches installed on a system. A patch is a piece of software that is usually installed via an existing application (software module, APS) to fix errors or add new features. The following information on patches is available:

- Patch number:

  A number like PS20032, for example. It always starts with “P”, the second letter specifies the affected hardware module. For detailed information refer to the *HiPath/OpenScape 4000 Service Manual.*

- Hardware module:

  This specifies the affected component. The valid values are:

  – HD (harddisk)

  – A1 (integrated server)

  – V1, V2, V3 (voice mail server)

  – T1, T2, T3 (telecommunications service)

  – BPA, BPB (ISU processor A/B)

  – GP (all line trunk groups)

- Status:

  The status of a patch can either be “Checked” (activated and checked) or “Not Checked” (activated without checking).

- Patch Group:

  This value shows the group identification of the patch.

A.5 Visualization on the Network Management Platform

The network management station is a central component for network administration. One of its main functions is to monitor the status of network components on a permanent basis and to inform the network administrator in case of state changes.

As a de facto standard, network management tools have graphical user interfaces and a graphical network map in order to show the topology and the current status of network components. These features are also supported by the OpenScape FM.

In general the functionality is as follows:

- Hierarchical, automatically discovered mapping of the network topology, presented in different abstraction levels (system network view, subnet view, component view etc.).
- Representation of HiPath/OpenScape 4000 alarms by graphical state change of HiPath/OpenScape 4000 system icons.
- Possibility to ”fine-tune” the network view by grouping HiPath/OpenScape 4000 systems together and put them into different networks and subnetworks.
- Representation of connected external systems by specific icons.
- Detailed alarm and error description in form of textual Browser Windows.
- Detailed system network topology description.
- Detailed installed hardware and software description.
- Search for systems, alarms, errors, hardware and software.
- Possibility of further investigation via remote login into HiPath/OpenScape 4000 Manager.

B Abbreviations

A HiPath/OpenScape system can be described logically by a hierarchy of logical components. This hierarchy is called a logical HiPath/OpenScape system model. The logical components are:

- HiPath/OpenScape system — global HiPath/OpenScape system units
- SWU — switching unit
- RMS — remote shelf
- Server — server units
- SN — switching network
- CC — common control
- LTG — line trunk group
- VMS — voice mail server
- ADS — administration and data server
- TFS — text and fax server
- Peripherals — peripheral units
- GSN — group switching network
- LTGC — line trunk group control
- SV — power supply
- GC — call charge computer
- SI — service interface
- SP — server peripherals
- LTU — line trunk unit
- SU — service unit
- VPL — attendant console
- AL — exchange line
- QL — tie line
- DL — data line
- APSE — additional special devices
- Devices — voice and multifunctional devices

C System Alarm Messages

Gr.No.	Al.No.	Alarm Name	Attached to HiPath/ OpenScape system Component
1	0	LTG RESTARTS	LTG
1	1	LTG FAILURE	LTG
1	2	LTU FAILURE	LTU
1	3	PHONEMAIL ALARM	HiPath/OpenScape system
1	4	LTUR HW STATUS BUS	HiPath/OpenScape system
1	5	CC RESTARTS	CC
1	6	STBY-CC FAILURE	CC
1	7	LTUR RESTARTS	HiPath/OpenScape system
1	8	RMS FAILURE	RMS
1	9	CHARGE COMPUTER	GC
1	10	IS RESTARTS	ADS
1	13	SM RESTARTS	Server
1	16	LTG CENTRAL CONTROL	LTG
1	17	CC CENTRAL CONTROL	CC
1	18	SWITCHING NETWORK	SN
1	19	CLOCKING SYSTEM	HiPath/OpenScape system
1	20	SIGNAL UNIT	SU
1	21	IS CENTRAL CONTROL	ADS
1	22	SM CENTRAL CONTROL	Server
1	23	SW ERRORS	HiPath/OpenScape system
1	24	SYSTEM MESSAGES	HiPath/OpenScape system
1	25	POWER SUPPLY	SV
1	26	SM-FAILURE	Server
1	27	UNIX / XENIX FAILURE	ADS
1	28	SYSTEM TIME FAILURE	ADS

Gr.No.	Al.No.	Alarm Name	Attached to HiPath/ OpenScape system Component
1	29	MAINTENANCE NOTE	HiPath/OpenScape system
1	30	SWITCHING UNIT FAILURE (Hicom 3.5)	SWU
2	0	C-O-TRUNK/EXCH-LINE	AL
2	1	TIE-LINE	QL
2	2	MULTIPLE DEVICES	Devices
2	3	ANALOG VOICE DEVICES	Devices
2	4	(DIGITAL) VOICE DEVICES	Devices
2	5	ATTENDANT CONSOLE	VPL
2	6	C-O/EXCHANGE DATA LINE	DL
2	7	TIE DATA LINE	DL
2	8	BASE STATION (Hicom 3.5)	Hicom
2	10	TFS-LINE	TFS
2	11	VMS-LINE	VMS
2	12	APSE	APSE
2	13	OTHER-DEVICES	HiPath/OpenScape system
2	14	DATA -DEVICES	DL
3	1	INWARD-TRUNK/EX-LINE	AL
3	2	OUTWARD-TRUNK/EX-LINE	AL
3	4	DIUC-ITALY	HiPath/OpenScape system
3	5	PHONEMAIL-ACCESS	HiPath/OpenScape system
3	8	1. freely configurable target alarm / hardware unit alarm	QL/hardware unit
...	...	...	...
3	63	56. freely configurable target alarm / hardware unit alarm	QL/hardware unit
3	64	57. freely configurable target alarm (Hicom 3.4) / hardware unit alarm	QL/hardware unit
...	...	...	...
3	519	512. freely configurable target alarm (Hicom 3.4) / hardware unit alarm	QL/hardware unit
3	520	1. freely configurable personal alarm (Hicom 3.4)	Devices

Gr.No.	Al.No.	Alarm Name	Attached to HiPath/ OpenScape system Component
...	...	...	...
3	583	64. freely configurable personal alarm (Hicom 3.4)	Devices
4	0	1. freely configurable personal alarm	Devices
...	...	...	...
4	63	64. freely configurable personal alarm	Devices
5	0	SERVICE TELETYP	V24
5	1	SERVICE UTC	SI
5	2	SERVICE TTX	SI
5	3	SERVICE FAX	SI
5	4	SERVICE VOICE	SI
5	5	SERVICE-XENIX	SI
5	6	SERVICE BSC	SI
5	7	SERVICE ISO	SI
5	8	SERVICE IBM	SI
5	14	IS FLASH MEMORY	SP
5	15	SM FLASH MEMORY	SP
5	16	IS DAT RECORDER	SP
5	17	SM DAT RECORDER	SP
5	18	IS HARD DISK	ADS
5	19	IS CARTRIDGE	SP
5	20	IS TAPE	SP
5	21	SM HARD DISK	Server
7	1	RETRY EXCEEDED	Manager
7	2	NOT ENOUGH SPACE	Manager
7	3	SWITCH ACCESS FAILING	Manager
7	4	PM-DB FULL	Manager
7	5	INFORMIX	Manager
7	6	DISK FULL	Manager
7	7	AFR FILE COUNT	Manager
7	8	AFR DB SPACE	Manager
7	9	AFR STOPPED	Manager
7	10	AFR FAULT	Manager

Gr.No.	Al.No.	Alarm Name	Attached to HiPath/ OpenScape system Component
7	11	AUTOLOCK:	Manager
7	12	BACKUP FAILED	Manager
7	13	RESTORE FAILED	Manager
7	14	DISK FULL	Manager
7	15	TRESH. EXCEEDED	Manager
7	16	LMT_CDW_UPDATE	Manager
7	17	LMT_LICENSE_REDUCTION	Manager
7	18	LMT_GLOBAL_ALARM_THRESHOLD	Manager
7	19	LMT_GLOBAL_ALARM	Manager
7	20	LMT_GLOBAL_WARNING_THRESHOLD	Manager
7	21	LMT_GLOBAL_WARNING	Manager
7	22	PROCM_PM_CONTROL	Manager
7	23	PROCM_PM_COL	Manager
7	24	PROCM_PM_SCHED	Manager
7	25	PROCM_COL_SCHEDULE	Manager
7	26	PROCM_COL_TRANSFORM	Manager
7	27	PROCM_COL_CYCLICCHECK	Manager
7	28	PROCM_COL_LINE	Manager
7	29	PROCM_COL_DB_PROXY	Manager
7	30	PROCM_COL_RECEIVE	Manager
7	31	PROCM_COL_METERING	Manager
7	32	PROCM_FTW_TRANSFER_CONTROL	Manager
7	33	PROCM_IDS_ONINIT	Manager
7	34	PROCM_LMT_DAEMON	Manager
7	35	PROCM_SWTD_SERVER	Manager
7	36	PROCM_HTTP_USSW	Manager
7	37	PROCM_HTTP_TOMCAT	Manager
7	38	PROCM_LOGMEVTLOG	Manager
7	39	PROCM_LOGMRECEIVER	Manager
7	40	PROCM_LOGMERRH	Manager
7	41	PROCM_LOGMCONTROL	Manager
7	42	PROCM_LOGMDISPATCH	Manager

Gr.No.	Al.No.	Alarm Name	Attached to HiPath/ OpenScape system Component
7	43	PROCM_LOGMSESSCONTROL	Manager
7	44	PROCM_SECM_SMW	Manager
7	45	PROCM_SECM_CORE	Manager
7	46	PROCM_SYMUPLOADCONTROL	Manager
7	47	PROCM_SYMSERVICE	Manager
7	48	PROCM_CMPROC_DOM_UXBPROC	Manager
7	49	PROCM_CMPROC_DOM_UXLMAIN	Manager
7	50	PROCM_CMPROC_CCS	Manager
7	51	PROCM_CMPROC_SUB_UXSDBSYN	Manager
7	52	PROCM_CMPROC_DOM_CSERVER	Manager
7	53	PROCM_CMPROC_DOM_CMIPSA	Manager
7	54	PROCM_CMPROC_DOM_CONVBJOB	Manager
7	55	PROCM_CMPROC_DOM_CDBSERVER	Manager
7	56	PROCM_CMPROC_SUB_ICPROCESSING	Manager
7	57	PROCM_CMPROC_SUB_CSERVER	Manager
7	58	PROCM_CMPROC_DOM_UMPROC	Manager
7	59	PROCM_CMPROC_DOM_UXSDBSYN	Manager
7	60	PROCM_CMPROC_DOM_UXSFILED	Manager
7	61	PROCM_CMPROC_DOM_DLSPROXY	Manager
7	62	PROCM_FM_AER_DAEMON	Manager
7	63	PROCM_FM_DB_SERVER	Manager
7	64	PROCM_NAMING_SERVICE	Manager
7	65	PROCM_FM_FTSERV	Manager
7	66	PROCM_FM_FTSUCC	Manager
7	67	PROCM_MPCID	Manager
7	68	PROCM_MPCIDLOG	Manager
7	69	PROCM_HISPAD	Manager
7	70	PROCM_REPORTGENERATOR	Manager
7	71	PROCM_REPGENREADY	Manager
7	72	PROCM_DMSIED	Manager
7	73	PROCM_XIESERVER	Manager
7	74	PROCM_COMWINACCESS	Manager

Gr.No.	Al.No.	Alarm Name	Attached to HiPath/ OpenScape system Component
7	75	LOGM_ACTIVITY_TABLE_THRESHOLD	Manager
7	76	LOGM_ERROR_TABLE_THRESHOLD	Manager
7	77	LICM_LICENSE_EXCEEDED	Manager
7	78	HBR_DATA_BACKUP	Manager
7	79	HBR_LOGICAL_ABD	Manager
7	80	HBR_LOGICAL_BUM	Manager
7	81	HBR_LOGICAL_CDB	Manager
7	82	HBR_LOGICAL_CHD	Manager
7	83	HBR_LOGICAL_COMWIN	Manager
7	84	HBR_LOGICAL_HBR	Manager
7	85	HBR_LOGICAL_HBR_MPCID	Manager
7	86	HBR_LOGICAL_HBR_TSYNC	Manager
7	87	HBR_LOGICAL_LAP2	Manager
7	88	HBR_LOGICAL_LOGM	Manager
7	89	HBR_LOGICAL_SSO	Manager
7	90	HBR_LOGICAL_SECM	Manager
7	91	HBR_LOGICAL_UBA	Manager
7	92	HBR_LOGICAL_WEBMIN	Manager
7	93	FM_COMANDFILE_SEND	Manager
7	94	PM_DATABASE_THRESHOLD	Manager
7	95	PM_REPORT	Manager
7	96	COL_FETCH	Manager
7	97	COL_RECEIVE	Manager
7	98	COL_OUTPUT_FILE_PROD	Manager
7	99	COL_FETCH_DEACTIVATED	Manager
7	100	CM_DB_SYNCH	Manager
7	101	SWA_ACTIVATION_FAILED	Manager
7	102	DISK_SATURATION_THRESHOLD	Manager
7	103	SSO_REPLICATION	Manager
7	104	LICM_H300_PORTCOUNT_WARN_REACHED	Manager
7	105	LICM_HP4K_V1_PORTCOUNT_WARN_REACHED	Manager
7	106	LICM_HP4K_V2_PORTCOUNT_WARN_REACHED	Manager

Gr.No.	Al.No.	Alarm Name	Attached to HiPath/ OpenScape system Component
7	107	LICM_HP4K_V3_PORTCOUNT_WARN_REACHED	Manager
7	108	LICM_HP4K_V4_PORTCOUNT_WARN_REACHED	Manager
7	109	LICM_HP4K_V5_PORTCOUNT_WARN_REACHED	Manager
7	110	LICM_PORTCOUNT_EXCEEDED	Manager

D OpenScape 4000 Plugin Rights

The plugin's access rights are integrated into the general access management (see *OpenScape FM Desktop User Guide*).

The description of the individual rights can be found within the tool tips for the corresponding right symbols (tree or submap).

The names of the rights for this plugin begin with the plugin designation *HiPath 4000*.

Index

T

V