

Signaling Manager User Guide

DESCRIPTION

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1 Overview

The information in this document applies to the Signaling Manager product, CNA 403 0874. Signaling Manager is a node management tool that is used to configure and control Signaling Nodes to enable the signaling traffic from/to other signaling nodes in the telecommunication networks.





2 Introduction

The Signaling Manager provides a Graphical User Interface (GUI) and a Command Line Interface (CLI) for the configuration and operation of the Signaling stack. It can be run both as an application and as an applet in a browser.

Signaling Manager is used to create and to save a new configuration and put the stack into operation. The configurations are stored in the local file system or in a remote file system using FTP or SFTP. Both IPv4 and IPv6 protocols can be used as bearers for this purpose. The Signaling Manager user information is available as this document and as online help.

It is highly recommended to read this document before using the system. To achieve optimal usage, section Section 9.1 on page 71 provides additional information regarding the preferred way of working with Signaling Manager.

Note: All the features implemented in the Signaling Manager GUI are also available in the CLI. This is explained in Section 6 on page 49 in this document. It is also possible to use the CLI commands from the Signaling Manager GUI which is also explained in this document in Section 4.3.4 on page 24.

Signaling Manager uses its own configuration file `signmgr.cnf` at start up. Here you can configure the system standard to use, file locations, remote file access, and so on. A detailed description of the parameters in this file is available in the Configuration File Description, see ref [1]. An overview of the available parameters is listed if the help option is used: `signmgrui -h`.

It is also possible to edit the Signaling Manager configuration file from the tool itself using the System Components IMC. More information about using the system components IMC can be found in the Configuring SS7 System Components, see ref [2]

It is very important that the tool is correctly installed for proper operation and interaction with the Signaling stack.

More detailed information and examples about using and operating Signaling manager can be found in the Operating Instructions documents.

2.1 Start up of Signaling Manager

The configuration parameter `online` in the Signaling Manager own configuration, `signmgr.cnf`, decides if the tool will act like a standalone configuration file editor or as a manager of the stack processes.

If the configuration parameter `online` is set to YES, the tool will try to open the active configuration and connect to the stack. The procedure is described below. In this description the files `planned.om.cim` and `active.om.cim` is mentioned.

Both files are of type `.cim` which is the file type that Signaling Manager uses to store the configuration. The definition of planned is a configuration that has been saved but is not set on the current running stack. The active file consists of the configuration that the current running stack is using.

1. Searches for `planned.om.cim` file in the config location directory specified as `config.location` in the `signmgr.cnf` file and loads it if found.
2. If `planned.om.cim` is not found, it will search for `active.om.cim` in the same directory and load it.
3. If either of the above files are found, Signaling Manager will try to establish a connection to the Signaling Stack. The name of the loaded file will be shown in the title bar.

Note: If Enhance Audit Log is enabled, and if there is any `planned.om.cim.auditlog` then the last unsaved changes may be uploaded to the loaded object model, see Enhanced Audit Log. When CLI is used, the unsaved changes will be applied automatically but when GUI is used, you'll be asked about favorite action in a dialogue box.

4. If none of the above files are found, the "New" dialogue will be displayed without trying to establish any connection to the stack.

Note: If Enhance Audit Log is enabled, and if there is any `.auditlog` for the new/saved or opened `.cim` file exists, then the changes may be uploaded to the loaded object model, see Enhanced Audit Log. When CLI is used, the changes will be applied automatically but when GUI is used, you'll be asked about favourite action in a dialogue box.

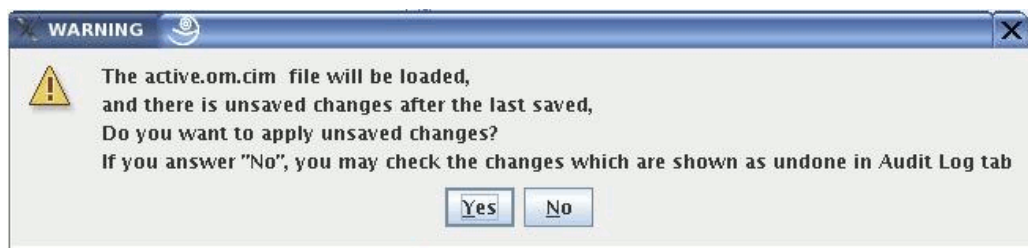


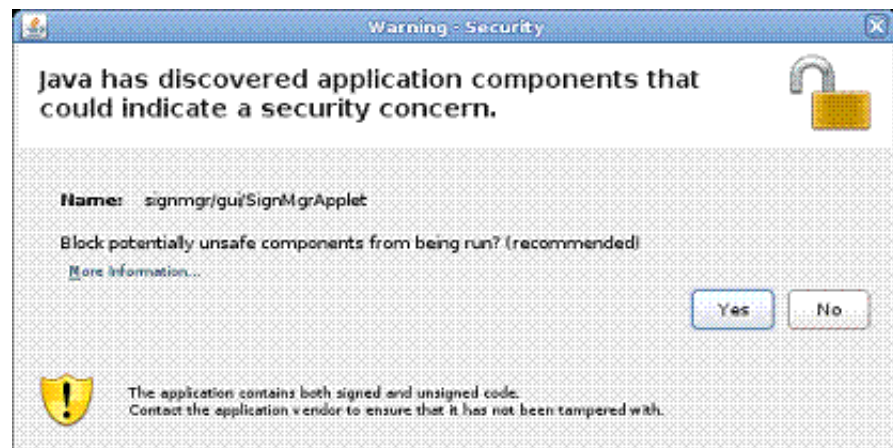
Figure 1 Dialogue box with shows the question regarding the entries in the audit log at startup.

If the configuration parameter `online` is set to `NO`, none of the above will be done and a blank Signaling Manager will be opened. When operating in this mode it is not possible to connect to the stack.



Note: You may launch and start Signaling Manager from a web page. This has been supported by using the Java Web Start technology. It is also possible to run Signaling Manager as applet. For more information see ref [2].

Depending on the installed version of java, when Signaling Manager is started as an applet, the following warning message can be shown:



This warning means that signaling manager sources are signed, but there is the file `signmgr.cnf` which is loaded by the applet and which is placed outside signed jars. This file is placed at separate place in order to be changed without additional efforts. If this warning is shown, it is necessary to press “No” in dialogue “Block potentially unsafe components from being run?” in order to continue work with Signaling Manager. If “Yes” choice is selected in this dialog, Signaling Manager will not be able to load `signmgr.cnf` and the appropriated error message will be shown: “Can't find `signmgr.cnf`”. After Yes/No has been pressed, this choice works up while the browser is opened. So, in order to make another choice in this dialog, browser should be reopened.

2.2 Standards in Signaling Manager

The behavior of Signaling Manager is in several different aspects dependent on a **standard** setting. Example values are ITU or ANSI. The complete set of values is found in Configuration File Description, see ref [1].

An overall system standard is set in Signaling Manager configuration included in `signmgr.cnf` or as a command line option. However, elements on different stack configuration levels such as network level, can be assigned specific standards overriding the system standard. The default value is though a reference to the system standard value.

If standard is not applicable on system level, for example in a gateway configuration between networks of different standards, the standard in `signmgr.cnf` can be assigned a NA value. This value is applicable for system standard only, not for standard parameters on other configuration levels. If system standard is set to NA, standard values must be set (possible in several places) on a



more detailed configuration level to provide all parts of the configuration with a valid standard value.

Changing the value of any occurrence of standard will change the operating conditions for Signaling Manager in the scope of the standard value. In some cases, the user interface is not affected, but in other cases the user is able to see a difference apart from the actual standard value. For example, default values might be changed as well as contents of various lists and descriptions. More specific changes to the behavior depending on standard are described in coming sections.

2.3 File Versions in Signaling Manager

For some modules, Signaling Manager has support for generation (export) of more than one CNF file version. When this is the case the appropriate file version that correspond to the module version has been configured in the settings for Signaling Manager. The properties or relations that are not applicable to the selected file version is automatically hidden in the GUI and CLI. It is however not possible to hide information about these in the documentation that is included with Signaling Manager, so if the documents mentions elements that are not visible then they are not applicable for your Signaling Stack.

2.4 Multi File System Support (MFS)

To be able to use Signaling Manager in an MFS environment the parameter `rio.host.name` in the Signaling Manager configuration file needs to be set to the names of all used hosts. Hosts that should be used in an MFS environment together with Signaling Manager needs to use the same port, protocol, install root, user name and password. If you specify the initial host names with help of the Signaling Manager IMC, you need to restart Signaling Manager for changes to apply. After starting Signaling Manager in MFS mode you can add, remove and temporary inactivate them in runtime. A host can temporary be inactivated by prefix the host name with a "!".

When you run Signaling Manager in MFS mode, write file operations are made against all specified hosts, but read operations are made only from the first specified host. No automatic consistency check is made of the file system. After a change in the host list, like activating a host after it has been inactivated or after adding a host, it is important to do a validation and (eventually) a synchronization of the file systems to be sure they are consistent. A file system validation shall also be made if a file operation fails for some reason.

File transfer in MFS mode can be accomplished using FTP or SFTP. This means that all traffic, for example loading, saving and exporting configurations, can be sent either encrypted or unencrypted over the network. A user can specify the most suitable way by setting `rio.protocol.type` parameter in the Signaling Manager configuration file.

NOTE: Build parameter "useJSch" with value "yes" or target "install_vfs_restricted" should be used to use SFTP protocol type. By default parameter "useJSch" is



set to "yes". If JSch library is not necessary set "useJSch" to "no". To make it easier to distinguish local and remote file systems while using MFS, roots in a file chooser for local and remote file systems are displayed starting with "local:/" and "remote:/" respectively.

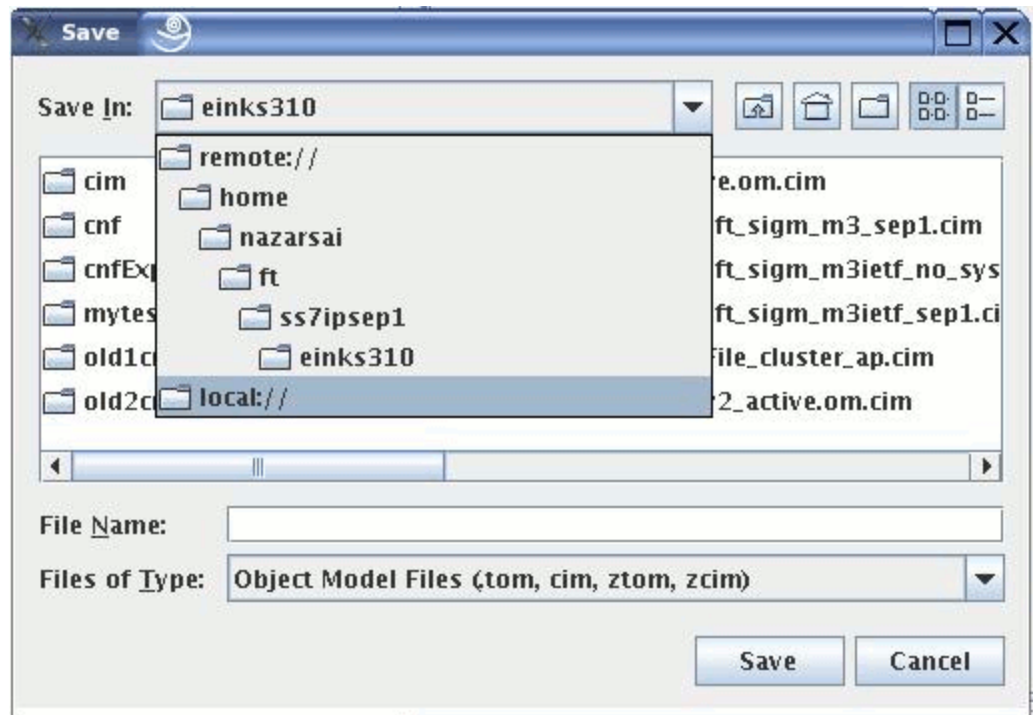


Figure 2 Distinguish between local and remote file systems in a file chooser.

2.5 Alarm Support

Signaling Manager will listen to incoming alarms from the stack processes. Which alarms Signaling Manager will listen to are set in OAM. More information about setting the alarm mask in OAM can be found in the Configuring SS7 System Components, see ref [2]. Alarms are, except from being logged to the UI, also being logged to a file called "sm.alarm.log". To set the location for the log file the parameter `alarm.log.location` is used. The users should have write permissions for `alarm.log.location` folder. To turn this logging off, you can set `alarm.log.quantity` to 0 (zero).

Note: Signaling Manager subscribes, by default, to all ECM alarms. These can be enabled or disabled by setting the "Ecm Alarm Enabled" property in the Signalling Manager configuration. The stack does not need to be restarted in order to activate this modification.

2.6 Multiple Log Daemons Support

It is supported to have multiple log daemons instances when logs from CP instances are stored in separate files. Each log daemon instance is assigned to

collect logs from particular CP instance. To be able to use this functionality via the Signaling Manager, you should configure CP and ECM IMCs in a proper way.

More information about how to do this can be found in the Configuring SS7 System Components, see ref [2]

2.7 Audit Log

Signaling Manager has the ability to log certain user operations to file. A log entry is consists of a time stamp, type of entry and specific information for this entry. The following operations are logged:

- Orders. Both the request and response.
- Stack operations:
 - New process added.
 - Process removed.
 - Process restarted.
 - Stack restarted.
 - Active ECM set.

Logging is executed if the parameter `audit.log.quantity` is set to a non-zero value, the value indicates how many log files which should be rotated. The parameter `audit.log.size` determines the max size of each log file. To set the location for the log file the parameter `audit.log.location` is used. The users should have write permissions for `audit.log.location`. The parameters are found in Signaling Manager IMC.

2.8 Enhanced Audit Log

Signaling Manager has also the ability to log any changes in the Object Model and all of the GUI actions (such as opening the file, sending the order) as a part of enhanced audit logging. Each change (or action, or operation) is an entry in the log and the following entry types are available:

- Property Changed (marked with a white background)
- Reference Changed (marked with a white background)
- MO Added (marked with a white background)
- MO Removed (marked with a white background)
- Operation (such as opening the file, adding/removal the process or host and so on, marked with an orange background)



— Action (sent order or the statistic request, marked with a yellow background)

The log entries are visible as rows in a table in **Audit Log** tab in the **Information** pane when using GUI.

There is the possibility to automatically generate CLI commands sequence from all executed GUI operations (for this it is necessary to enable "View as CLI commands" checkbox).

During the Object Model modification it's also added the possibility to make undo and redo on the audit log entries (which concern Object Model changes). The Undone entries are marked with a light grey background.

After the configuration is saved or applied to the stack all the log entries (concerning Object Model changes) become applied. They cannot be undone and marked with a gray background. The same happens when the other configuration is opened. All the model changed made for the previous configuration become disabled, marked with a gray background and cannot be undone.

The actual (not undone) changes in the Object Model which were done after last saving (or applying to the stack) are also stored in an `.auditlog` file with the same name as the editing `cim/tom` file. This file with the stored changes will be useful if a crash happens during the modification. If an `active.om.cim/active.om.tom` file is modified, the changes will be applied on the `planned.om.cim/planned.om.tom` file and the changes will be stored as above Entry elements in the `planned.om.cim.auditlog/planned.om.tom.auditlog.xml` file. The changes will be stored every 60 seconds.

The other audit log entries (operations and actions) are keeping only during current Signaling Manager session (while the Signaling Manager is opened) and are not stored in the audit log file.

When object model is saved or applied to the stack, `.auditlog` file is removed (since there are no unsaved Object Model changes).

Please be aware about the following scenario: if some audit log entries are undone and after this a new Object Model change is made, all undone entries are deleted from the audit log table.

You may disable this feature by setting the `audit.log.enhanced` parameter to "no" or "off" in the Signaling Manager configuration file.

2.9 Statistics Support

Performance statistics can be received using the **Statistics** tab. It works very similar to the **Actions** except that it receives performance statistics and alarm counters for a module instead of an action result.





3 Using Signaling Manager Help

3.1 Options in Help Menu

The Signaling Manager help menu contains general help options:

- **Contents** – Brings up the Signaling Manager help information including the information in this document in a Web browser.
- **About Signaling Manager** – Brings up release and license information for Signaling Manager.

3.2 Description Tab

A short description of a property, element, action, parameter or an MO, currently having focus, is displayed in the **Description** tab of the **Information** pane. A property gains focus when its input field in the Properties tab is selected. Elements and MOs gains focus when selected in the **Navigation** pane.





4 User Interface

4.1 Main Signaling Manager Window

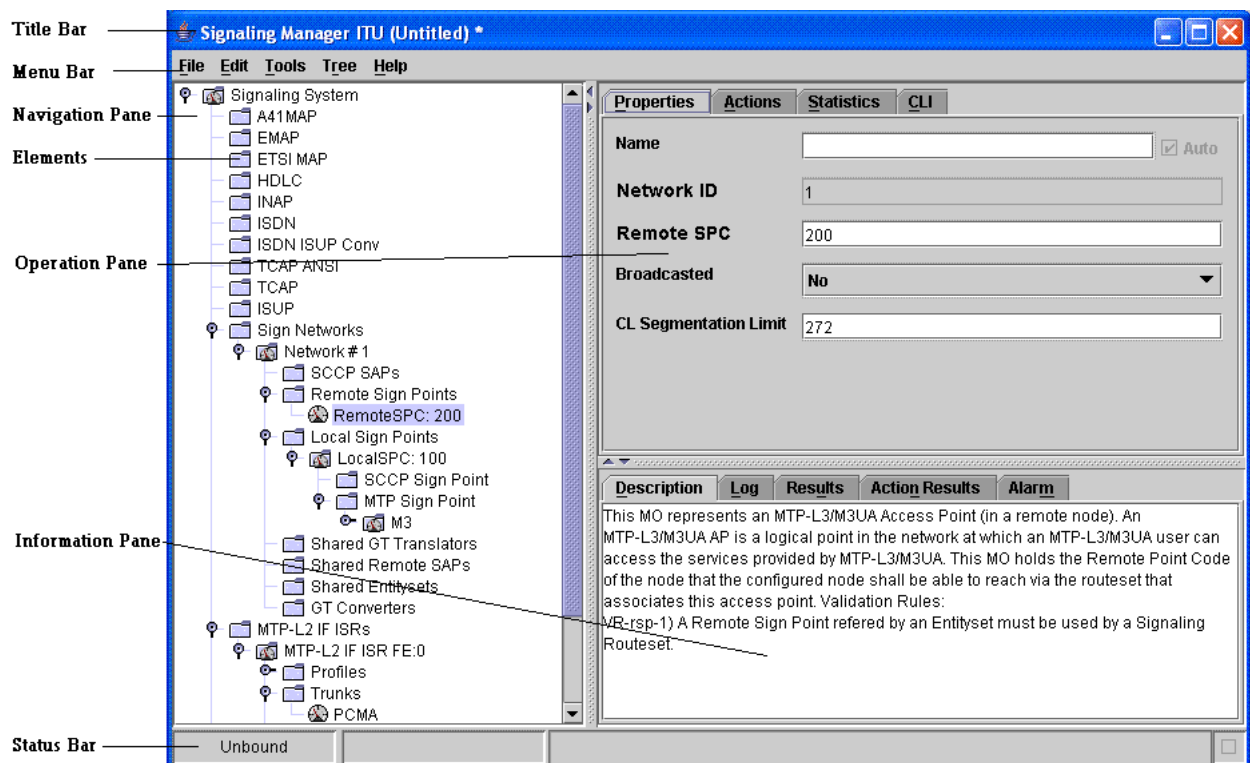


Figure 3 Example of a Main Signaling Manager Window

The main Signaling Manager window is split into the following parts:

Title Bar

Shows the title, system standard and current file name. When something in the configuration has changed, a star (*) is appended after the file name. It is possible to change the title ("Signaling Manager") using the title option.

Menu Bar

Provides access to basic Signaling Manager functions, such as creating, opening, saving and exporting the configurations.

Navigation pane

Contains all **Elements** that make up the currently opened Signaling stack configuration.



Operation pane

Consists of:

- **Properties** tab to view and edit properties, see Properties tab.
- **Actions** tab to choose and perform Actions (Signaling Protocol Layer Orders) for an Element, see Actions tab.
- **Statistic** tab to choose and retrieve counters and statistical information from the stack, see Statistics tab.
- **CLI** tab to perform MML commands, see CLI tab.

Information pane

Consists of:

- **Description** tab for viewing the description of a selected property
- **Log** tab for logging information when debug is enabled
- **Results** tab for viewing the result of a validation or search
- **Action Results** for viewing the result of the performed action
- **Alarm** for viewing current alarms and alarm notifications

Status Bar

Displays status information about stack connection and various process operations.

4.2 Signaling Manager Navigation Pane

The left hand side of the Signaling Manager main window contains the Signaling Manager Navigation pane. It uses a tree like view to show the structure, as a set of Elements, of the **Signaling System** currently loaded into Signaling Manager. The entire configuration of a Signaling Stack is performed by using the **Navigation** pane to add, delete and select Elements that make up the stack configuration.

In Signaling Manager, the Signaling System is a representation of the complete Signaling Stack. The elements in the tree represent the configuration of all the Signaling Protocol Layers. The required elements are added automatically while the other must be added manually.

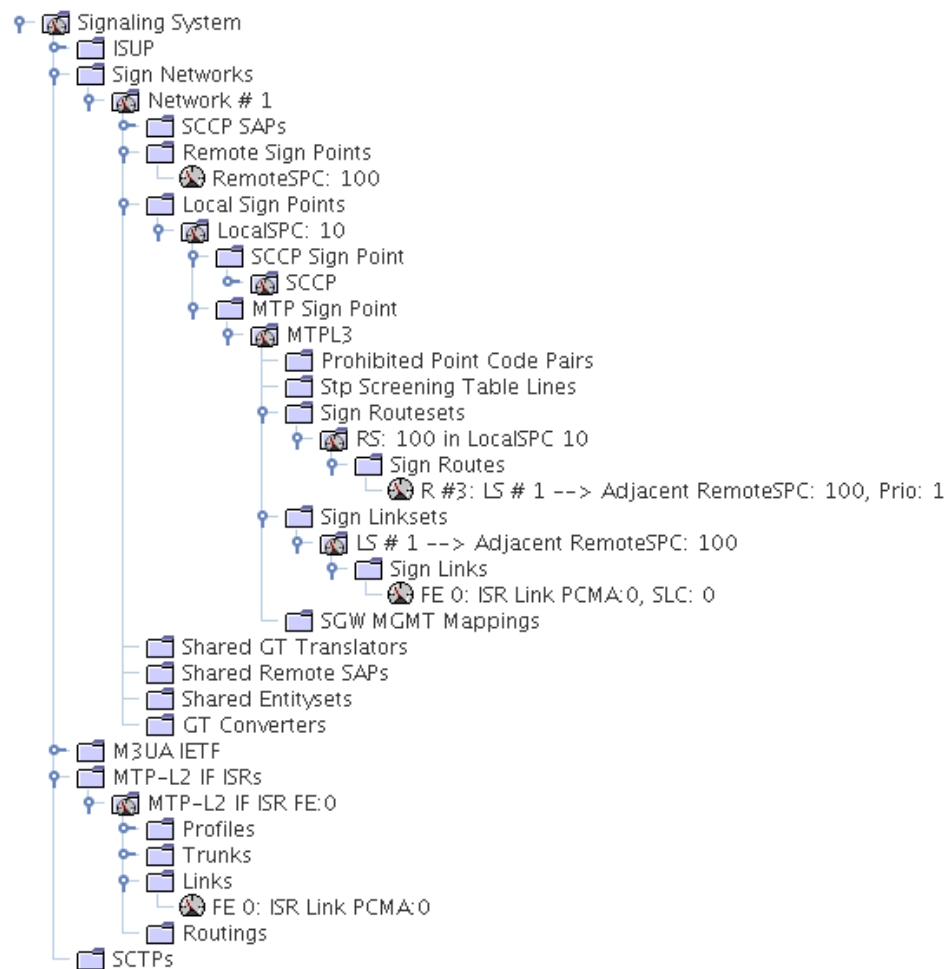



Figure 4 Example of the Signaling Manager Navigation pane displaying some parts of a Signaling System

All Elements in the tree except those shown as  may have sub-elements. Elements containing sub-elements can be expanded and collapsed by left-clicking the symbols next to the them, or by double-clicking the Element itself.

Expand or Collapse in the Element's popup menu can be used to expand or collapse the entire Element subtree. The shortcuts for these functions are **Ctrl+E** and **Ctrl+L**, respectively.

The following tables shows different symbols and notations used in **Navigation** pane:

Table 1 Elements notation and Symbols description

| Symbol | Description |
|--------|--|
| | This is a Group-Element which represents an aggregation relation, used to organize the sub-elements into groups. The grouping elements has no properties and has no other purpose besides acting as containers for other elements. |
| | This is an Element indicating that you can view or edit its properties in a Properties tab, but that it also may contain sub-elements. |
| | This is an Element with no sub-elements. It also indicates that the properties can be viewed or edited in a Properties tab. |
| | The horizontal handle is used to expand folders containing sub-elements. |
| | The vertical handle is used to collapse folders containing sub-elements. |

4.2.1

Element Popup Menu

The actions that is applicable for a specific Element is available in its popup menu: Right-click the element in the Signaling Manager Navigation pane to open this menu. Shortcuts exist for each option.

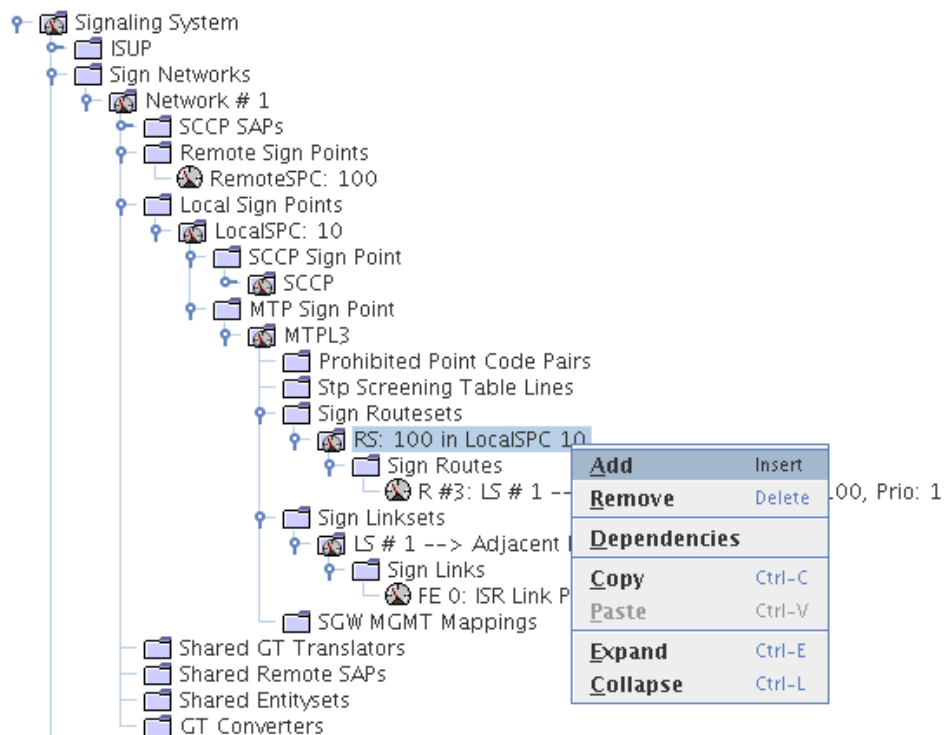


Figure 5 The Signaling Manager Navigation pane shows the popup menu for a Routeset Element



4.2.2 Pop-Up Menu Options

Table 2 The popup Menu Options

| Element Popup Menu Option | Description | Shortcut |
|---------------------------|--|----------|
| Add | <p>When a Group-Element is selected: Adds a new sub-element to the element with default values.</p> <p>When an Element under a Group-Element is selected: Adds a copy of the selected element to the parent.</p> <p>Some properties are automatically set/changed to the next suitable value in order to make the new element valid.</p> | Insert |
| Remove | <p>Removes the Element and all its sub-elements.</p> <p>A confirmation dialog pops up and lists all elements that have references to the element or its sub-elements. These references are cleared (set to none) if the Yes-button is pressed.</p> | Delete |
| Copy | Copies the Element with all sub-elements and their properties values in the buffer for later paste. | Ctrl+C |
| Paste | Pastes the copied Element with all sub-elements. This option is disabled if the buffer is empty or the target location is not suitable for that type of MO. | Ctrl+V |
| Expand | Expands the Element and all its sub-elements. | Ctrl+E |
| Collapse | Collapses the Element and all its sub-elements. | Ctrl+L |

4.3 Signaling Manager Operation Pane

The area on the top-right part of the Signaling Manager window is called the Signaling Manager Operation pane. Here you can view and edit the properties of an Element, selected in the **Navigation** pane tree, by using the Properties tab, choose and perform an action on an Element using the Actions tab and perform MML commands using the CLI tab.

4.3.1 Properties Tab

The **Properties** tab displays all properties (configuration parameters) for a certain Element selected in the Signaling Manager Navigation pane.

| Property | Value |
|---------------------|---|
| Status | N/A |
| Name | <input type="text"/> <input checked="" type="checkbox"/> Auto |
| Node ID | 0 |
| Signaling Link Code | 0 |
| Linkset No | 1 |
| Logical HSN | 0 |
| Logical SDL | 0 |
| L2 Link | FE 0: ISR Link PCMA:0 |

Figure 6 Example of Properties tab for an instance of a M3 Signaling Link

The property values are shown using different techniques depending on their type. Basically, all text strings and numbers are shown in text fields. Properties that can only have a limited number of values are shown in a combobox. Some properties are references to other Elements. These are called Reference Properties. For more details about the different types of properties see Property explained in the terminology section.

When an Element is created, its properties which do not require a user specific value, are assigned default values. In many cases, the default values may work without the need for any changes.

A short help text for the property currently in focus is shown in the **Description** tab of the Information pane.

The text styles used on the Properties tab indicates how the properties can be handled:

- Properties shown with a grey background (instead of a normal white text field), or in a combobox with a grey button, are read only and can not be changed.



- Mandatory Properties, has a larger font size as their display name.
- When Properties' values are not set at all or differ from defaults, their display names are blue-colored.
- When a configuration is in **Reconfiguration Mode**, some properties are changed to Read Only and some can only be increased. A red box is drawn around the property input field to alert the user when it only can be increased.

Note:

- Properties defined as expert are visible in the **Properties** tab if and only if the Expert Mode is activated from Tools menu.
- Some properties are standard-dependent. If these properties have not been set and thus contain a default value, their value might change upon changing the standard since different standards sometimes have different default values. Aspects of standard for a specific property are also displayed in the **Description** tab of the Information pane.

By default, the name property is empty and the checkbox to the right is marked. This default behavior gives the element an auto-generated name based on the values entered in the element. In order to give the element an own unique name it is possible to edit the name field. This has the effect that this name is added to the auto-generated name and they are shown in the GUI. To remove the autogenerated name uncheck the checkbox.

4.3.2

Actions Tab

The **Actions tab** displays all actions available for different Signaling Protocol Modules. In addition, a number of actions apply to the entire signaling system.

The tab consists of four parts: action area, element list, additional parameters and the **Send** button. From the **Action** area, the action is selected. The list of actions can be limited by selecting a specific module. From the **Element** list, the element(s) to which the action is to be applied is selected. The visibility of the third part, the application parameters, depends on the action definition. If applicable, this part is used for specifying additional action parameter values other than the ones defined by the selected element. Finally, the **Send** button performs the action towards the stack.

Information about actions, additional parameters and possible standard constraints are displayed in the **Description** tab of the Information pane when an action or parameter is selected.

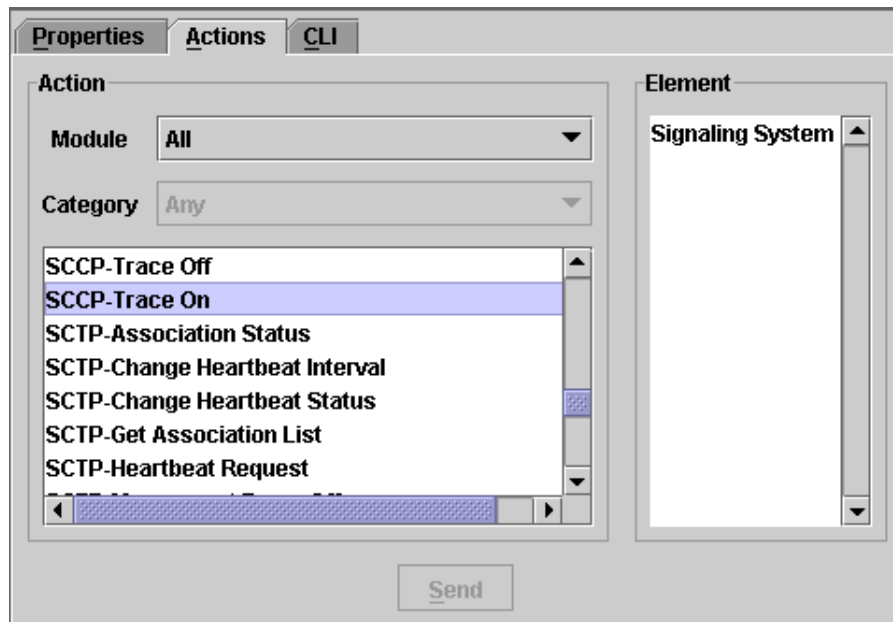


Figure 7 Actions tab without additional parameters

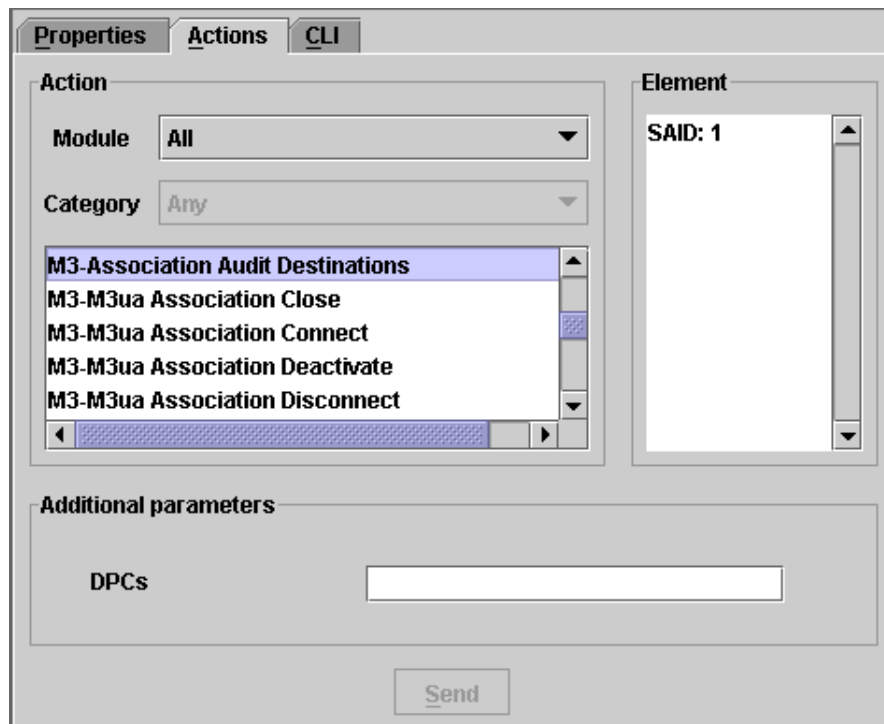


Figure 8 Actions tab with additional parameters

There are two slightly different ways to perform an action. The first alternative is to select an action and then select the element(s) to which it should be applied. The other alternative is to select an element from the Signaling Manager Navigation pane and then select an action from the list of actions applicable to this element. Both alternatives require that two preconditions are fulfilled:



- Current configuration in Signaling Manager matches the configuration used by the stack.
- Signaling Manager is connected to the stack and has status Active (see Section 4.5 on page 33)

The steps to perform an action according to the first alternative are:

1. Open the **Actions** tab.
2. Select an **Action** from the list. The Element list will be updated for the selected action, that is, only elements applicable to the selected action will be shown.
3. Select one or several **Element(s)** from the Element list.
4. Provide values for **Additional parameters** if applicable to the selected action.
5. Click on the **Send** button.

The steps to perform an action according to the second alternative are:

1. Open the **Actions** tab.
2. Select an **Element** from the Signaling Manager Navigation pane. The Element list will display the selected element, and the actions list will display the actions applicable to the selected element. The module selection box will also contain the non-module value `Selected from element` indicating that the action list is limited by the chosen element.
3. Select an **Action** from the action list.
4. Provide values for **Additional parameters** if applicable to the selected action.
5. Click on the **Send** button.

The result of the Action is displayed in the **Action Results** tab of the Information pane.

Note:

- Action are sometimes applicable only to some standards. If such constraints applies, a notification will be displayed. In a case where several **Element(s)** are selected from the element list but only a subset of these are applicable to the selected standard for these elements, the selected **Action** will always be applied to all elements in the subset and a notification will be displayed for all selected elements outside the subset.
- Actions for management of the log levels of Common Part don't make any impact if the used version of CP is lower than R16.

4.3.3 Statistics tab

The **Statistics tab** is divided into two sub tabs; the first also called **Statistics** and the other is called **Polling**. When first entering this tab a panel similar to what is shown in Figure 9 is displayed, that is the sub tab **Statistics**.

4.3.3.1 Statistics

The **Statistics** sub tab displays all statistics and counters available for different Signaling Protocol Modules and is shown in Figure 9. In addition, a number of statistics orders and counters apply to the entire signaling system. This tab is used in exactly the same way as the **Actions** tab, but instead of an result, you receive a counter or a statistical value when pressing the **Retrieve** button. By pressing **Add to polling** button for a statistic, it is added to the list of statistics which will be periodically polled. The view of periodically polled statistics is in the **Polling** tab, see Section 4.3.3.2 on page 22. Retrieval of statistics can only be done when Signaling Manager is in state Active or Bound but adding statistics to polling can be done in any state. More about states in Section 4.5 on page 33. It is also possible to retrieve the statistics per instance by specifying the Instance ID in the **Instance ID** field. By leaving this field empty the total number of statistics value for all instances will be retrieved.

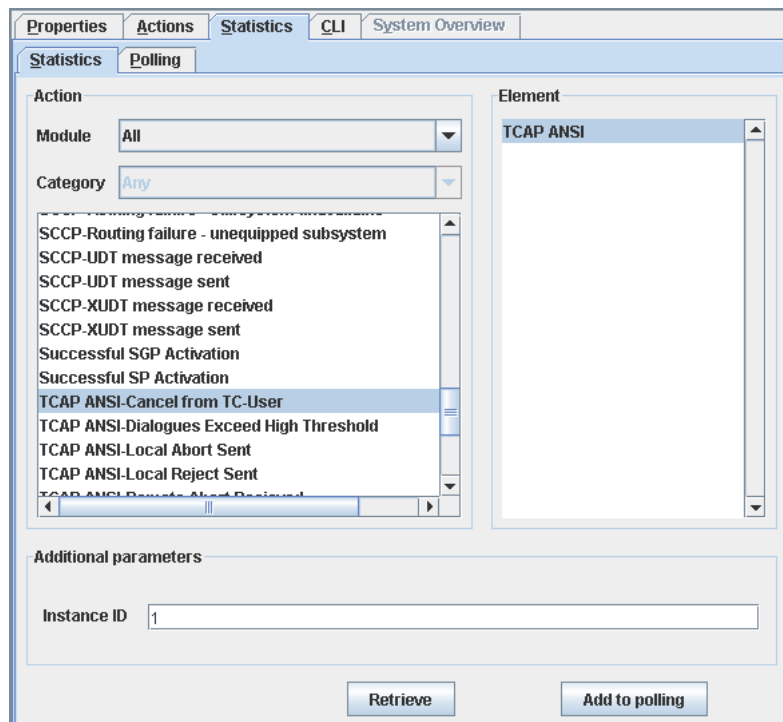


Figure 9 Statistics tab view

4.3.3.2 Polling

The **Polling** tab is used for periodically polling of statistical counters, see Figure 10. The table contains statistics which has been added to polling from the **Statistics**



tab using the **Add to polling** button, see Section 4.3.3.1 on page 22. Each row in the table shows both the counter value as well as the rate. The rate is calculated on the basis of how much the counter has been increased per second during the last interval.

The polling interval and the last update is shown in the top of the panel. The polling interval can be changed in runtime through Signaling Manager configuration inside System Components, see ref [1]. Also be aware that the polling is stopped when the interval is changed.

Pressing **Start** button, which is enabled in Active or Bound state, will start the polling and the statistical counters will be updated periodically with the specified interval. When the **Start** button has been pressed and the polling has started the button will change text to **Stop** and pressing it in this state will stop the polling.

Information about what statistic counters that are polled is included in the cim file and are loaded when the cim file is opened. The polling will though never be active at startup and must be started manually to avoid that the system is loaded by a lot of statistic requests by mistake.

Note: Polling will be stopped automatically if state is changed from Active or Bound, for example if disconnected.

If a row in the polling table is selected and then right-clicked a popup-menu appears with the possibility to remove the selected statistic from the set of polled statistics.

Note: If an element is removed from the tree in the navigation pane, all statistics which depends on that instance will be removed from the polling set.

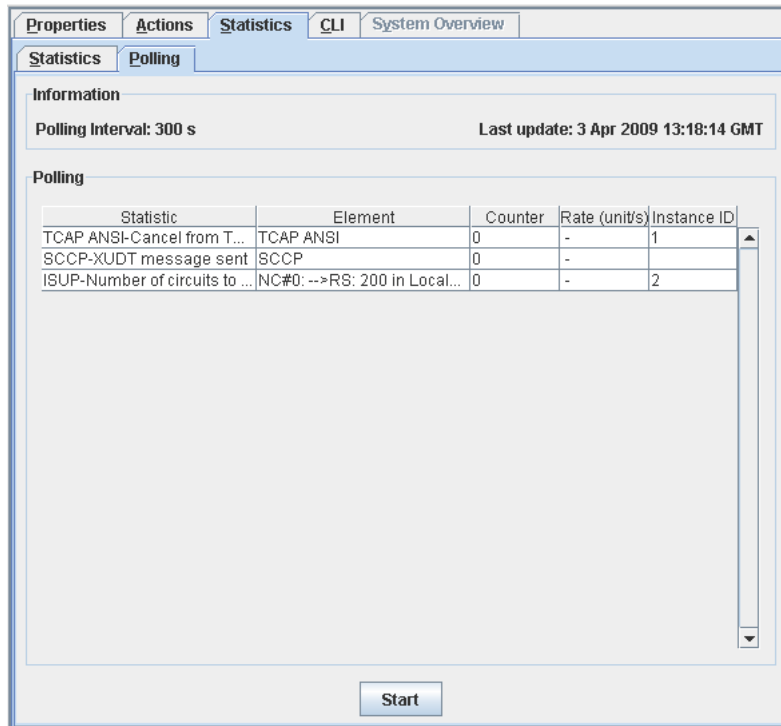


Figure 10 Polling tab view

4.3.4

CLI Tab

This tab displays a command field where you can type the Signaling Manager commands. The result of the commands is displayed in the area below the Command field. Signaling Manager Navigation pane is also updated if the typed command affects the tree structure.

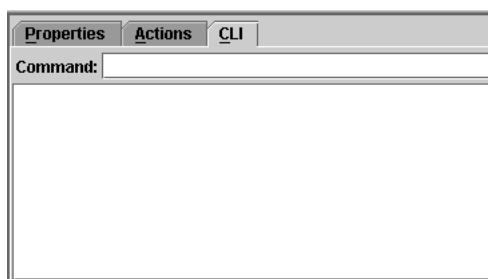


Figure 11 CLI tab

In order to execute one of the available CLI commands within Signaling Manager GUI, you may perform the following steps:

1. Open the **CLI** tab
2. Type the specific command in the Command field using a syntax as `<command>: <arg_1>=<value>, <arg_2>=<value>`, where `arg_n` is an argument to the command.



Note: By typing `help:cmd=<command>` you can get detailed information for a command. See Notation and Features in Section 6 on page 49, to get more information on how a command can be performed. When CLI is used in Signaling Manager GUI, **Ctrl+Space** is used instead of Tab key for completion feature explained in Section 6 on page 49.

A right-click in the Command field trigger a popup menu that consist of three alternatives: Clear, Abort and Load batch. Clear erases all earlier commands from the history field below, Abort stops the current CLI-command, and Load batch starts a new batch job. It is important to use Load batch from this menu because the CLI command “loadbatch” may not be executed from the command-line in the GUI.

4.3.5 System Overview tab

The system overview gives a table-based view of the objects in the configuration tree together with their status. The system overview is divided in **categories** and **groups**. Categories is visualized as tabs and groups as tables inside the categories. Each row in a group table correspond to an **element** in the tree (MO Instance). Below is a list of all categories and their groups:

- Applications Server
 - Local AS
 - Remote AS
- Application Server Process
 - Remote SGP
 - Remote SP
- SSN
 - Remote SSN
- Signaling Link
 - Link
- Signaling Routeset
 - Routeset
- SCTP Objects tree
 - Section 4.3.5.1 on page 28
- M3-Sctp IP path monitor
 - Section 4.3.5.2 on page 29



By default the system overview is disabled. It is enabled through the property **System Overview Enabled** in the Signaling Manager MO **System Components->Signaling Manager**. Inside the same MO the property **System Overview Order Timer** is located, which default value is set to 50. This timer is used to not overload the stack, it sets the number of milliseconds the System Overview should wait when sending orders to initially update all status fields.

The status is updated using orders and alarms. Orders is used to retrieve the initial status for all entries when Signaling Manager is started or when system overview is first enabled. The orders is used to update the status, for example an order is received that a certain link is “Out of service” and the status for that particular link is updated. When the alarm has ceased or been updated with another status the system overview will too. The status column for a MO can have three different colors depending on the meaning of the status:

| | |
|---------------|-----------------------------|
| Green | Everything is working fine. |
| Yellow | Partially working. |
| Red | Not working. |

Consider the links in Figure 12, the one “In service” is green and the one “Out of service” is red.

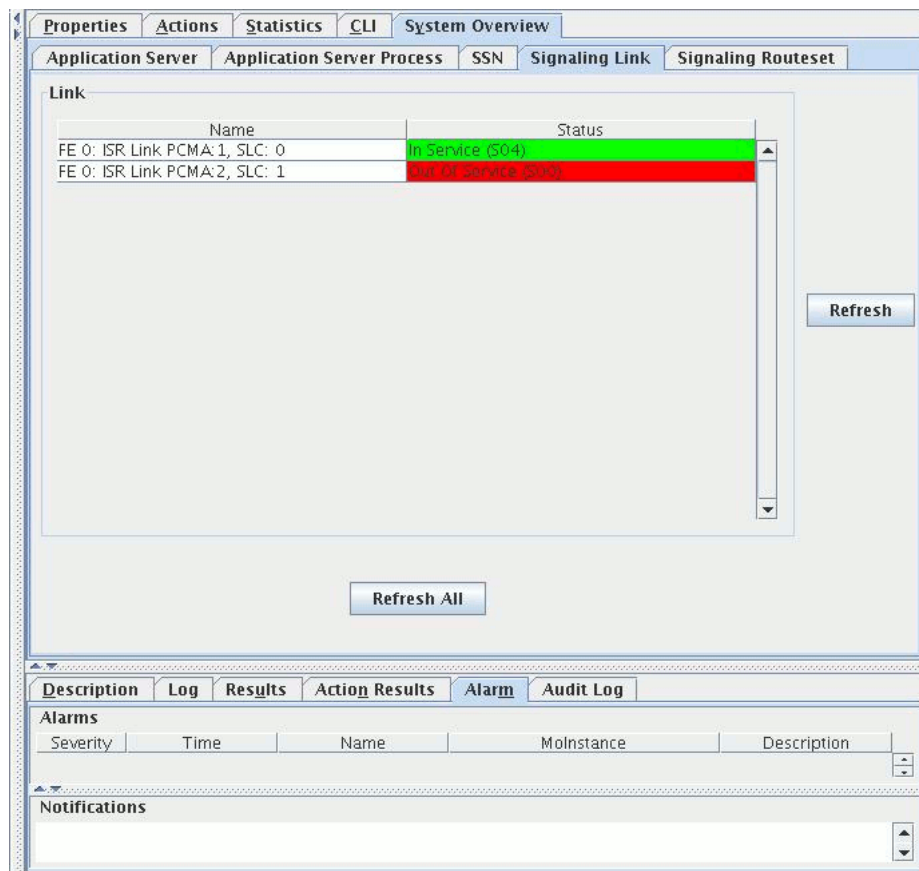


Figure 12 The System Overview tab

By pressing **Refresh** button status of the appropriate group will be refreshed.

By pressing **Refresh All** button status of the groups will be refreshed.

By selecting a row in the table and right click on it a popup-menu appears with the option to **Goto Actions**. This opens the Actions tab and displays actions available for the same MO.

An important step for the system overview to behave correctly is to enable the alarms which the different statuses is reacting upon. How to enable alarms is described in Section 2.5 on page 7. Table 3 shows the alarms which must be enabled for the different groups of the system overview:

Table 3 Alarms and status relations

| Group (System Overview) | IMC(s) | Alarm | Alarm id | Module |
|-------------------------|--------|-----------------|----------|--------|
| Local AS | m3ietf | As State Change | 126 | MTPL3 |
| Remote AS | m3ietf | As State Change | 126 | MTPL3 |



| | | | | |
|-------------------|------------|--------------------------------|-----|-------|
| Remote SGP | m3ietf | Signaling Process State Change | 124 | MTPL3 |
| Remote SP | m3ietf | Signaling Process State Change | 124 | MTPL3 |
| Remote SSN | sccp | Remote SSN Status Change | 42 | SCCP |
| Shared Remote SSN | sccp | Remote SSN Status Change | 42 | SCCP |
| Local SSN | sccp | Local SSN Bind Request | 46 | SCCP |
| Local SSN | sccp | Local SSN Unbind Request | 47 | SCCP |
| Link | m3ietf | Link In Service | 3 | MTPL3 |
| | | Link Out Of Service | 4 | MTPL3 |
| Routeset | m3ietf, m3 | Route Set Failure | 111 | MTPL3 |
| | | Route Set Recovery | 112 | MTPL3 |
| SCTP Objects tree | sctp | Sctp Alarm Objects List Update | 18 | SCTP |

If an alarm is not enabled the status related to that alarm will not be updated. This means that if only a subset of the statuses is interesting only the alarms associated to those need to be enabled, the rest will simply never get updated.

4.3.5.1 SCTP Objects Tree

This tab gives the information on configuration SCTP objects. SM will not update information in objects tree automatically.

The right frame will show properties of currently selected object.

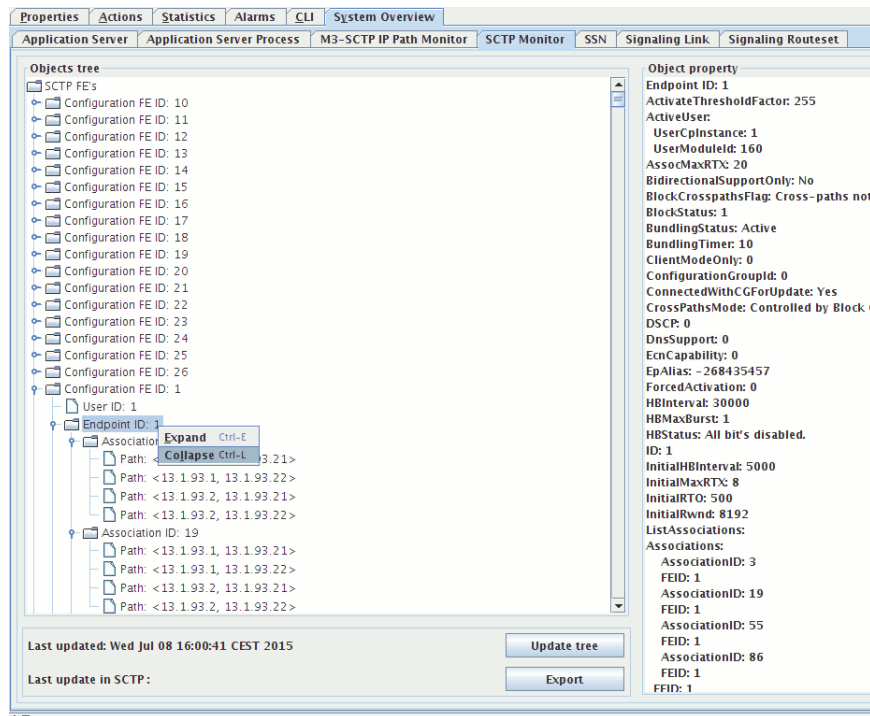


Figure 13 The Sctp Objects tree tab

Sctp objects tree can be exported to sctp_view.xml by "Export" button.

The "Last update in Sctp" field shows time when alarm "Sctp Alarm Objects List Update" has been received.

It is possible to expand/collapse the tree elements through the context menu or by pressing **Ctrl+E** / **Ctrl+L** hot keys.

4.3.5.2

M3 Sctp IP path monitor

This tab gives the information about M3 associations and related Sctp IP paths.

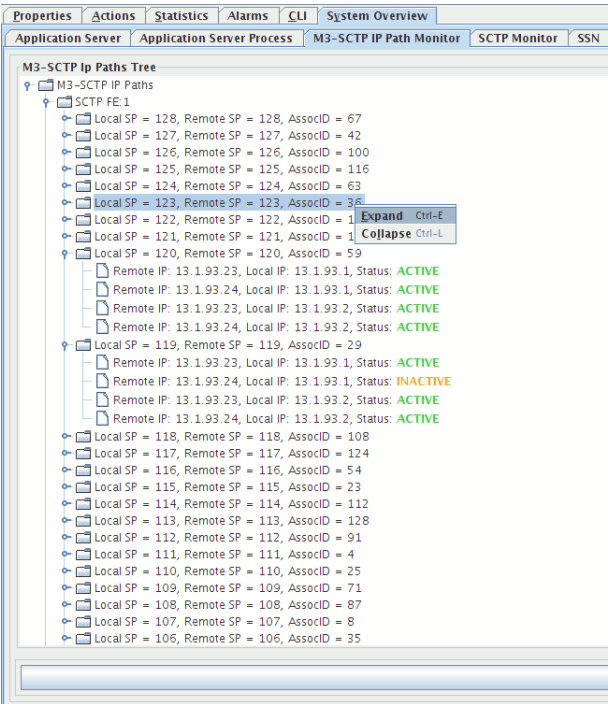


Figure 14 The M3-SCTP IP paths tree tab

The association statuses are colored accordingly to the state.

It is possible to expand/collapse the tree elements through the context menu or by pressing **Ctrl+E** /**Ctrl+L** hot keys.

4.4 Signaling Manager Information Pane

The space on the bottom— right part of the Signaling Manager window is called the Signaling Manager Information pane.

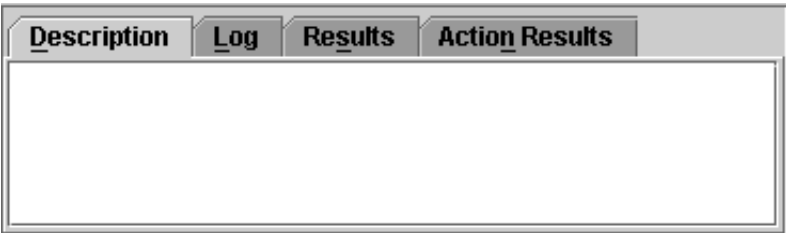


Figure 15 Signaling Manager Information pane

| | |
|--------------------|---|
| Description | Used for viewing the description of the currently selected property, action, parameter, or element. |
| Log | Used for logging information such as errors or warnings. |
| Results | Used for viewing the result of a validation or search. |



Action Results

Used for viewing the result of performed Actions and Counters. Each action result can include several rows of information that is made visible by expanding the action result element. If applicable, a number of elements are included giving additional result information related to the specific action. The last row of information in the action result is the details about the orders performed towards the stack. These are listed as sub-elements to **Order details**.

Action results can be removed one by one using the **Remove** pop-up menu option. **Clear** menu option removes all action results.

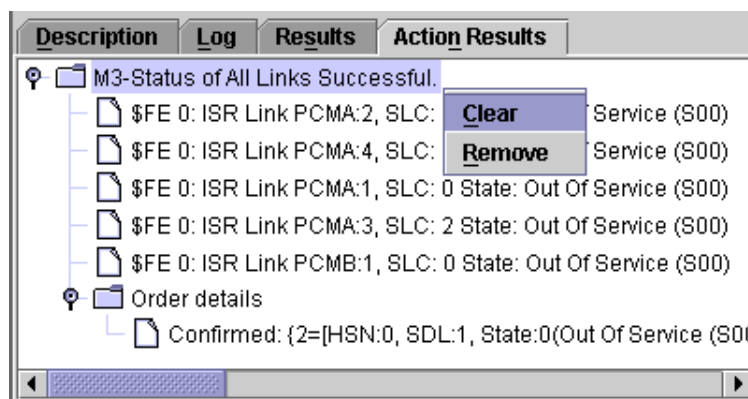


Figure 16 The Action Results Tab

Alarm

This tab is used for viewing incoming alarms and notifications. Active alarms are showed in the alarm table and are updated with a new timestamp when a raise event is received from the stack. This assures that visible alarms are up to date. The presentation of the alarm can vary between alarms, but some information is present for all alarms. First there will be a filled circle that tells which severity an alarm has (see list for possible colors), followed by a timestamp and a reference to the instance object from where the alarm came from. Last is the alarm presentation that will vary depending on the alarm specifications.

List of possible alarm severities.

- Red, **fatal**
- Orange, **warning**
- Blue, **notification**

All alarm events (alarm raise/cease and notifications) are logged in the **Notifications** list. See Figure 17



Alarms and notifications can both be **removed** and **cleared** using the (right click) popup menu options and there is also an option for **goto instance** that will link to the referring element in the navigation pane.

Note: Alarms and notifications are also logged to a file named “sm.alarm.log”. If the CLI is used, this file can be used to view alarm events.

| Severity | Time | Name | MolInstance | Description |
|----------|-----------------|-------------------------|---------------------------------|-------------|
| ● | 24 Sep 09:36:19 | Link Unavailable for UP | FE 0: ISR Link PCMA:2, SLC: 1 | |
| ● | 24 Sep 09:36:19 | Link Unavailable for UP | FE 0: ISR Link PCMB:1, SLC: 2 | |
| ● | 24 Sep 09:36:19 | Low Link Availability | R #3: LS # 1 --> Adjacent Re... | |

| Notifications | |
|-----------------|--|
| 24 Sep 10:16:39 | : Link Available for UP : FE 0: ISR Link PCMB:2, SLC: 3 |
| 24 Sep 10:16:39 | : Link In Service : FE 0: ISR Link PCMB:2, SLC: 3 |
| 24 Sep 09:37:13 | : Remote SSN Status Change : RemoteSPC: 200 SSN: 20 : Status: Allowed |
| 24 Sep 09:37:13 | : Route Set Recovery : RS: 200 in LocalSPC 100 |
| 24 Sep 09:37:13 | : Link Available for UP : FE 0: ISR Link PCMA:1, SLC: 0 |
| 24 Sep 09:37:12 | : Remote SSN Status Change : RemoteSPC: 200 SSN: 20 : Status: Prohibited |
| 24 Sep 09:37:12 | : Route Set Failure : RS: 200 in LocalSPC 100 |
| 24 Sep 09:37:12 | : Link Unavailable for UP : FE 0: ISR Link PCMB:2, SLC: 3 |

Figure 17 Alarm and notifications tab

Audit Log

Used to view any changes related to object model (since modification is started) and all other GUI actions (such as opening the file, adding the process, sending the order to the stack).

| Type | View |
|------------------|---|
| Property Changed | HighThresholdPercentage: 73 -> 72 |
| Operation | Save Configuration |
| Action | ISUP-Trace On |
| Property Changed | LowThresholdPercentage: 40 -> 41 |
| Operation | Set configuration mode of Signaling Manager |
| Property Changed | TrafficLevel_forCongestionLevel1: 5 -> 2 |

Figure 18 Audit Log tab

| Type | View |
|------------------|-----------------------------------|
| Property Changed | HighThresholdPercentage: 73 -> 72 |
| Property Changed | LowThresholdPercentage: 40 -> 41 |
| Property Changed | CLSegmentationLimit: 272 -> 274 |

Figure 19 View only model changes option is enabled

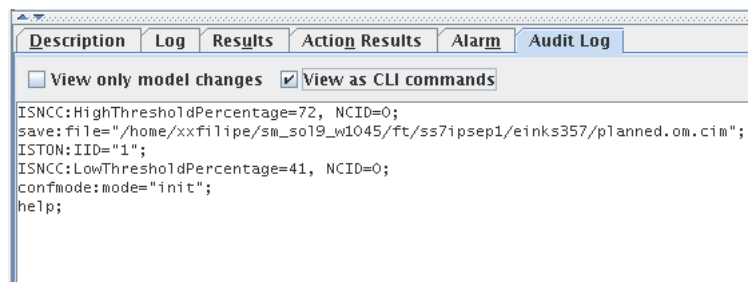


Figure 20 View as CLI commands option is enabled

4.5 Signaling Manager Status Bar

The left-hand part of the Status Bar is used for displaying connection status to stack processes as well as status of various operations to these processes. A more detailed description of how this status is changed is described in Section 7 on page 53.

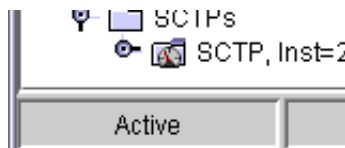


Figure 21 Status Bar showing status Active

Values shown in the Status Bar have the following meaning:

| | |
|----------------------------------|--|
| Unbound | Signaling Manager is not bound to the stack. |
| Binding | Signaling Manager is trying to connect and bind itself to the stack. This operation cannot be aborted but will time out after about a minute. Other parts of the GUI can be used during binding process. |
| Bound | Signaling Manager is connected and bound to the stack but some stack processes are not in state Running. |
| Activating / Reactivating | Signaling Manager is activating the stack processes with the configuration present in the stack file system. |
| Active | All processes are in state Running. |
| Restarting System | The entire stack is restarted. |
| Restarting Process | A single stack process is restarted. |
| Adding Process | A new stack process is added. |

Removing Process

A stack process is removed.

Setting Active Ecm

The stack is started on a new host.

Adding Host

A new host is added.

4.6 Menu Bar

4.6.1 File Menu

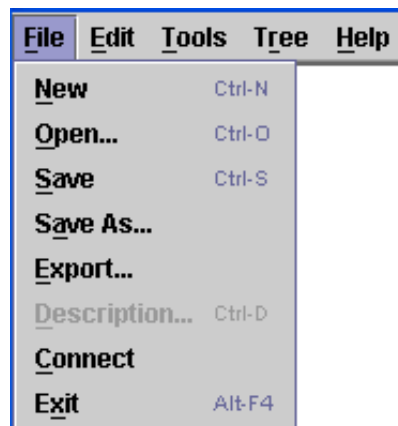


Figure 22 File Menu Options

This menu is primary for handling all sort of file operations, like new, open, save and so on. If Signaling Manager is connected to a remote host by ftp or sftp, you can always reach your local files by specifying a file name with the `file://` notation or choose the local root in the dropdown menu. This could be practical if you want to open a file locally and then needs to save the configuration to a remote host. This feature also works in CLI.

New...

Removes the current configuration to start a new configuration from scratch. If unsaved changes to the current configuration exist, the system will ask if they should be saved first. It will open a dialogue box with the following tabs:

- **Template:** to start the configuration with an existing template.
- **Import CNF:** to start the configuration by reading an existing stack configuration in .cnf ASCII format. For more information see Migration chapter.
- **Blank:** to start the configuration from scratch.

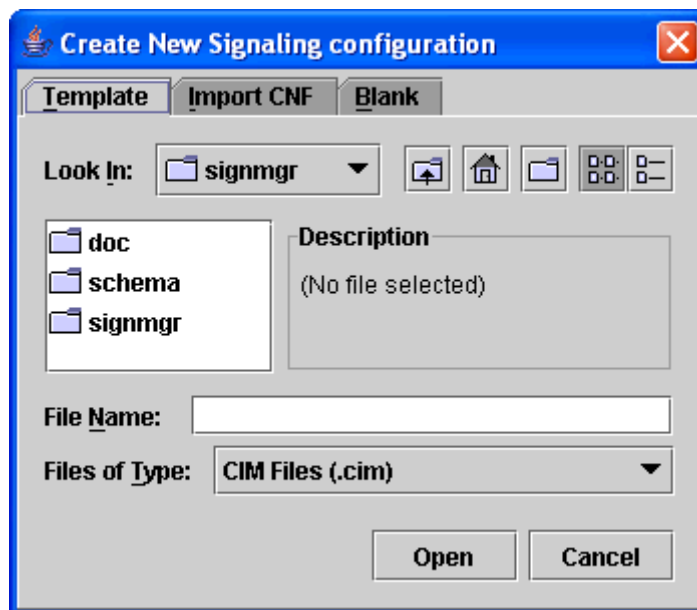


Figure 23 Create New Signaling Configuration dialogue

| | |
|-----------------------|---|
| Open... | Opens a previously saved configuration, that is file with .cim extension. |
| Save | Saves changes to the current configuration, that is file with .cim extension. If the current configuration is "active.om.cim" the file will be saved to the "planned.om.cim". See Export and apply configuration for more information about how these files are handled. |
| Save as... | Saves the current configuration under a new name, that is file with .cim extension. |
| Export... | This option is only available when Signaling Manager is configured for offline operation. Generates a number of CNF format files, that is files with .cnf extension. Depending on the configured Signaling Protocol Modules, one or more cnf files will be generated. This option opens the Export dialogue box where you may select a directory to store all generated CNF files. CNF files are the files being used by the Signaling Protocol modules during the initiation/reinitiation process. |
| | Note: When using Signaling Manager online the Configure button in the Process View is used for applying the configuration. |
| Description... | Opens a dialogue box where you can specify your own description for the configuration. This description is also displayed in the Template chooser to make it easier to find the right template. |

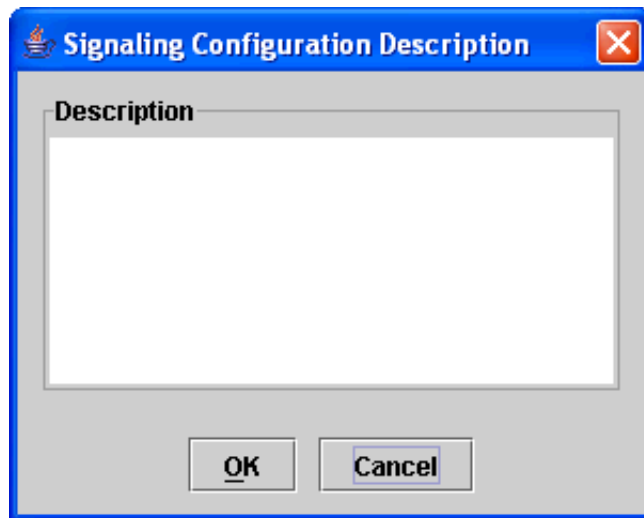


Figure 24 Signaling Configuration Description dialogue

Connect Make a connection to the running stack. This connection uses the IP address and port number defined in the `signmgr.cnf` file.

If it is connected, this option will be changed to **Disconnect**.

Exit Quits Signaling Manager. If there are unsaved changes, the system will ask if they should be saved first.

4.6.2

Edit



Figure 25 Edit menu

Undo change in OM

If the object model is modified since it's loaded and if Enhanced Audit Log feature is enabled, the changes will be shown in the Audit Log Tab of the Information Pane. These changes can be undone by selecting this option in Edit menu. You can also use **Ctrl+Z** keys to undo. The undone entry is shown with a gray background in the Audit Log Tab.



Redo change in OM

If a change is undone in the modified object model, you may select this option to redo the latest undone entry. You can also use **Shift+Ctrl+Z** keys to Redo the last undone entry. When an undone entry is redone, the background color is changed back to normal again in the Audit Log Tab.

Validate

Checks the values of the configuration properties, aggregation relations and references to see if the configuration is valid. Signaling Manager also have validation rules that secures a consistent configuration. These rules are both validating on system level to see that the configuration between modules are correct as well as internal module prerequisites are fulfilled.

Note: Since some validation rules depends on standard, the validation result based on one standard value might differ from the result based on another standard value.

The result of the validation is displayed in the **Results** tab of the Information pane. See Figure 26

By selecting an entry in the **Results** tab, focus will be set on the related property or element where you may correct the error. You can press **F12** or just click on the next entry to jump to the next issue. **Shift+F12** is used to go back to the previous one.

Some errors supports the **Quick Fix** option. A description of this option is shown as a tool tip if the mouse cursor hovers over an entry. By right-clicking the entry it is possible to perform the quick fix for the selected entry or all entries that supports it.

Note: Some problems may cause more than one validation error.

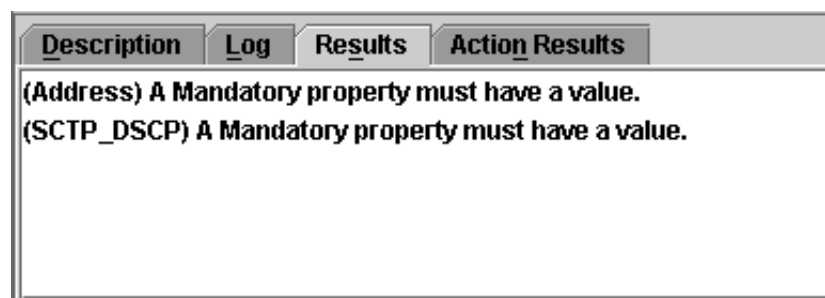


Figure 26 The result of the validation of an example configuration



Find Elements...

This is an **Advanced Search Option** and it may be useful to quickly find a specific element. A dialogue box will be opened where you should type a value you want to find, select search mode and search options.

Found elements will be listed in the **Results** tab of the Information pane. By selecting an entry in that tab, the corresponding element is selected in the navigation pane. You can use **F12** to go through the found instances.

Note: See detailed description of this option in Section 4.6.2.1 on page 38

Find Property...

This option is useful to quickly find a specific Property if you are uncertain where to find it. A dialogue box will be opened where you can type a property name or part of it. The search stops after the first hit. Example of a search criteria: Code. In this example, the Signaling Link Code property of an instance of SignLink MO will gain the focus and you will be able to quickly editing its value.

Find Next Property

Press **F3** or **Find Next Property** in the menu to jump to the next property that matches the search criteria. Example: Logical as search criteria will find both Logical HSN and Logical SDL in the SignalingLink MO.

4.6.2.1

Find element dialog

Advanced Search Dialog makes it possible to find instances and properties using three different search modes.

Text

In this mode elements will be found if they anyhow contain the substring entered in the **Find field**.

For example if you want to find property 'Max Links Used' you could just enter 'link' and press **Search button**.

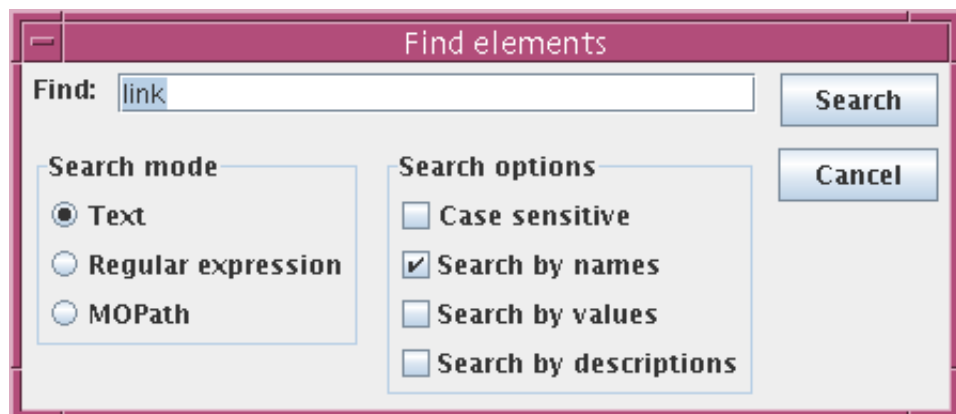


Figure 27 Find element dialog example

Regular expression

This mode is equivalent to **Text** mode except of input string in the **Find** field is considered as a regular expression (standard Java regexp format) and thereby element strings (names, values, descriptions) are compared against this regexp during the search.

For example if you want to find the same 'Max Links Used' property you could use the `".*link.*"` regular expression.

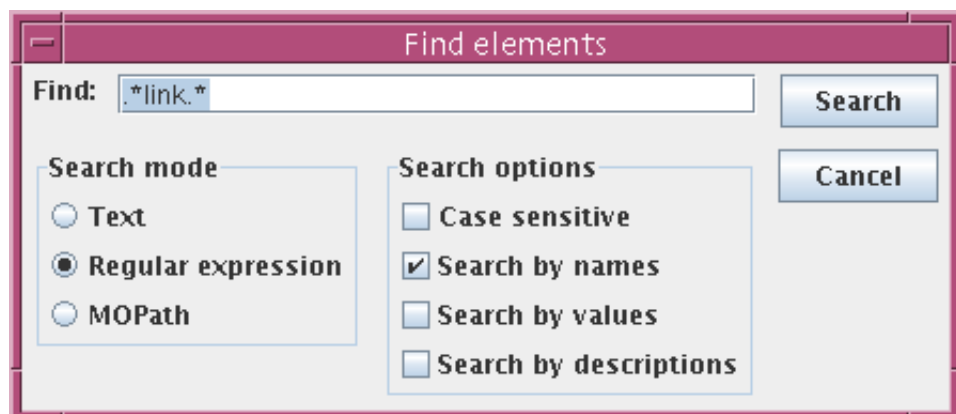


Figure 28 Find element dialog example

MOPath

This mode allows to find elements following a certain syntax. This syntax is described in Appendix 1.

For instance if you want to find all 'NniSaal' instances with 'MaxLinksUsed' property equal 3 you should use the following MOPath query: `"//NniSaal/[@MaxLinksUsed=3]"`.

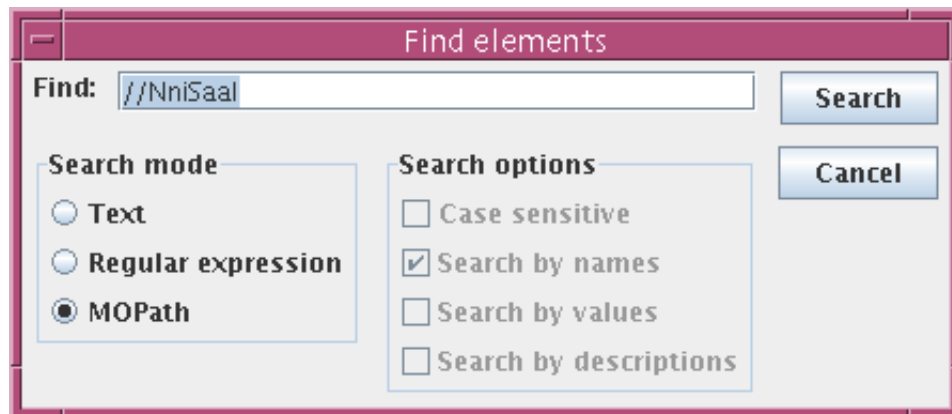


Figure 29 Find element dialog example

Before the search you can also choose what search options do you want to use (not applicable for MOPath mode).

Case sensitive This option defines whether or not search mechanism should apply case sensitivity during strings comparison.

Search by names Check for coincidence in names of instances and properties.

Search by values Check for coincidence in values of properties.

Search by descriptions Check for coincidence in descriptions of instances and properties.

Note:

- If none of "Search by..." options is selected **Search button** is inactive.
- If **Find field** is empty **Search button** is inactive.
- **Search dialog** saves the last state (input string, mode, options) during the search attempts.

The result of the search will be shown in the **Results** tab of the Information pane. You can use the **Replace all** pop-up menu item on one of the result entries to change the value of the same property for all found instances of the same **MoClass** as the selected item.

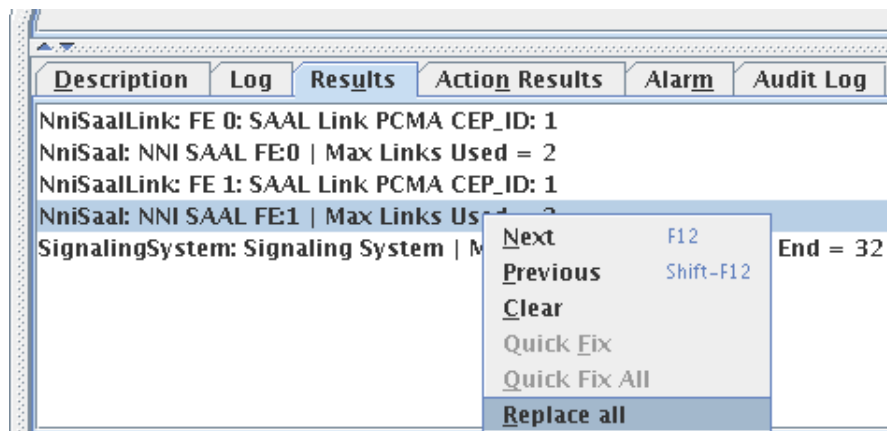


Figure 30 Results tab

Note: **Replace all** item is only active for found properties which are not read-only.

When you select **Replace all** item the following dialog will appear, where you should enter the new property value.

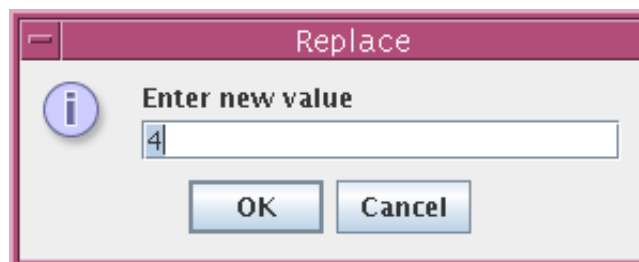


Figure 31 Replace all dialog

The entered value will then be partly validated and if there are any errors (wrong type, enum range) the error message will appear and the replacement will not be done.

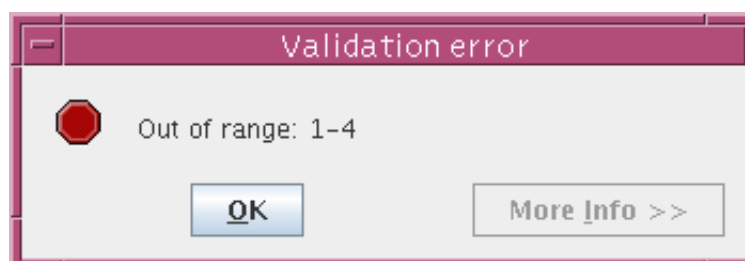


Figure 32 Validation error dialog

Note: Not all validation rules are covered by this check. General validation procedure is still required.

If there are no validation errors the replacement will be performed. But if some of the properties which are about to be changed are read-only or non-reconfigurable their values will not be changed and the warning message will appear.

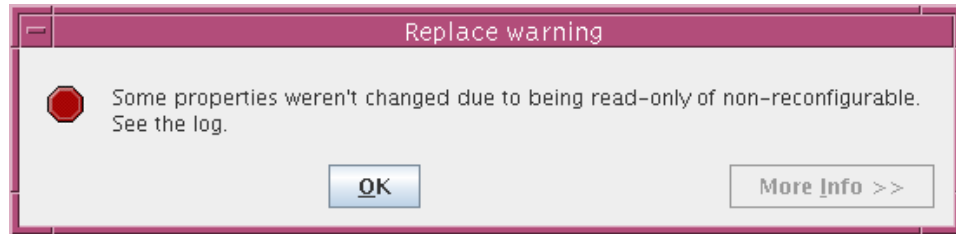


Figure 33 Replace warning dialog

Properties which weren't changed will be logged in the **Log** tab of the Information pane.



Figure 34 Log tab

4.6.3

Tools

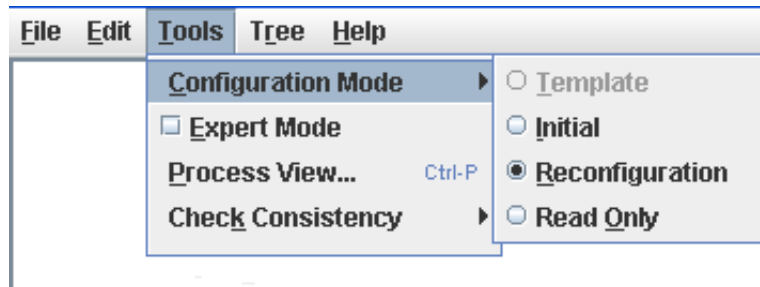


Figure 35 Tools menu view



Configuration Mode

Used to set the configuration in **Initial**, **Reconfiguration** or **Read Only** mode.

- **Template:** Turns off input field validation to allow any text to be entered as property value. This option is only available when the Signaling Manager is in offline mode. The mode is useful for creating template configuration files. Property values, that must be defined before applying the configuration to the stack, should be set to a text instruction about what value to fill in.
- **Initial:** Used when making changes that requires the stack to be restarted.
- **Reconfiguration:** Only the reconfigurable properties are enabled for modification and the rest are visible but disabled. Properties that are configurable but may only be increased or decreased, will be identified by an additional red box around their input field. The “increase only” properties cannot be decreased from their current value. If you accidentally increase a value you must change to **Initial** mode to change it back, but only if you haven't configured the stack with the increased value yet. The “decrease only” properties does not have any validation for them and it is up to the user to keep in mind the previous value used by signaling stack before any changes.
- **Read Only:** All the properties are locked for changes. Useful when monitoring the stack using Actions, to avoid making changes by accident.

Note:

- Changing to or from **Initial** mode will bring up a dialog, warning about the possible risks associated entering or leaving this mode; Changes to non-runtime reconfigurable properties is allowed in **Initial** mode but a restart of the stack may be necessary for them to take effect.
- The Configuration Mode also controls the lock-file. When in Read Only mode no lock-file is created, the other two modes require that a lock-file exists. See also the `read.only` parameter that controls whether to start as Read Only by default or not.



Expert Mode To hide or view the expert properties for any modification. Expert properties are properties which normally a regular user does not need to edit.

Process View Opens Signaling Stack Process View dialogue box where you can perform various process handling operations. See Process Handling Section 7 on page 53 for more details.

Check Consistency Checks the consistency of **CNF Files** or **Active OM File** by calculating the checksum of the files and comparing with the checksum values stored in the files.

The menu item **CNF Files** find all config files (located in export directory), which were manually edited or in some other way altered, outside the control of Signaling Manager.

The menu item **Active OM File** find the changes made in the opened active configuration since the last reconfiguration.

File System Validation Checks the MFS hosts for inconsistencies between the file systems (for example missing files or file differences). If the validation fails then the **File System Synchronization** tool can be used to correct any errors. This tool is only available in a MFS environment. For more information about MFS see Section 2.4 on page 6

File System Synchronization This tool can be used to synchronize one host with others, that is all files from the master will be copied to the chosen destinations. This scenario can arise if the **File System Validation**, for some reason, fails or if a new host has been added. Multiple destinations can be selected if there are more than one host that has inconsistencies the synchronization. This tool is only available in a MFS environment. See Figure 37. For more information about MFS see Section 2.4 on page 6.

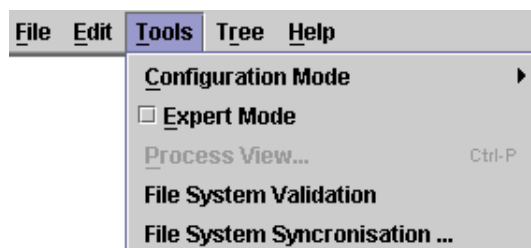


Figure 36 Multi host configuration menu

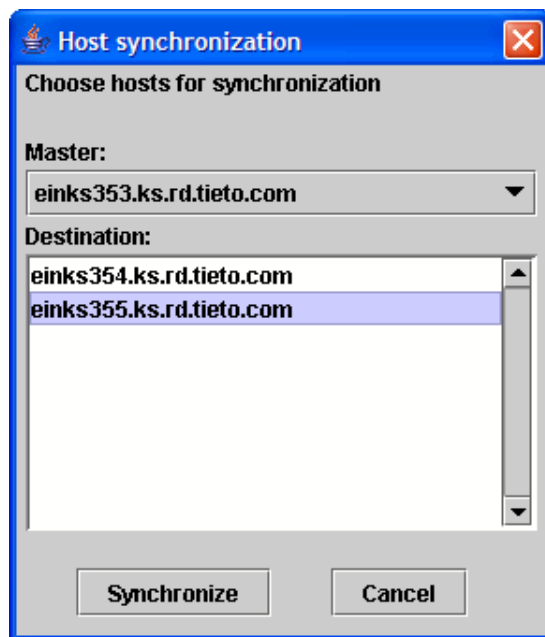


Figure 37 Synchronization tool

4.6.4

Tree Menu

Add

This option is enabled when an Element or a Group-Element in Navigation pane is selected. A new instance of the element will be added to the tree.

Remove

Removes the selected element.

Collapse

Collapses the selected Element and all its sub-elements.

Expand

Expands the selected Element and all its sub-elements.

4.6.5

Help Menu

Contents

Brings up the table of contents for the help system in a web browser where you can navigate through this User Guide and other Signaling Manager related information.

About Signaling Manager

Brings up a window displaying copyright and version information for Signaling Manager. The **More Info >>** button displays a list of supported signaling stack protocol modules and also the parameters settings used by the Signaling Manager at startup.





5 Shortcuts

5.1 Alt - Mnemonic Options

Underlined Mnemonic characters is used to access functions without using the mouse. The character is used as a short-cut together with the **Alt** key. These underlined characters are visible in the labels in menus, tabs and buttons.

Examples of these are:

- Alt+F: File
- Alt+F: File; Alt+E: File->Export...
- Alt+E: Edit
- Alt+E; Alt+E: Edit->Find Element...
- Alt+P, Alt+A, Alt+D. Alt+L, Alt+U, Alt+N, Alt-C, Alt-R: Used to swap between the tabs of the Operation pane and the tabs of the Information pane.

Note: Mnemonic options are applicable only if the focus is in an appropriate context for the function.

5.2 Ctrl - Shortcuts Options

Some functions are available regardless where the focus is in Signaling Manager. **Ctrl** key and the mnemonic character identified in the options in GUI are used for these functions. Example of some of these are:

- Ctrl+N: File->New...
- Ctrl+O: File->Open...
- Ctrl+S: File->Save
- Ctrl+D: File->Description...
- Ctrl+W: Edit->Validate
- Ctrl+F: Edit->Find Property...
- Ctrl+P: Tools->Process View...

One specially useful option is the “Rotate focus” shortcut (Ctrl+R) that moves focus between the Signaling Manager Navigation pane and the Operation pane

5.3 Function Keys (F1-F12)

The following Function Keys are used for specific purposes in Signaling Manager:



| | |
|------------------|--|
| F1 | Help->Contents |
| F3 | Edit->Find Next Property |
| F12 | Selects the next result entry, displayed in the Result tab of the Information pane. |
| Shift-F12 | Selects the previous result entry. |

5.4

Desktop Specific Keys

| | |
|--------------------------|--|
| Arrows | Used to navigate through the elements in the Signaling Manager Navigation pane, or the properties in the Properties tab. It can also be used to navigate through the history in the CLI command field. |
| Ctrl+R | Used to rotate the focus between the Signaling Manager Navigation pane tree and the Operation pane. |
| Space | Used to open the list of available options when a property using combobox or a reference property is selected in the Properties tab. |
| Page Up/Page Down | Used to scroll up and down the properties (five properties at a hit) in the Properties tab. |



6 Command Line Interface (CLI)

6.1 Overview

The CLI supports the same functionality as the Graphical User Interface excluding change of “key” properties. These “key” properties are used in order to find the instance which should be changed.

On top of providing a shell that accepts MML commands it is also possible to run the tool in batch mode. In batch mode it reads a file containing a set of MML commands and executes them in the order they appear in the file.

All supported commands can be divided into three groups.

- Create and modify Configuration.

When configuring from the CLI, the same principle is used as from the GUI in terms of create and modify MO instances. For each MO in the tree there are create command, modify command, delete command and a print command.

- Invoking Actions.

All actions are tied to a specific MO.

- Basic Signaling Manager functions.

Miscellaneous commands such as creating, importing, opening, saving and exporting the configurations.

Note:

- In order to be able to recognize the commands for a module, they starts with the initials for that module. For example SS is the initial for Signaling System which is used for all commands defined for Signaling System, TC is used for TCAP, SC for SCCP, M3 for M3.
- When SM is started using CLI it is very important to load a proper .cim file that contains the same configuration as used in the running stack. If they mismatch you may get a strange and misleading information from for example `procp` command. To do this, use one of the following ways:

- `signmcli -om.file="file.name.cim"`
- `cli> open: file="file_name.cim"`



6.2 Starting the CLI

The CLI is started using the `signmcli` script whether it shall be run in batch mode or in interactive mode. In order to start in batch mode, pipe the file with MML commands to the script.

Interactive mode: `signmcli`

Batch mode: `signmcli < <mml_file> or cat <mml_file> | signmcli`, where `<mml_file>` is a file containing all the commands.

Note: It is also possible to load batch files from within the CLI using the `loadbatch` command.

6.3 Notations and Features

The following notations are used when a command is explained using the help on a command:

Table 4 CLI notations

| Notion | Name | Description |
|--------|------------------------|--|
| [,] | Optional — all or none | It means that it contains optional arguments due to [] notation and either every one of the parameters specified within [] separated by comma must be defined or none of them in order to be able to perform the command. Example: [IID,TR,TS] in the M3SLI:LN0,SLC,[LPC],[LPC],[IID,TR,TS] command. |
| (,) | Required group | It means every one of the parameters within the parentheses separated by comma must be defined in order to be able to perform the command. Parentheses make the parameters as a group to indicate that the specified group is needed when the group is used within other notation, for example as { (,) (,) } |
| { } | One of | It means that one of the arguments within { } separated by must exist in order to be able to perform the command. |



| Notion | Name | Description |
|-----------|--------------|--|
| {[],[]} | At least one | It means that at least one of the arguments identified in [] within { } and separated by comma must exist in order to be able to perform the command. |
| [{ }] | At most one | It means that it contains optional arguments and due to { } one of the arguments within { } separated by must exist to perform the command. |

The following features are useful when using CLI

| | |
|-----------------------|---|
| Completion | Tab key can be used to complete your typed input to get the possible matches. If only one single match is found, you can still press Tab key to complete the command with possible arguments. If the selected argument has a predefined set of values, by pressing the Tab key, the possible values will be listed to select from. |
| History | Up and Down arrows keys are used for command history to go back to the previous or to the next executed commands. |
| Editing | Left and Right arrow keys together with Backspace and Delete works as expected in an editor. Moreover, Ctrl-A can be used to move to the start of the line and Ctrl-E to move to the end. Ctrl-K can be used to cut out everything from the cursor to the end of line, and Ctrl-Y to paste it back again. |
| Print commands | A print command for an MO generates both a create and a modify command for all elements that match the command arguments. The create command consists of all parameters that was needed to create this MO and the modify command has all parameters included in the MO. The expert mode determines which parameters to include in the printout. |
| Help command | A complete online help-system is available through the help-command. Enter the command <code>help: cmd=help</code> to get more information about this. |

For more information about the available commands you may use the “CLI Command Descriptions” references in the Signaling Manager Help, <installation dir>/doc/index.html.



6.4 CLI Naming Conventions

The majority of Signaling Manager CLI commands consist of five characters, although exceptions from this rule exist when it comes to basic management functions such as open and save configuration files. In order to understand these five character commands, some general naming conventions apply.

- The first two characters reflect the module to which the command applies.

Examples: SS is the initial part of commands for Signaling System, TCAP commands start with TC and SCCP commands start with SC.

- The last character reflect the operation. To achieve similarities with older applications related to Signaling Manager functionality, commands used for creating things ends with I (for initialize). The same reasons apply to modify and delete operations. Modification commands ends with C (for change) while delete operations ends with E (for end). Commands printing information generally ends with a P.

Examples:

TCAPI - creates a TCAP configuration

TCAPC - modifies an existing TCAP configuration

TCAPE - deletes an existing TCAP configuration

TCAPP - prints the current TCAP configuration

6.5 Standard Value in CLI

The standard value is used by the CLI to determine if a CLI command is applicable or not. Applicable commands uses the standard value to determine the set of parameters and their value ranges since some parameters and/or value ranges might not be applicable for a certain standard. If a CLI command or command parameter is not applicable for the selected standard, an error message with the current standard constraints will be displayed.

The CLI on-line help will be given based on the system standard set in `signmgr.cnf`. If the system standard is set to value NA, descriptions will be given for all standards, useful when running multi-standard configurations.



7 Process Handling

Signaling Stack processes are managed from the Process View dialogue box which is opened when the Process View option in the Tools menu is selected.

For versions, earlier than OAM R3 and CP R18, the dialogue box consists of two parts: Stack Processes and a number of buttons for different types of operations on the Signaling Stack processes.

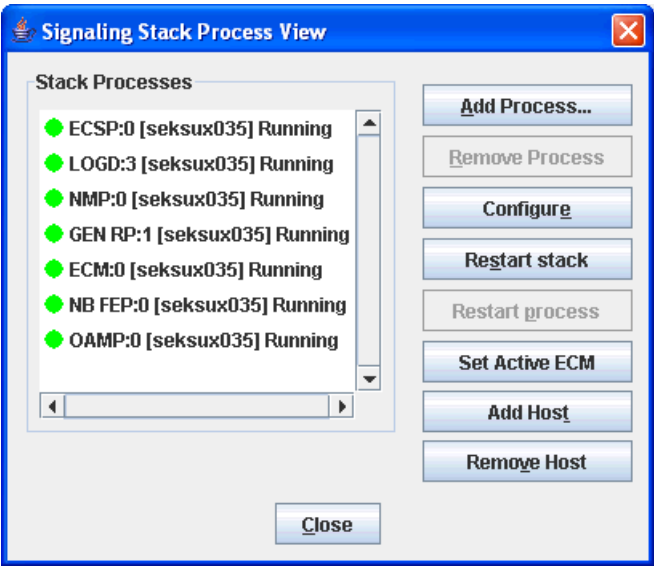


Figure 38 Old Process View Dialog

For versions starting from OAM R3 and CP R18, the dialogue box consists of the following parts:

| | |
|-----------------|---|
| Stack Processes | List of the available processes. |
| Triggering Type | Pane that contains information about stack and local triggering types. |
| Process Modules | Pane that provides information about modules' log levels, trace settings and message filtering. |
| Menu bar | Bar that provides access to available operations on Signaling Stack processes through three menus: Stack, Process and Trace Settings. |



Quick access buttons

Set of buttons, located under the menu bar and providing quick access to operations of configuration, restarting stack, adding, removing and restarting processes.

Also it is possible to use hot keys. You can find required combination in the proper menu, opposite to the required menu item.

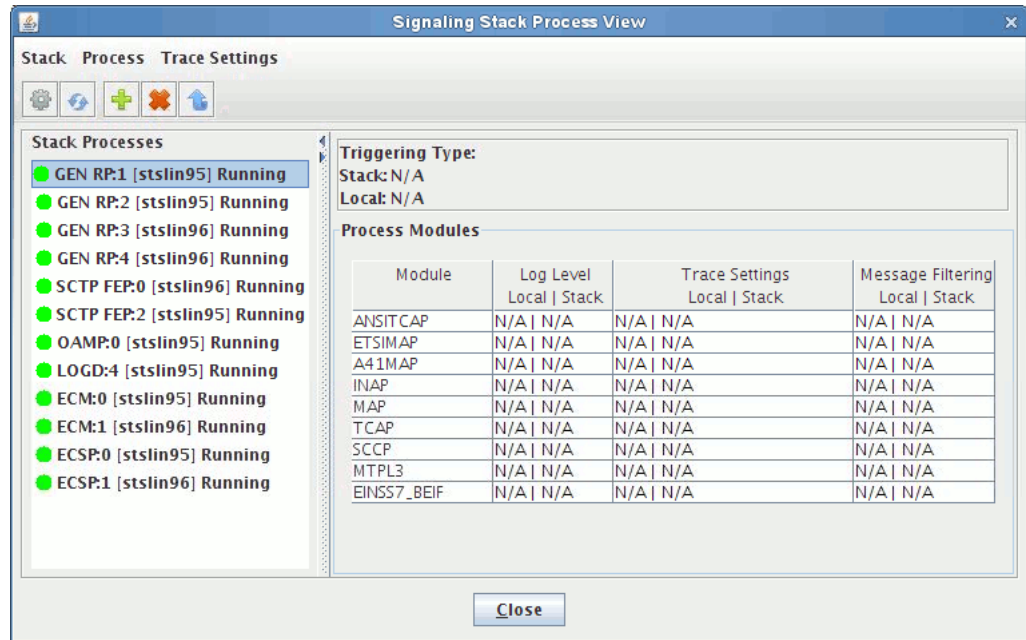


Figure 39 New Process View Dialog

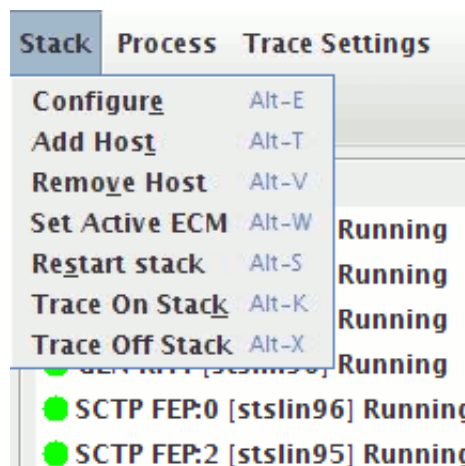


Figure 40 New Process View Dialog Stack menu

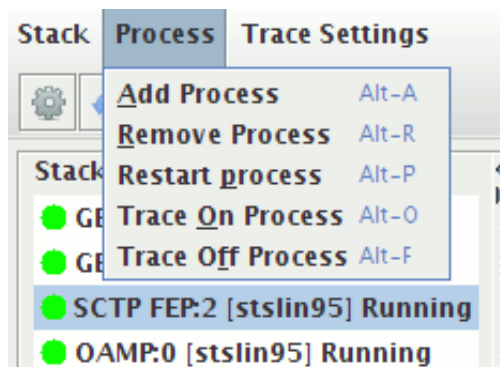


Figure 41 New Process View Dialog Process menu

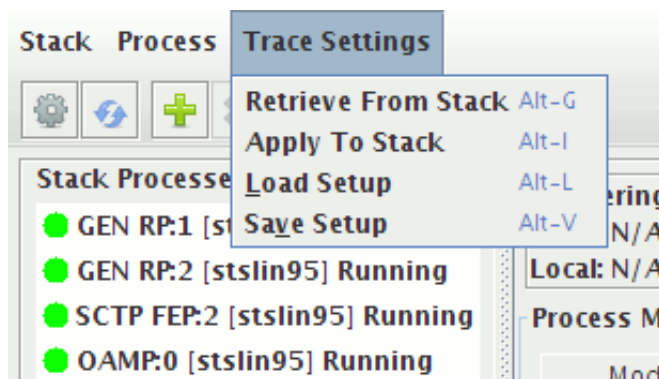


Figure 42 New Process View Dialog Trace Settings menu

The process list is automatically filled with the current stack processes when connected to the stack (see **Connect** menu option in File menu). If not connected or if there are no stack processes, the list will show a No process info available message. Each process in the list will be prefixed with a colored dot indicating the process status. A green dot indicates a running process, a yellow dot typically indicates a process being idle or in a reconfiguration state. A red dot indicates that the process is not working, for example being blocked, terminated or down. The process state and host name where the process is running are also shown as a text after each process identification. Apart from displaying the process states, the process list is used for selecting a process on which to perform an operation.

The old version of Process View Dialog contains buttons to the right of the process list, representing a number of process-related operations. These operations are:

| | |
|-----------------------|--|
| Add process... | Adds a new AP, BE or FE process to the system. See Section 7.1 on page 56 for details. |
| Remove Process | Removes the selected AP, BE or FE process from the set of running processes. See Section 7.2 on page 59 for details. |
| Configure | Apply the configuration to the stack including all processes using the current configuration in Signaling Manager. See Section 7.3 on page 60 for details. |



| | |
|------------------------|--|
| Restart stack | Stops and restarts all stack processes including ECM and automatically reconnects to the stack |
| Restart process | Stops and restarts the process selected in the process list. |
| Set Active ECM | Switch the host on which the active ECM, OAM and NMP processes are running. See Section 7.4 on page 60 for details. Note: The Set Active ECM operation will require a manual connect to the restarted stack processes using Connect menu option in File menu . |
| Add Host | Adds a new host to the system and possibility to start processes on it . See Section 7.5 on page 61 for details. |

All operations except for **Configure** require that the application is in status Active (see Section 4.5 on page 33). **Remove** and **Restart Process** also require that a single process is selected in the process list.

In a new version of Process View Dialog those operations were moved to the menus. Also were added new operations with traces. In Stack menu:

| | |
|------------------------|--|
| Trace On Stack | Sets trace settings level to the stack to ON. |
| Trace Off Stack | Sets trace settings level to the stack to OFF. |

New items In Process menu:

| | |
|--------------------------|--|
| Trace On Process | Sets trace settings level to the process to ON. |
| Trace Off Process | Sets trace settings level to the process to OFF. |

New version of Process View Dialog also contains new menu Trace Settings. It includes:

| | |
|----------------------------|--|
| Retrieve From Stack | Retrieves trace settings from the stack. |
| Apply To Stack | Applies trace settings to the stack. |
| Load Setup | Opens file chooser dialog and allows to choose and load trace settings file. |
| Save Setup | Opens file chooser dialog and allows to save trace settings into file. |



7.1 Adding a Process

In the old version of Process View Dialog adding a new process to the signaling system is done from a separate dialog displayed after pressing the **Add Process...** button. In the new version it is done by going to Process menu and pressing **Add Process** there.

Add Signaling Process

Host ID: ss7-iv-vm43

Process Group: Log

Process Class: SCTP FEP

☐ Application

Instance ID:

☐ Back End

Instance ID:

☒ Front End

FE Configuration: SCTP FE0

Instance ID:

☒ Reconfigure stack

☒ Start all links and associations

OK Cancel

Figure 43 Add process dialogue box for a front end process

To add any new stack process, some pieces of information must be provided. Common to all new signaling processes are:



| | |
|----------------------|---|
| Host ID | Name of the host ID on which the process shall start. The host must be predefined in the <code>ecm.xml</code> file. This file is located in the same directory as the stack configuration files. If the ECM IMC is loaded and used for configuring ECM, the Host ID is chosen from a combo box where the values are taken from the ECM configuration. |
| Process Group | Name of a start sequence group also predefined in the <code>ecm.xml</code> file. If the ECM IMC is loaded and used for configuring ECM, the Start sequence group is chosen from a combo box where the values are taken from the ECM configuration. |
| Process Class | Name of a Class also predefined in the <code>ecm.xml</code> file. If the ECM IMC is loaded and used for configuring ECM, the Process Class is chosen from a combo box where the values are taken from the ECM configuration. Only process classes whose instance types are AP, RP and FEP are visible in the combo box list of items. |

7.1.1 Adding a Front End Process

Adding a front end stack process requires the following steps to be performed:

- Create a new front end configuration in the Signaling Manager Navigation pane.
- Connect to the currently running stack if not already done.
- Open the Add Process dialogue box to enter the common process information.
- Select a process class using necessary instance type to enable the Front End radio button. There are 3 types of FE Process: FEP, SCTP_CONTROL and SCTP_SERVER. FE process types SCTP_CONTROL and SCTP_SERVER are used for Multi process SCTP and requires that DistributedEndPoint property was enabled.

Note: Only one SCTP Control will be supported and it will have an Instance ID=0. SCTP_CONTROL and SCTP_SERVER are not used simultaneously with the FEP Instance Type

- Select the front end configuration from the FE Configuration combo box.
- Optionally uncheck the **Reconfigure stack** checkbox to avoid that the entire stack is reconfigured with the configuration currently present in Signaling Manager. Instead only the front end configuration used by the new process will be exported and the new process started.

Note: It is important that a full reconfiguration is performed later to make the configuration in Signaling Manager consistent with the configuration in the stack.



- Optionally uncheck the **Start all links and associations** checkbox if the links and associations shall be manually started later. For example after the new front end has been verified to work properly. This option is only available if the **Reconfigure stack** checkbox is checked.
- Press **OK** to add the new process.

7.1.2 Adding a Back End Process

Adding a back end stack process requires the following steps to be performed:

- Connect to the currently running stack if not already connected.
- Open the Add Process dialogue box to enter common process information.
- Select a process class using instance type RP to enable the Back End radio button.
- Signaling Manager will assign first free id for instance. If it is needed, instance id could be updated with new value from pool of free one.
- Press **OK** to add the new process.

7.1.3 Adding Another Custom Process

Adding a custom process requires the following steps to be performed:

- Connect to the currently running stack if not already connected.
- Open the Add Process dialogue box to enter common process information.
- Select a process class using instance type AP to enable the Application radio button.
- Signaling Manager will assign first free id for instance. If it is needed, instance id could be updated with new value from pool of free one.
- Press **OK** to add the new process.

7.2 Removing a Process

Removing a process in the old version of Process View Dialog is performed by selecting the process from the process list and pressing the **Remove** button. The processes are neither reconfigured or restarted as a consequence of this operation. In the new version it is done by going to Process menu and pressing **Remove Process** there.

Note:

- It is strongly recommended to remove an FE from the configuration and then verify before removing the process. If the configuration still is consistent after the configuration changes, then remove the process. This is important to avoid traffic disturbances since links defined in BE processes usually is affected.
- It is not possible to remove the NMM process nor adding it.

7.3 Configuring a Stack

Pressing the **Configure** button in case you use old version of Process View Dialog or choosing **Configure** in Stack menu in case of new version will use the entire Signaling Manager configuration and generate new stack configuration files (cnf format) in the location where the stack processes reads their configuration information from. For details regarding the configuration file export, see Section 8 on page 65.

7.4 Setting Active ECM

If the ECM and all stack processes must be moved to another host, the move is performed by setting the active ECM host to another value.

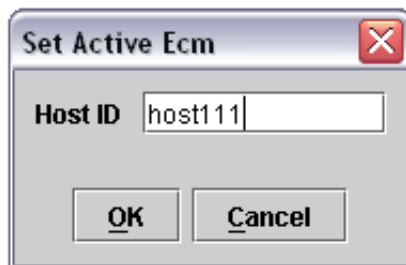


Figure 44 Host ID dialogue used when setting new active ECM.

Setting a new host for ECM and stack processes requires the following steps to be performed:

- Press the **Set Active ECM** button in **Process View** dialog in case you use old version of Process View Dialog or choose **Set Active ECM** in Stack menu in case of new version to display the **Set Active ECM** dialog.
- Enter the name of the host on which the stack shall start.
- Press **OK** to perform the move.

All processes will now be terminated and new processes will be started on the new host.

- If reconnect to the new stack did not happen automatically, it could be done manually by using the **Connect** menu option in **File menu**.

**Note:**

- To be able to connect to the stack on the new host, the IP address must be present in the list of CP Manager IP addresses in Signaling Manager configuration file.
- Signaling Manager assumes that the old and new hosts use the same file system location for configuration files. No implicit export or reconfiguration operations are performed by Signaling Manager when setting a new active ECM.

7.5 Adding a Host

Adding a new host to the signaling system is done from a separate dialog displayed after pressing the **Add Host** button in case you use old version of Process View Dialog or pressing **Add Host** in Stack menu in case of new version.

Figure 45 Add host dialogue box for a front end process

Host

Name of the host ID which will be added and on which the process in the Stack Processes shall start.



| | |
|----------------------|--|
| Pre script | Pre-script configuration parameter for new host in ECM configuration. |
| Post script | Post-script configuration parameter for new host in ECM configuration. |
| Process Group | Name of a start sequence group also predefined in the <code>ecm.xml</code> file. If the ECM IMC is loaded and used for configuring ECM, the Start sequence group is chosen from a combo box where the values are taken from the ECM configuration. |
| Process Class | <p>Name of a Class also predefined in the <code>ecm.xml</code> file. If the ECM IMC is loaded and used for configuring ECM, the Process Class is chosen from a combo box where the values are taken from the ECM configuration. Only process classes whose instance types are AP, RP, FEP, SCTP_CONTROL and SCTP_SERVER are visible in the combo box list of items.</p> <p>Depending on the instance type of the selected Process Class in this list, different radio button panels will be enabled.</p> |
| Check boxes | <p>The Reconfigure stack and Start all links and associations check boxes might be set if you want to reconfigure the stack and start all links and associations directly after host is added and the processes are started on.</p> <p>Note: These check boxes have no effect if it is not any Front End process added into the stack process list.</p> |

Stack Processes

This section of the Add Host dialogue box is used to collect the list of processes which is needed to be started on the new host. You may define Application, Back End and Front End processes, then by pressing on the **Add** button, the process will be added to the list of stack processes.

The following steps are performed by Signaling Manager during "Add Host" operation when **OK** button is pressed:

- ECM configuration is updated with information about a newly added host.
- CP configuration is updated with new IP-address for CP-Manager if IP-Alias for CP-Manager is not used. To enable this usage the property `cp.address.aliased` is to be set to "yes" or "on".
- Signaling Manager configuration is updated with a new remote host name specified in the property `rio.host.name` if MFS is used.



- All updated configuration is distributed to all remote hosts including the newly added one.

The start of processes on the newly added has to be done manually since Signaling Manager doesn't do it automatically. After that the information about new processes will be visible in the **Process View** dialog.

7.6 Removing a Host

Removing a host from the signaling system is done from a separate dialog displayed after pressing the **Remove Host** button in case you use old version of Process View Dialog. If you use a new version, go to Stack menu and choose **Remove Host** there.

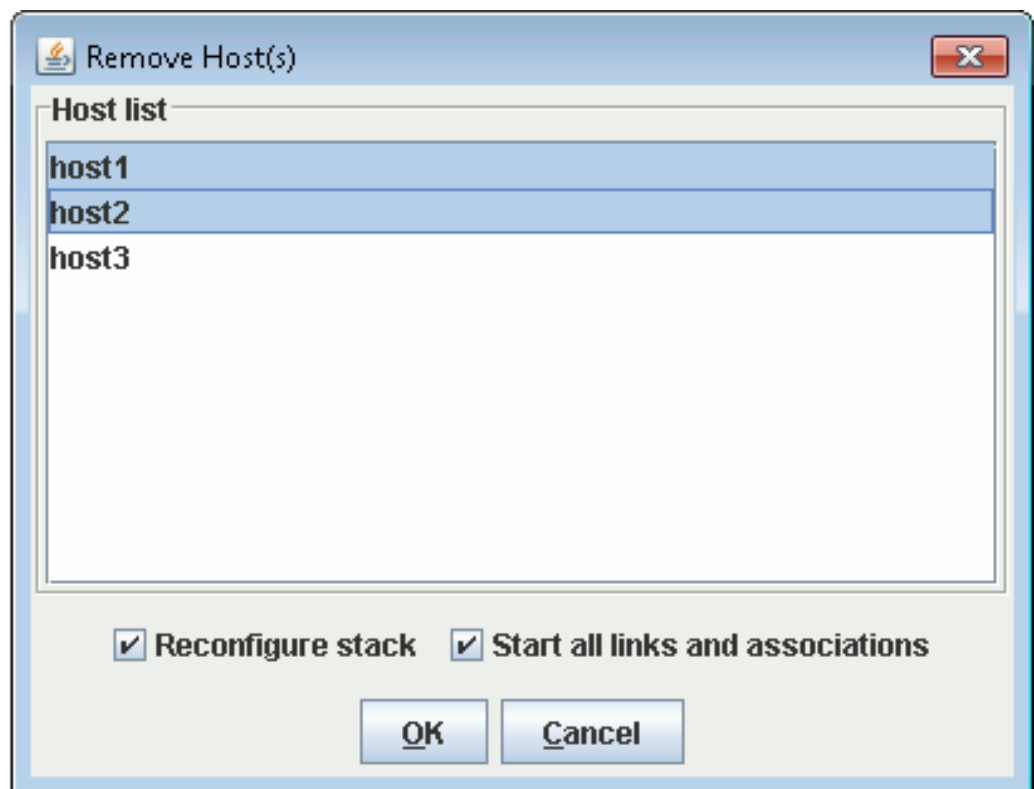


Figure 46 Remove host dialogue box

| | |
|--------------------|---|
| Host List | A list of configured hosts in signaling system. It is possible to select more than one host for removal at a time. |
| Check boxes | The Reconfigure stack and Start all links and associations check boxes might be set if you want to reconfigure the stack and start all links and associations directly after host is removed from the system. |

The following steps are performed by Signaling Manager during "Remove Host" operation when **OK** button is pressed:



- ECM configuration is updated. Selected hosts are removed.
- CP configuration is updated. IP-address for removed hosts deleted from CP-Manager if IP-Alias for CP-Manager is not used. To enable this usage the property `cp.address.aliased` is to be set to "yes" or "on".
- Signaling Manager configuration is updated. Appropriate remote host name specified in the property `rio.host.name` is removed if MFS is used.
- All updated configuration is distributed to all remote hosts.
- `ECM_RECONFIG_req` sent to force ECM read updated configuration.



8 Export and Apply Configuration

This chapter describes how to apply the configuration changes in the Signaling Manager to the stack processes.

8.1 Offline Configuration

The purpose of offline configuration is mainly for editing templates or preparing configurations for new installations. The tool behaves as a normal editor. Creating reconfigurations in this mode should be avoided, since this makes it harder for the tool to guarantee that the configuration updates are accepted by the stack. It is not possible to apply a configuration to the stack while in this mode.

To avoid that the stack configuration is changed by mistake, the `export.location` directory is protected from use in offline mode. The only purpose of the **Export** menu item is for use by advanced users that want to review the generated CNF-files.

Note: If you are using the CLI it is possible to do a initial configuration with the command: `configure: INITIAL;`

8.2 Online Configuration: Initial

An initial configuration of a stack is done when installing, upgrading or when it is necessary to restart the stack processes for any other reason, like when changing properties that are not runtime reconfigurable. The configuration may be prepared by using a predefined template, by importing it from the CNF-files of a previous release or by creating it from scratch.

Note: After a configure is performed Signaling Manager automatically changes to Reconfig mode.

When performing an initial configuration, the Signaling Manager generates the configuration in CNF format (.cnf files) and puts it in the prespecified location that the stack has access to. The initial configuration requires the stack to be started or restarted to make the stack to load the configuration.

In order to apply the prepared configuration, perform the following steps:

1. Click the **Configure** button in the Process View dialogue box. If you use new version of Process View Dialog, find this button under Stack menu.

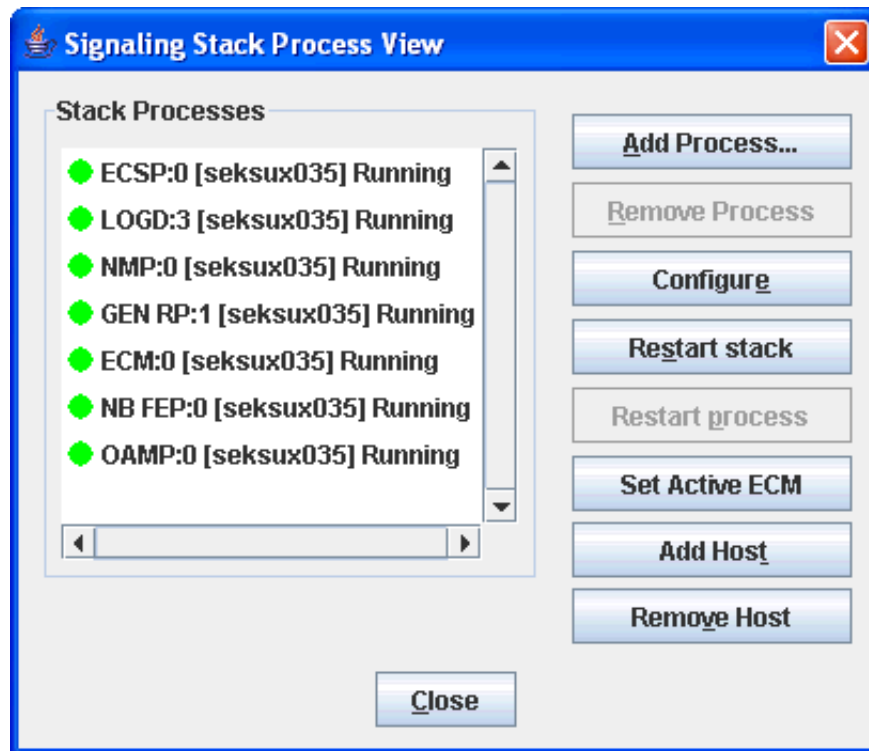


Figure 47 Old Process View dialogue box

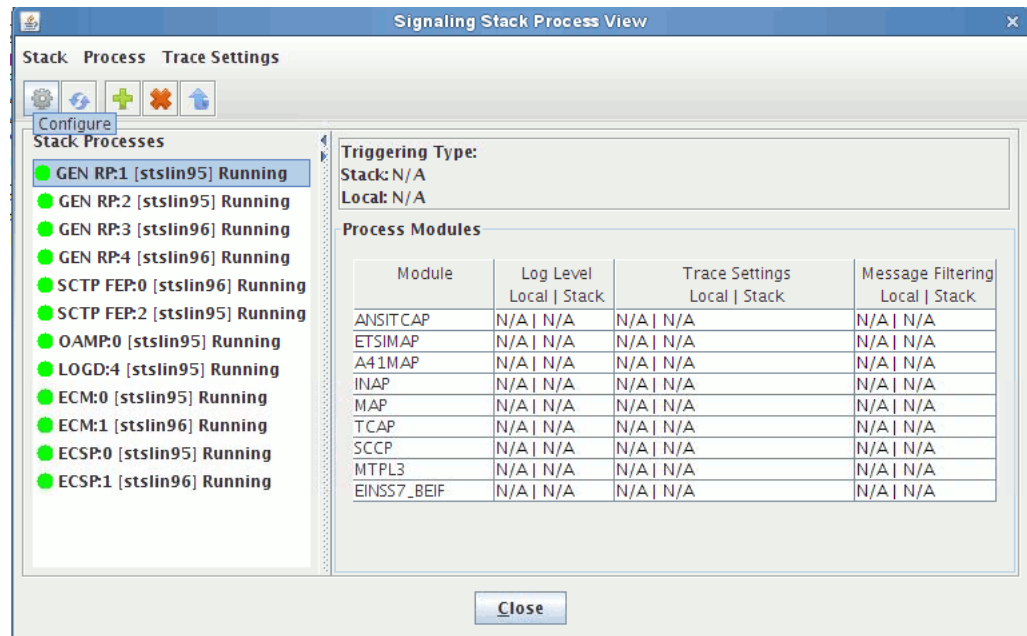


Figure 48 New Process View dialogue box with pointed Configure button

2. Select the type of configuration in the opened Configure dialogue box.

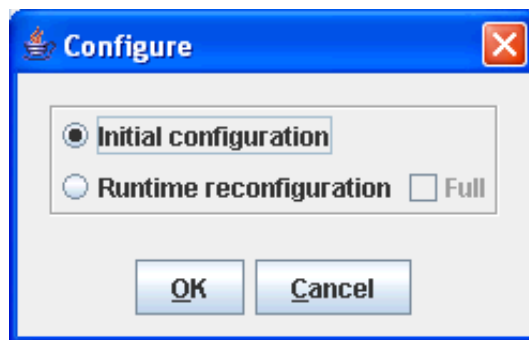


Figure 49 Configure dialogue

3. Select the **Initial configuration** radio button and click OK

Note: The configuration will be validated before the CNF files is generated. If the configuration is not valid a Validation Failure dialogue box will appear and the result of the validation will be shown in the **Results** tab.

4. Click OK to confirm the following message displayed after the previous action.

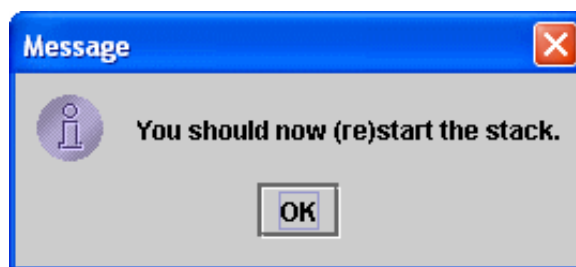


Figure 50 Message to confirm the initial configuration

The following steps are performed by the Signaling Manager during an Initial configuration. The term **planned flags** used below means that an element that has **planned flags** is allowed to be changed in Reconfig mode even if the property is not reconfigurable in runtime. Typically an element has a **planned flag** when it is created and the flag is removed after a configuration.

- The current configuration in the Signaling Manager is saved to `planned.om.cim` in the `config.location` specified in the `signmgr.cnf` file. This file have **planned flags** set for new elements.
- Any old `.cnf` files are renamed to `*.cnf.bak`
- A number of `.cnf` files are generated and distributed to `export.location`.
- If there is an `active.om.cim` in the `config.location` it will be copied to `prev_<date>.om.cim` and renamed to `active.om.cim.bak`.
- The current configuration is saved to `active.om.cim` in the `config.location`. This file has all **planned flags** turned off.



- The Signaling Manager will keep up to three versions of the prev files. If there are more than three files, the oldest one is deleted.
- The `planned.om.cim` in the `config.location` is renamed to `planned.om.cim.bak`
- A message dialog informs the user to start or restart the stack.

8.3 Online Configuration: Runtime Reconfiguration

A Runtime Reconfiguration is to change the configuration of a signaling stack without losing any traffic. To aid you, the reconfiguration mode locks some properties, aggregations and references so that they cannot be changed.

Properties, which can only be increased (or decreased) can be edited. They are marked with a red colored frame around the property input field to warn you that the property have a limitation.

A warning is displayed when trying to remove elements that can only be added, or elements that only can be removed under certain circumstances. For instance in the case when you try to remove a Link which might be in use by the running stack. A link can be removed but it must be stopped first.

Care must be taken to only use the configuration that is currently in use by the stack to do the changes. During normal online operation the right configuration is automatically loaded at startup. Unless **open** or **new** has been used it should be OK to do the reconfiguration changes in runtime.

In order to do a runtime reconfiguration, you need to perform the following steps:

1. Make the configuration changes allowed in reconfiguration mode.
2. Click the **Configure** button in the Process View dialogue box. If you use new version of Process View Dialog, find this button under Stack menu.
3. Select the **Runtime reconfiguration** radio button in the Configure dialogue box and click OK if you want to reconfigure only the modules whose configurations have been changed since last reconfiguration or restart. If you want to reconfigure all modules in the stack, then check the **Full** check box and click Ok.

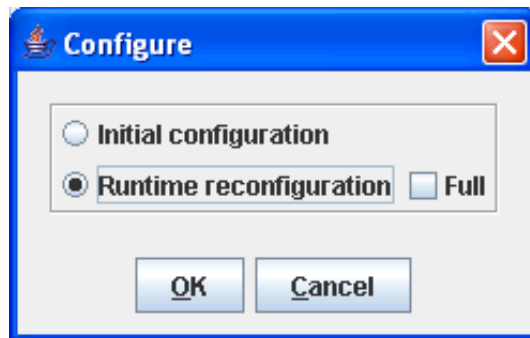


Figure 51 Configure dialogue

The Signaling Manager will validate the configuration and check that the stack is in running state.

It will then perform the same generation of configuration files as it does during an initial configuration.

The Signaling Manager sends a reconfigure request to the stack.

Starting from the CAA901791R3A OAM file version, the new reconfiguration option for the force reconfiguration was added, so, Runtime reconfiguration can be executed in three ways:

- 31) **Checksum based** item means that the activation request will be sent only for modules which configuration has been changed after last restart or reconfiguration.
- 2) **Full** item means that the activation request will be sent for all modules (some of them will be reconfigured, the other will stay in running state).
- 3) **Force** item means that the all modules will be reconfigured.

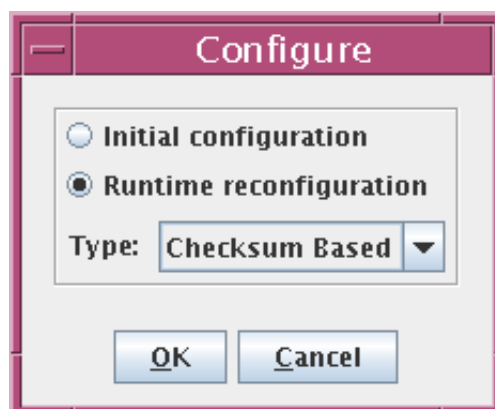


Figure 52 Extended configure dialogue





9 Signaling Manager, General Operations

9.1 Way of Working Recommendations

9.1.1 Introduction

A consequence of providing all necessary functions in Signaling Manager is that some tasks can be performed in several different ways. Recommendation in this section selects the preferred way of working for each of these tasks.

9.1.2 Save Configuration in .cim File Format

It is recommended to use the .cim file format as the only format for storing stack configuration.

Although possible, it is not recommended to only save a configuration in .cnf format. This format is only used by the stack modules and has several drawbacks. For example, the information is stored in multiple files, loading configuration into Signaling Manager requires several steps and migration becomes more difficult.

In the same way, it is not recommended to save configuration only as a file containing a set of CLI commands. If done, this makes validation of entire configuration hard and automatic migration is not supported.

9.1.3 Consider Automatic Naming

The automatic name of several elements reflects the configuration values for the specific element. If the value of such an element is changed, the name change accordingly. Therefore, always consider the automatic naming before changing to a specific name of an element. It is also possible to combine these two labels. Select the alternative that provides most readability and is easiest to understand.

9.2 Assign Reference

Means that an element is being selected and assigned to the current element. The procedure is:

1. Select an **Element** in Signaling Manager Navigation pane. Its properties will be listed in the Properties tab.
2. Press **Space** key or click on the ... button for a Reference Property in the **Properties** tab of the selected Element in order to open the Select dialogue box.



3. Select an element from the list of valid elements presented in the Select dialogue box, if there is any, otherwise you need to add the required elements before being able to proceed.
4. Click on the OK button. The input field for the reference property in the **Properties** tab will be updated with the name of the referenced element.

Note: For some Reference Properties the cardinality is one to many. In this case it is possible to assign several elements to the same property. This is achieved by keeping the Ctrl button pressed while selecting the desired elements. For a Reference Property that has one to one cardinality it is only possible to choose one element and in that case the Ctrl button can not be used.

9.3 Add Element

Means that an element of a certain MO will be added to a Group-Element in the Signaling Manager. You may make a copy of an existing Element or add a new Element using its default settings.

Note: It is recommended to use the copy variant described below, in order to use automation values for some properties.

9.3.1 Using Copy

The procedure for making a copy of an existing Element is:

1. Select an existing **Element** in Signaling Manager Navigation pane.
2. Press **Insert** key or Right-Click the Element to open its popup menu and select **Add**. A copy of the selected Element will be added to the Group-Element containing that Element in Signaling Manager Navigation.

Some of the properties in the copy may have been automatically changed. This is done for properties that must be changed to make a valid configuration and where an automated change is likely to be correct.

9.3.2 Using New

The procedure for making a new Element is:

1. Select an **Group-Element** in Signaling Manager Navigation tree.
2. Press **Insert** key or Right-Click the Group-Element to open its popup menu and select **Add**. An instance of an MO will be added to the Group-Element in Signaling Manager Navigation.



10 Migration

10.1 Supported Modules

Signaling Manager supports a number of versions of the signaling stack protocol modules. These can be viewed by selecting the **More Info>>** button in the About Signaling Manager dialogue box.

10.2 Import CNF

10.2.1 General

Signaling Manager provides the possibility to import an existing stack configuration in cnf format. This is done in the **Import CNF** tab from the **New...** menu. Signaling Manager automatically detects what module version the cnf files is configured for and if the version is older than the current version it is migrated to fit this format. This also implies that when configuring the stack or exporting the stack configuration the .cnf files will always be in the format of the current version for that module. The “Files of Type..” option shall be set to Autodetect CNF in order to filter so only supported cnf files are visible.

If you are importing an non HD configuration the **cp.cnf should not be imported**. For more information about how to configure CP in Signaling Manager can be found in Configuring SS7 System Components, see ref [2].

When importing the “EINSS7_ECMclasses.xml” configuration file it will be renamed to “EINSS7_ECMclasses.xml.old” because it should not be used anymore after the import is performed. When exporting the configuration the information in this file will be included in the “ecm.xml” file.

Note: It is possible to export a configuration in an older module version format by setting the `module.versions` parameter. For more information about this see Section 2.3 on page 6

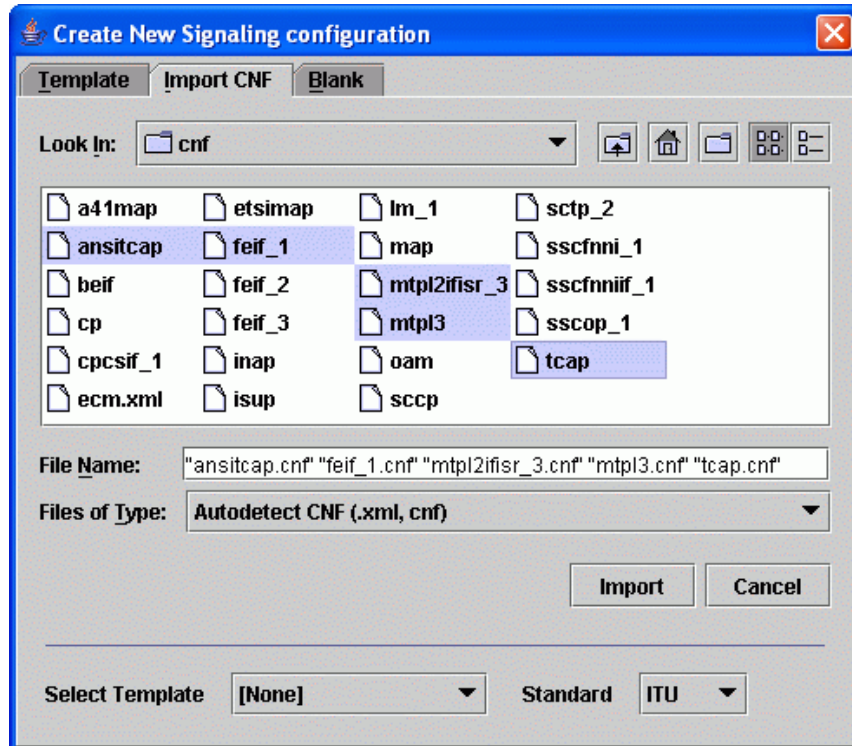


Figure 53 Import CNF tab in Create New Signaling configuration dialogue

Note: All stack modules that are dependent of each other must be selected and imported together at once, that is a complete working stack configuration. Typically, when Autodetect CNF type is chosen, all files presented should be selected using Ctrl-A. The standard setting in the Signaling Manager configuration must match the standard of the imported signaling stack configuration.

As the result of a successful import, the instances of the configured object, will be loaded in the Signaling Manager. These are visible in the Signaling Manager Navigation pane. It is important to notice that Signaling Manager generates the configuration for the latest supported version during Export or Configure operation. Default values, if defined, are used for the parameters which are not found in the imported files but exist in the latest versions.

Note: A configuration of some modules has a parameter 'FileType'. SM is able to import all possible values: 'SINGLE_FILE', 'MIXED_FILE', 'SEVERAL_FILES', but to export only 'MIXED_FILE' variant.

10.2.2

Import using a template

At the bottom of the import tab there is a drop down list, "Select Template", that lets the user choose between three different template options:

— Blank, no template will be used during import. This is the default behavior.



- Keep current model. Selecting this option assumes that a configuration is already loaded. If Signaling Manager is run in online mode the configuration loaded will probably be an active.om.cim. The modules chosen to be imported from cnf will be “added” to the existing configuration as opposed to the default import scenario where any previous configuration is cleared.
- The third and last option is to select a specific template file from the ones listed in the drop down list. All CIM files that exists in the template directory will be listed here. The chosen template will be loaded prior to importing the selected cnf files.

Note: If a module chosen to be imported already has been loaded by the template file it will be discarded, no duplicates will be imported. The log for Signaling Manager will show each such duplicate found as a warning.

10.2.3 Standard Dependency during Import

When importing older cnf files that do not include standard information, the system standard set in `signmgr.cnf` will be used to select proper parse and validation rules. If a file cannot be properly parsed using this standard (because it was written/generated for a different standard), an error will be displayed and the file will not be imported.

Note: Since system standard is used as fallback standard, value NA is not a valid value for system standard during import.

10.3 Migrating .cim Files

Signaling Manager supports opening of .cim files generated by older Signaling Manager versions. Differences might occur between versions due to parameters being added or removed, parameters becoming mandatory or parameters being moved from one configured object to another. Normally, the migration is made automatically and silent but the log will indicate that migration has been performed. However, effects of a migrated .cim file might be seen in one or several of the following ways depending on the reason for migration:

- Properties occur in the properties set of a different element than in the older version.
- Validation fails because an added mandatory property without default value has not been set.
- The resulting .cnf files differ from the files generated by the older version.

Saving a converted .cim file is always done in the new format.



10.4 Migrating CLI Commands

10.4.1 General

There is no automatic migration function for CLI commands. If deviations are detected, these must be adjusted manually by editing the file containing the command set.

Differences in parameters between different Signaling Manager versions for reasons described in Section 10.3 on page 75 also affect the CLI if the modified parameters are used in any CLI command. Thus, batch files containing sets of CLI commands must be migrated to reflect the new parameter set for each affected command.

If a single CLI command does not fulfill the new required syntax, an error message will be returned and the command will not be executed. In case several commands are run in a batch, the entire set of commands will be analyzed for migration changes prior to execution of the first command. This is to avoid inconsistency caused by failed commands late in the command sequence.

10.4.2 Command Analyzer

To be able to verify the syntax of old files containing sets of CLI commands when migrating from one Signaling Manager version to another, the CLI Command Analyzer can be invoked without actually executing the commands. If there are deviations, the output is a list of all deviations in the provided set of commands.

The Command Analyzer is invoked separately by starting the CLI with the configuration parameters `online=N0` and `batch.analysis=YES`. See Configuration File Description (ref [1]) for configuration parameter details.

A single command set file is analyzed by running the CLI in batch mode. If several files are to be tested or if the environment puts restrictions on command line options and redirection, an alternative is to start the CLI once in interactive mode and execute the `loadbatch` CLI command for each file. Starting the CLI in different modes is described in Section 6.2 on page 49.



11 Signaling Manager, Access Restriction

11.1 Overview

Different access levels for different users are supported in SM. Each access level defines a particular set of SM capabilities. They will be ordered from the most minimal to the most full where each next access level includes the previous one.

Table 5 SM access levels

| Access Level | Description |
|--------------|--|
| 1 | Provide configuration reading & "static" monitoring (alarms from OAM default alarm mask, system overview). This level corresponds to "Read-Only" SM configuration mode. |
| 2 | Provide "dynamic" monitoring (statistics requests, "read-only" action/orders). This level corresponds to "Read-Only" SM configuration mode. |
| 3 | Provide stack configuration changing (initial configuration & reconfiguration, process/stack restart, remaining action/orders). From this level all SM configuration modes are accessible. |
| 4 | Provide system configuration changing (process adding, removal, host adding) |

11.2 Configuration

Assignment of access rights to SM users will be done in a separate SM access configuration file "signmgr.acs". The security will be maintained by setting only read permissions to access this file. Only a system administrator (root) should be allowed to edit it. The users with 3rd and 4th access levels should have write permissions for config.location and export.location folders. The SM will search for this file at first inside classpath and then in ./etc directory. The format of this file described below:

access.level.<level>=<user1,user2,user3>

access.level.<level>=<user4,user5,user6>

Where < level> is digit from 1–4 range

Example:



access.level.3=konata,kagami

access.level.4=flash,bisu

Note: Usually username is the name of the current system user (who started SM), but in the case of remote login - the login name will be used to grant permission

if a user is not specified in the "signmgr.acs", the user is granted with minimum access level.

If "signmgr.acs" is not found in the predetermined location (classpath or etc directory), then a full access is granted for all SM users.

By default this file does not exist.



12 Signaling Manager, Terms and Abbreviations

12.1 Combobox

A combobox list is used for selecting a value in a list of available values. It looks like a button with a small triangular arrow on the right hand side. Click it, and a list showing the allowed values pops up. Select value, and the list closes again. The **Space** key can be used to drop down the list when the combobox field is selected.

12.2 Editable Combobox

This works as a Combobox with the difference that the user is free to add a new value instead of choosing one of the predefined.

12.3 Radio Button

A radio button is a circular on or off button with a text describing the state to the right. Click the circle to make the radio button selected.

Radio buttons always appear in groups of two or more. Selecting one radio button automatically deselects the others in that group.

12.4 Checkbox

A checkbox is a square on or off button with a text describing the on state to the right. Click the box once to put it in the selected state (a checkmark appears in the box). Clicking a second time deselects the checkbox again.

Checkboxes are always independent of one another. Checking one box does not affect the state of any other. Although selecting a checkbox may enable other buttons, text fields, and so on, that are only relevant when the checkbox is selected.

12.5 Input Text Field

This is used for typing a value for a property in its Properties tab. Some properties are using default values but they can be modified within their range which is displayed in the **Description** field of the Information pane. If you have changed a default value, you may reset to the default value by just removing all the types value and press Enter.

12.6 Disabled Field

Some properties depend on the value on some other properties. In this case, the properties, which are not valid during certain circumstances, are disabled. That is the input field are locked from any changes and grayed out.

12.7 Read Only Field

If a property is not allowed to be modified it will be shown as a Disabled Field in the Properties tab. Some properties are Read Only by default and some depend on the Configuration Mode.

12.8 Element

A Signaling Manager element is any object that appears in the Signaling Manager navigation tree view, that is a component providing a part of a signaling stack configuration. It is an instance of a certain MO in the Signaling Manager Navigation pane. There are two types of elements:



Elements which can contain other elements, that is an element with aggregation relation.



Elements which can not contain any other element as sub-element, that is an element without any aggregation relation.

Note: See also Group Element.

12.9 Group-Element



A special Signaling Manager element with no properties. It can only hold other **Element** of the same type. It is a notation for an aggregation relation in the Signaling Manager navigation tree.

12.10 Sub-Element

An element appearing beneath another element in the Signaling Manager Navigation pane hierarchy is said to be a sub-element to the element above.

12.11 MO

Managed Object is the base object for an Element in the Information Model. An **Element** represents an instance of a certain MO in the Signaling Manager Navigation pane.



12.12 Property

A parameter defined for an MO is called a Property. The value of the property is set for each instance of an MO which is presented by an **Element** in the Signaling Manager Navigation pane. Properties are seen in **Properties tab** of an Element. Depending on the type of a property, the following fields are used in **Properties** tab:

- **Input Text Field** where you type the value.
- **Combobox** where you select a value.
- **Editable Combobox** where you select a value.
- **Disabled Field** where you are not allowed to set any value.
- **Read Only Field** where the value either is already set by default or will be calculated and be set automatically.

Note: See also **Reference Property**.

12.13 Reference Property

A parameter defined for an MO which uses another **Element** as value is called Reference Property. The ... notation next to the input field in the Properties tab represents such properties. The following figure shows an L2 Link Property Reference assigned to FE 0: ISR Link PCMA:0, SLC: 0 link Element.

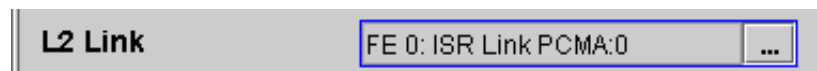


Figure 54 L2 Link Reference Property of an instance of Sign Link TPs

Note:

- For some Reference Properties the cardinality is one to many. In this case it is possible to assign several elements to the same property. This is achieved by keeping the Ctrl button pressed while selecting the desired elements. For a Reference Property that has one to one cardinality it is only possible to choose one element and in that case the Ctrl button can not be used.
- If right-clicking on a Reference Property that has an assigned element and choose **goto element** in the popup menu, the referred element will get focus in the **Navigation Pane**.

12.14 CLI

Command Line Interface. The CLI supports the same functionality as the Signaling Manager Graphical User Interface (GUI). The CLI is also available within Signaling Manager GUI from the CLI tab in the Signaling Manager Operation pane.



- 12.15 MML
- Man Machine Language commands which are available in Signaling Manager CLI.
- 12.16 Signaling Stack
- Each Signaling Stack contains a number of Signaling Protocol Layers, for instance SCTP stack or TCAP stack. The installation of a Signaling stack is not covered by this Signaling Manager User Guide.
- 12.17 Signaling System
- Signaling System is an MO which describes all the hardware and software parts to make up a specific Signaling node. The top **Element** in the Signaling Manager Navigation pane is an instance of the Signaling System MO.
- 12.18 Signaling Protocol Layer
- Depending on the Signaling stack, different Signaling protocol layers are included. For instance, a TCAP stack consists of TCAP, SCCP, M3 and MTP-L2 Signaling protocol layers.
- 12.19 BE
- The Back End (BE) processes contains the M3 and higher Signaling protocol layers of a Signaling stack. It handles the normal signaling traffic.
- 12.20 NMP
- Network Management Process (NMP) is a process that contains the M3 and SCCP layers. It handles the network management messages of these layers.
- 12.21 FE
- A Front End (FE) process contains a Signaling link layer that interfaces the hardware.
- The type of FE used depends on the type of board providing the physical connection towards to the Signaling network.



12.22 Standard

Standard is a value set on system levels as well as on various configuration level such as Signaling System, TCAP, Signaling Network or FE. The standard determines available operations in Signaling Manager as well as value ranges and other validation rules. See Section 2.2 on page 5 for further details.

12.23 MFS

Multiple File System. Used for distributing an SS7 configuration to multiple hosts.





13 Appendix 1: Syntax for Find Elements

Table 6 Find Element Syntax

| Search criteria notation | Description |
|--------------------------|---|
| // | <p>Makes the search global, that is no matter which element is selected, the search will be done globally. Example:</p> <p>//SignLink</p> <p>Finds all SignLink elements.</p> |
| / | <p>Enter a new search criteria for elements selected by the previous part of the path. If the next part is a name of an MO it will enter an aggregation. Example: MtpSignPoint/SignLinkset/SignLink</p> <p>Finds all SignLinks in the currently selected LocalSignPoint.</p> |
| @ | <p>Enters a reference, when used outside a filter criteria, see below. Example: //SignLinkset/@AdjacentSPC</p> <p>Finds all adjacent RemoteSignPoints in the system. Be aware that there will be duplicates if more than one Linkset use the same adjacent SPC.</p> |
| [@<property><op><value>] | <p>Filters the found elements and returns only those where a certain property has a certain value. It is possible to specify more than one match-rule, separated by commas. The operator can be anyone of <, >, =, !=.</p> <p>Example:</p> <p>//SignLink[@SignalingLinkCode=1, @LinksetNo<4]</p> <p>Finds all SignLinks with SignalingLinkCode set to 1 that belong to a linkset with a number less than 4.</p> |
| [<path><op><value>] | <p>Advanced version of the above filter, using a path to a property to compare with. This path may not contain any filter criterias of its own and must end with a "@<property>" that returns the value to compare with.</p> |



| Search criteria notation | Description |
|--------------------------|---|
| .. | Go to the parent of the current element. Example: <code>//SignLink[@SignalingLinkCode=0]/..</code> Finds all SignLinksets that has a SignLink with SLC=0. |
| ... | Searches all elements below the current element. Example: <code>.../[@RemoteSPC=200]</code> Finds all elements which has a property "RemoteSPC" set to 200. |
| * | Wildcard, selects all aggregations Example: <code>//LocalSignPoint/*</code> Finds all children to all LocalSignPoints. |



14 Appendix 2: 3PP Software Licenses

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15 References

Table 7 References

| Reference | Name | Document Number |
|-----------|-----------------------------------|---------------------------|
| [1] | Signaling Manager Configuration | 19073-CNA 403 0874/1 Uen |
| [2] | Configuring SS7 System Components | 7/1543-CNA 403 0874/1 Uen |