Subscriber Data Management

Release 9.1

System Configuration Reference Manual

910-6699-001 Revision A
June 2013

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Chapter 1

Introduction

Topics:

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- *Scope and audience.....24*
- *Document organization.....24*
- *Related publications.....25*
- *Customer Care Center.....26*
- *Emergency Response.....28*
- *Locate Product Documentation on the Customer Support Site.....28*

This chapter provides general information about manual organization, the scope of this manual, its targeted audience, how to get technical assistance, and how to locate customer documentation on the Customer Support site.

About this document

This document describes in detail the entities and operations required to configure the Subscriber Data Management (SDM) system. This document also describes the user interfaces used to configure the system and the entities to set up users, groups, services, and access privileges.

Scope and audience

Use this document to look up entity information for provisioning the system as well as the entities required to set up users, groups, services, and access privileges. To learn how to use the interfaces and provision the SDM system, refer to the *System Configuration User Guide*.

This document is intended for operators that are responsible and qualified for the subject matter of this document.

Document organization

This document is organized into the following chapters:

- *Introduction* contains general information about this document, to contact the Tekelec Customer Care Center, and how to locate the customer documentation on the Customer Support site.
- *User Interfaces* describes the user interfaces, user management, and notification management.
- *Home Location Register (HLR)* provides details on HLR system configuration and feature entities as well as HLR operations performed through the CLI.
- *Signaling System 7 (SS7)* provides details on SS7 entities that configure the SS7 features using MTP2, ATM broadband, or SIGTRAN.
- *Session Initiation Protocol (SIP)* provides details on SIP server, SIP registrar, and SIP User Agent entities as well as SIP operations performed through the CLI.
- *Home Subscriber Server (HSS)* provides the details on HSS entities including IMS-HSS system feature entities. This chapter also includes HSS operations performed through the CLI.
- *Authentication, Authorization, and Accounting (AAA)* provides details on AAA entities.
- *ENUM Server* provides details on ENUM Server configuration entities.
- *LTE-HSS* provides details on LTE-HSS entities including error notifications and performance counts.
- *Subscription Locator Function (SLF)* provides details to provision the SLF.
- *Equipment Identity Register (EIR)* provides details on EIR system configuration entities.
- *LTE-EIR* provides details on LTE-EIR entities.
- *Diameter* provides details on DRA system configuration entities.
- *System* provides details on the entities that retrieve alarms and provision system features.

About links and references

Information within the same document is linked and can be reached by clicking the hyperlink.

To follow references pointing outside of the document, use these guidelines:

General:

- Locate the referenced section in the Table of Content of the referenced document.
- Locate the same section name in the referenced document.
- Place the PDF files in one folder or on a disc and use the powerful Adobe PDF search functions to locate related information in one or more documents simultaneously.

Alarms

- *SDM Alarms Dictionary*

Product, features, concepts

- *SDM Product Description*

Monitoring, maintenance, or troubleshooting:

- Procedures: *Monitoring, Maintenance, Troubleshooting User Guide*
- Entities: *Monitoring, Maintenance, Troubleshooting Reference Manual*

Subscriber provisioning:

- Procedures: *Subscriber Provisioning User Guide*
- Entities: *Subscriber Provisioning Reference Manual*

System configuration:

- Procedures: *System Configuration User Guide*
- Entities: *System Configuration Reference Manual*

User Interfaces:

- *User guides*
  - How to use the user interface
  - How to set up users (permissions, groups, services)
- *Reference manuals*
  - About user interfaces
  - Entities for setting up users

To determine the components of the complete documentation set delivered with the software, refer to the *SDM Documentation Roadmap* delivered with each documentation set.

Related publications

For a detailed description of the available SDM documentation, refer to the *SDM Documentation Roadmap* included with your SDM documentation set.

Customer Care Center

The Tekelec Customer Care Center is your initial point of contact for all product support needs. A representative takes your call or email, creates a Customer Service Request (CSR) and directs your requests to the Tekelec Technical Assistance Center (TAC). Each CSR includes an individual tracking number. Together with TAC Engineers, the representative will help you resolve your request.

The Customer Care Center is available 24 hours a day, 7 days a week, 365 days a year, and is linked to TAC Engineers around the globe.

Tekelec TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

Tekelec Technical Assistance Centers are located around the globe in the following locations:

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

  Phone:

  1-888-FOR-TKLC or 1-888-367-8552 (toll-free, within continental USA and Canada)

  1-919-460-2150 (outside continental USA and Canada)

  TAC Regional Support Office Hours:

  8:00 a.m. through 5:00 p.m. (GMT minus 5 hours), Monday through Friday, excluding holidays

- **Caribbean and Latin America (CALA)**

  Phone:

  +1-919-460-2150

  TAC Regional Support Office Hours (except Brazil):

  10:00 a.m. through 7:00 p.m. (GMT minus 6 hours), Monday through Friday, excluding holidays

  - **Argentina**

    Phone:

    0-800-555-5246 (toll-free)

  - **Brazil**

    Phone:

    0-800-891-4341 (toll-free)

    TAC Regional Support Office Hours:

    8:00 a.m. through 5:48 p.m. (GMT minus 3 hours), Monday through Friday, excluding holidays

  - **Chile**

Phone:

1230-020-555-5468

- **Colombia**

  Phone:

  01-800-912-0537

- **Dominican Republic**

  Phone:

  1-888-367-8552

- **Mexico**

  Phone:

  001-888-367-8552

- **Peru**

  Phone:

  0800-53-087

- **Puerto Rico**

  Phone:

  1-888-367-8552 (1-888-FOR-TKLC)

- **Venezuela**

  Phone:

  0800-176-6497

- **Europe, Middle East, and Africa**

  Regional Office Hours:

  8:30 a.m. through 5:00 p.m. (GMT), Monday through Friday, excluding holidays

  - **Signaling**

    Phone:

    +44 1784 467 804 (within UK)

  - **Software Solutions**

    Phone:

    +33 3 89 33 54 00

- **Asia**

  - **India**

    Phone:

    +91-124-465-5098 or +1-919-460-2150

    TAC Regional Support Office Hours:

10:00 a.m. through 7:00 p.m. (GMT plus 5 1/2 hours), Monday through Saturday, excluding holidays

- **Singapore**

  Phone:

  +65 6796 2288

  TAC Regional Support Office Hours:

  9:00 a.m. through 6:00 p.m. (GMT plus 8 hours), Monday through Friday, excluding holidays

Emergency Response

In the event of a critical service situation, emergency response is offered by the Tekelec Customer Care Center 24 hours a day, 7 days a week. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with the Tekelec Customer Care Center.

Locate Product Documentation on the Customer Support Site

Access to Tekelec's Customer Support site is restricted to current Tekelec customers only. This section describes how to log into the Tekelec Customer Support site and locate a document. Viewing the document requires Adobe Acrobat Reader, which can be downloaded at www.adobe.com.

1. Log into the *Tekelec Customer Support* site.

   Note: If you have not registered for this new site, click the **Register Here** link. Have your customer number available. The response time for registration requests is 24 to 48 hours.

2. Click the **Product Support** tab.
3. Use the Search field to locate a document by its part number, release number, document name, or document type. The Search field accepts both full and partial entries.
4. Click a subject folder to browse through a list of related files.
5. To download a file to your location, right-click the file name and select **Save Target As**.

Chapter 2

User Interfaces

Topics:

- *Command Line Interface.....30*
- *Web Craft Interface (WebCI).....36*
- *User Security Management.....55*
- *Notification Security Management.....65*

This chapter describes the user interfaces that allow the operator to configure the system or provision subscribers. The description includes functionalities, command convention, navigation method, command execution, and the GUI symbols used in the WebCI.

Command Line Interface

The Command Line Interface (CLI) is the client OAM&P (Operation, Alarm, Maintenance and Provisioning) application that manages and provisions the Tekelec Subscriber Data Management. The CLI provides a command-line, text-based environment to access the OAM&P. The operator accesses OAM&P functionality by invoking commands in the CLI. Changes made to system configuration or subscriber provisioning data takes effect immediately. The system administrator creates and manages users, their username and password, and assigns users to groups with different access privileges for specific services.

The administrator can perform all tasks through the CLI:

- Create and manage users
- Manage the Dynamic System Configuration
- View, add, delete, and modify subscriber provisioning information
- View and modify configuration data
- View and modify operational aspects of the system
- View and modify system configuration properties
- View current and historical data
- Remote system administration
- System maintenance

Refer to *User Security Management through CLI* in this document for a detailed description of the User Security Management feature, also refer to the "Creating and Managing users for the User Interfaces" section in the *SDM System Configuration - User Guide* for step by step procedures to provision users through the CLI and WebCI.

CLI Command Convention

In this document, system information such as commands, system prompts, and responses, will be represented as follows:

- Command Strings that the user enters appear in bold face:

  ```
  # cli
  ```

  Note: CLI commands are case sensitive. Users must enter the command string exactly as shown, including spaces.

- System Prompts and Responses appear in courier font:

  ```
  1: System []>
  ```

System Identification

The CLI identifies the system ID of the system to which the opened CLI session is connected. The system ID is provided by Tekelec for a specific SDM system and is also used as the Customer Name.

The CLI displays the Customer Name (SystemID) as part of the license information. Display the Customer Name and other license information by executing the DisplayLicense() operation.

```
:Oamp[]:OampManager[]:LicenseManager[LicenseId = 6]> DisplayLicense()
```

Refer to the *Command Line Interface (CLI)* section of the *SDM System Configuration – User Guide* for instructions on how to start, navigate, or end a CLI session.

CLI Navigation

Navigation diagram

All navigation, provisioning, or configuration in the CLI subsystems is based on entities, attributes, and values.

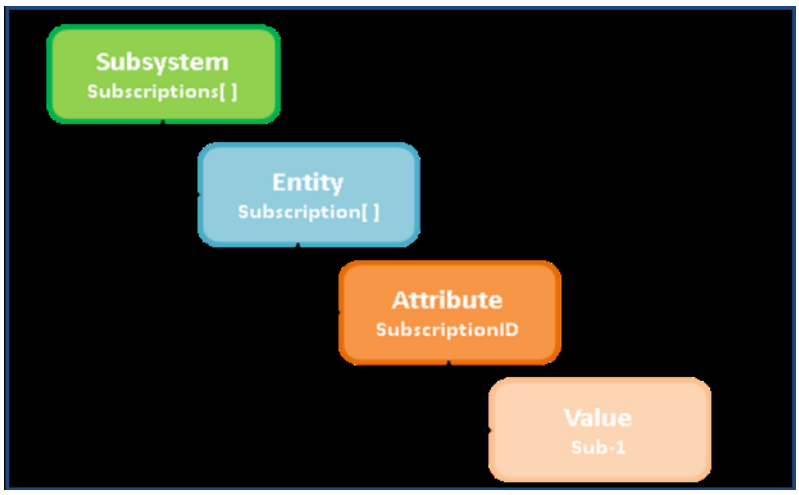


Figure 1: Subsystem Navigation Diagram

Each subsystem, for example, Hlr, Sip, Hss, Database, OAM&P, SS7, System, and Subscriptions, is made up of entities. An entity is a table in a database that contains all the information about the entity. Each entity is defined by one or more attributes, which can be mandatory or optional. An attribute is defined by its value.

For example, the Hlr subsystem contains entities such as Plmn, Algorithm, and MSISDN. The Plmn entity is defined by the PlmnId attribute, which is a mandatory attribute. The PlmnId has a value of `Montreal`.

Navigating through the CLI entails defining instances of entities, that is, by choosing a set of attributes of an entity and assigning a value to each selected attribute, the user creates an instance of the entity. By adding, modifying or deleting attribute values, the user is provisioning a subscriber entity or configuring a system entity.

To connect to the system, refer to section *Accessing the System* in the *SDM System Configuration - User Guide*, and log in with a valid user ID and password.

Command line usage

- System prompt:

  #
- Starting CLI at system prompt:

  ```
  # cli
  ```
- CLI system startup prompt:

```
1 :>
```

The first part of the prompt is the command number, which starts at 1 and auto-increments for each new command entered. This number is used to keep a history log of the commands issued.

- CLI prompt with navigation context:

  ```
  2: System[] >
  ```

  The command number, has incremented.

  The second part of the prompt indicates the current navigation context (`System[]`). This shows where the user is within the navigational levels.

  The third part is the prompt separator (>). The user can enter commands after the prompt separator.

- The subsystems can be accessed from anywhere in the CLI when the command is preceded by a colon (:), which defines an absolute navigation path:

  ```
  2 :Hlr[]:Plmn[PlmnId = Montreal]> :System[]
  3 :System[]>
  ```

CLI commands

This section lists basic Unix shell commands, CLI commands and characters, as well as subsystem access commands.

Basic Unix shell commands

These basic UNIX shell commands facilitate usage of the CLI.

Command	Definition
<CTRL> a	jump to home
quit	exit the CLI
<CTRL> e	jump to end
<CTRL> l	clear screen
<CTRL> u	clear typed line
↑	Use up arrow to scroll up the command history
↓	Use down arrow to scroll down the command history
<CTRL> z	Cancels any change made by the ongoing command by aborting the session.*

WARNING:

When using the CLI, the <CTRL> z command does not send the process execution to background, as it typically would. Since there is no need to allow to run the CLI in background, the Tekelec implementation intentionally interprets the <CTRL> z command as an “abort” message and suspends the ongoing command. Basically, the use of the <CTRL> z command cancels any change made by the ongoing command. In some situations, executing this command may produce a core dump of the CLI processes.

However, using the CTRL-Z command will not cause any service outage, nor will it cause data corruption. The same warning also applies for the use of the <CTRL> z command when using the Command File Loader (CmdFileLoader).

CLI commands

Command	Definition
`add`	Adds a new instance to the system
`attributes`	Show attributes of an entity
`delete`	Deletes instances from the system
`display`	Display the instances
`entities`	Show sub-entities
`help`	Display help options
`history`	Lists history of commands
`instances`	Display all instances of an entity
`key`	Show navigation key attributes
`modify`	Make changes to instances
`operations`	Show operations
`parameters`	Show parameters of an operation
`quit`	Exit the CLI
`top`	Go to top level
`tree`	View the command tree
`up`	Go up one level
`version`	Displays current version of the software load

CLI characters

Symbol	Definition
*	Indicates a mandatory item
;	Separate multiple attributes or attribute values with a semicolon
,	Separate multiple items in a value list with a comma
.	Specifies the current instance
:	Separates different levels between entities

Subsystem access commands

Command	Definition
`Database[]`	access Database subsystem
`Hlr[]`	access HLR subsystem
`Oamp[]`	access OAM&P subsystem
`SS7[]`	access SS7 subsystem
`System[]`	access System subsystem
`Sip[]`	access SIP functionalities of the Tekelec ngHLR
`Hss[]`	HSS subsystem
`Subscriptions[]`	Access Subscriptions subsystem

Operations

The CLI supports the following operations: Display, Add, Modify, and Delete. These operations can be used on entities and instances to provision or modify system parameters.

The supported operands for each operation are listed below.

Table 1: CLI operations

Operation	Supported Operand
Display	=, <, >, >=, <=
Add	=
Modify	=
Delete	=

Command History

A history of all the commands entered can be viewed.

To view all the commands entered, type `history`.

To view the most recent commands, type `history <#>`, where # is used to specify the number of the most recent commands to be displayed.

To view a specific command entered, type `!<command #>`.

Auto-Complete Functionality

The CLI is powered by a contextual auto-complete functionality enabled by the <Tab> key. Using this functionality is by no means necessary for the use of the CLI, but offers great improvements in operational efficiency.

This function aids in navigation as well as provisioning by completing the following command strings:

- Recognized Subsystem, Entity, and Attribute names
- Recognized Values for Attributes when there is a finite number of acceptable values
- Navigation options
- Displaying which Entities are mandatory (marked with an "*")
- Completing grammar

Press the **Tab** key at any time in the CLI for text or grammar completion, information about available Entities and Values for Attributes, and help. If the <**Tab**> key does not complete any further, there is no system-defined acceptable values or the user may insert a sign or closing bracket "]" to continue editing the command.

Attributes

Mandatory Attributes

When using the CLI, some attributes are preceded by an asterisk (*). The asterisk has different meanings depending on the context where it is being used.

When navigating to entities, an attribute with an asterisk indicates a key instance and it is mandatory to continue navigating. When performing an Add operation, the attribute is a mandatory attribute and must be included in the command. In the add operation, a unique instance is being created. For a Modify, Delete, or Display operation, the asterisk indicates the attribute is a key instance, but it is not a mandatory attribute. If no mandatory attributes are specified, then the operation will apply to 0 or more instances.

Inherited Attributes

Attributes that are passed down from a higher level (parent) entity to a lower (child entity) are called inherited attributes . The inherited attributes are passed on when navigating down to lower level entities. In order to access the lower entities, the inherited attributes must be specified in the CLI command string.

In this document, all the attributes are considered to be Read/Write unless noted otherwise.

Command help options

This option displays options available for built-in commands.

Help options show the operator the operations available to perform on the system.

From the directory where the command is stored, type the command name followed by `-h` or `-help` as shown with the commands below.

Help options are available for commands such as

- `blueupdate.sh -help`
- `cfl -help` (Command File Loader)
- `ctl -h` (Command Template Loader)
- `CmdTemplateViewer -h` (Command Template Viewer)

Note: The user must have access privileges to these interfaces and must have logged in successfully before these commands become available.

Web Craft Interface (WebCI)

This chapter provides an overview of the Tekelec GUI: Web Craft Interface (WebCI), with the navigation system, the different operations available and the auto-refresh mechanism.

With the User Security Management feature, not all WebCI operations and functionalities are available to all users. The administrator of the system is in charge to create and manage users, their username and password and assign them to groups with different access privileges for specific services.

Please refer to the *User Security Management* in this document for a more detailed description of the User Security Management feature, also refer to the "Creating and Managing users for the User Interfaces" section in the *SDM System Configuration - User Guide* for step by step procedures to provision users through the CLI and WebCI.

Hereunder are some general descriptions of the WebCI's different characteristics:

System Identification

The WebCI provides to the user an easy way to identify the System ID (System Number given by Tekelec for a specific SDM system, also used as the Customer Name) of the system to which the opened WebCI session is connected to.

The WebCI displays the SystemID in the front page (at user login) as well as in its menu, as part of the System folder name.

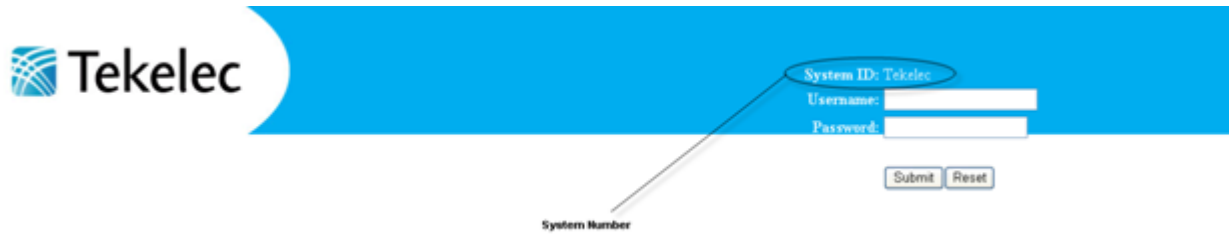


Figure 2: SystemID visible in WebCI front page

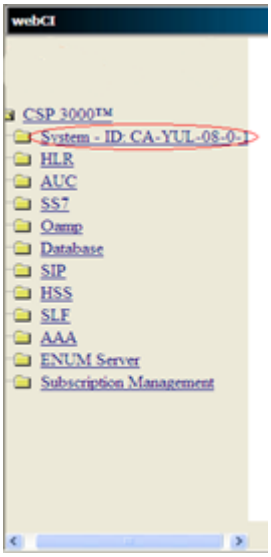


Figure 3: SystemID visible in WebCI front page

Hyperlinks

Hyperlinks take the user to the system configuration or user provisioning tables. Hyperlinks may have one or more sublinks.

Pop-up windows

Pop-up windows appear:

- To display further information, after clicking on a button or on a text highlighted in blue. A provisioning window or simply a confirmation request will appear depending on the operation.
- To request a confirmation of the action to take and always give the chance for the operator to Cancel or proceed with the action.

If the web browser is configured to block pop-up windows, some WebCI screens will not be displayed. To display all WebCI screens, add the address of the Single Board Computer (SBC) to the list of allowed sites. Alternatively, temporarily allow the pop-ups windows to be displayed in order to view the WebCI screens.

Table entry count

- HSS Shared Initial Filtering Criteria
- HSS SLF Public 2 HSS Name (HSS Redirect Host Mapping)

The Web Craft Interface (WebCI) is a web-based application that provides a user friendly graphical user interface (GUI). The WebCI is used to facilitate system configuration, subscriber provisioning, and alarm management.

WebCI navigation

The WebCI main menu is located to the left of the window. The menu provides access to the SDM applications.

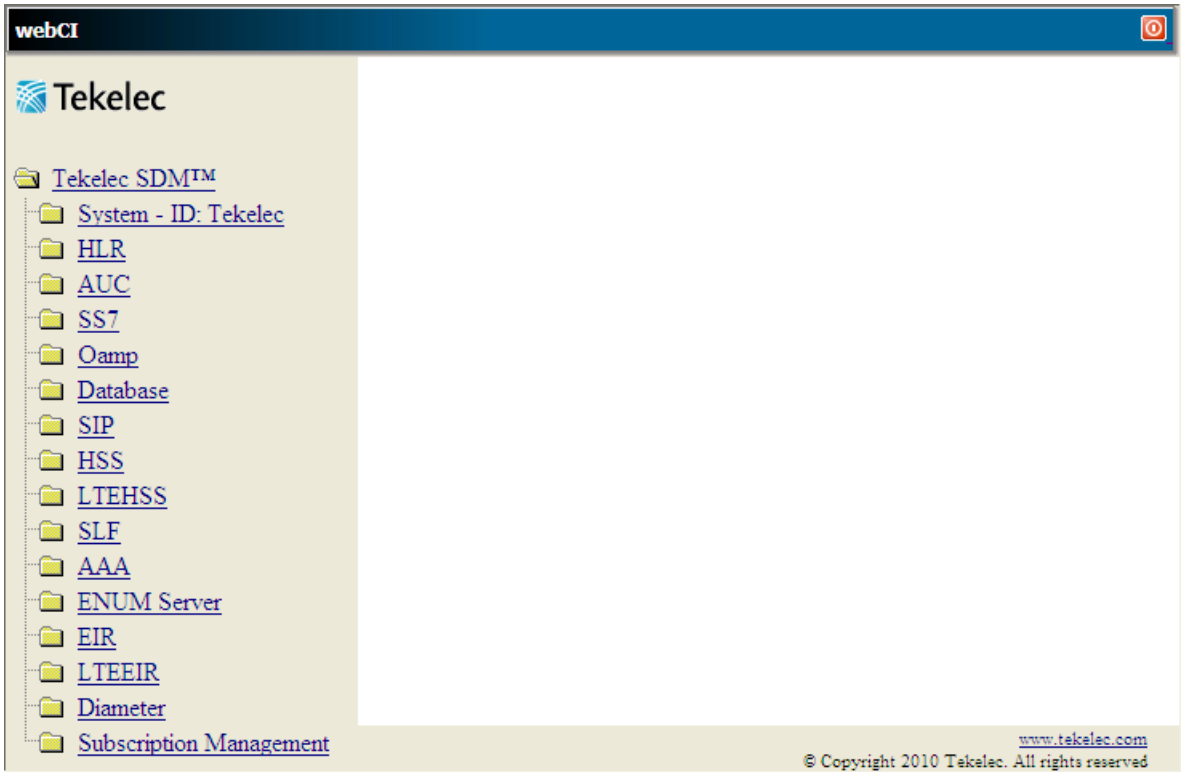


Figure 4: WebCI main window

Clicking the application name or folder opens a submenu. Each submenu item has a specific configuration window.

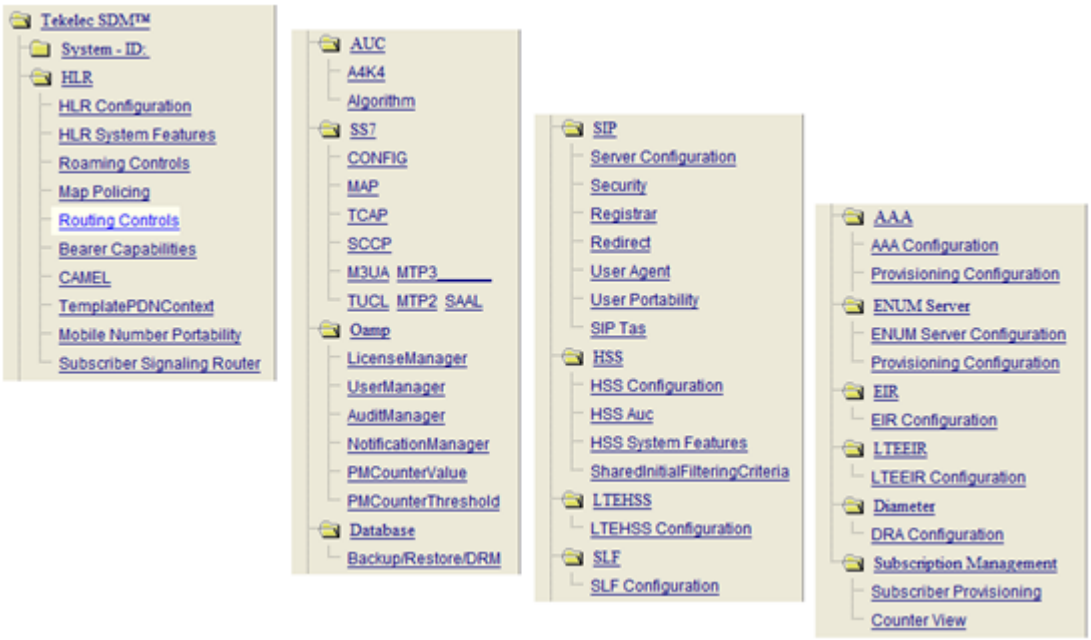


Figure 5: WebCI main menu expanded

These windows may have tabs to access additional configuration settings.

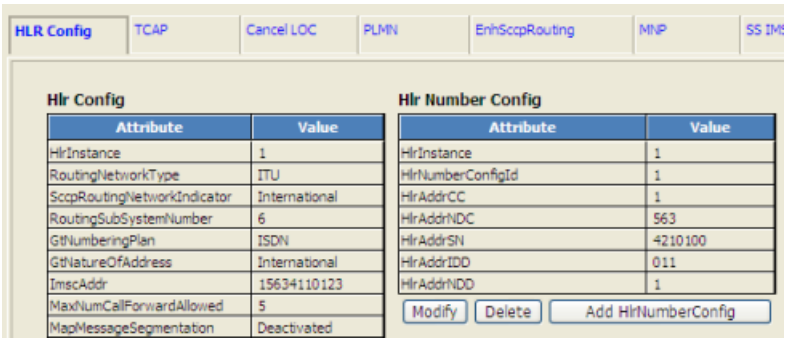


Figure 6: WebCI window tabs

WebCI main menu descriptions

This table describes the purpose of each menu item. The items are listed in order they appear on the menu.

Table 2: WebCI main menu descriptions

Application	Folder	Description
System	**Shelf View**	Provides information on each of the hardware platform's slots (processors) and the services running on each one of them. This window allows to configure the system with identities/services on each slot. This view also allows to perform Switch Overs.
	Shelf Inventory	Displays Shelf information and the software version.
	Service Management	Provisions services to each slot's Identity. Also allows the operator to manage those services on each slot.
	Geo Redundancy View	Provides information on the geo-redundant feature, whether it is enabled or disabled and what the Geo-Redundancy Virtual IP (VIP) address of the peer site is, as well as information on the state of the database. It also allows to enable or disable the feature and to modify the Geo-Redundancy VIP address of the peer site.
	Active Alarm View	Provides a listing of all active alarms existing on the shelf.
	History Alarm View	Provides a listing of all alarms that have occurred as well as those that have been cleared on the system.
HLR	**HLR Configuration**	This window is divided into the following tabs: HLR Config: allows to provision HLR Configuration parameters, HLR Number Configuration, and HLR SIP Subscriber Information for MAP SRI Interworking with SIP Subscribers.

		• TCAP: allows manual execution of the TCAP out-of-service and TCAP in-service operations. • Cancel LOC: allows manual execution of a Cancel Location and a Cancel GPRS Location. • PLMN: allows manual provisioning of Plmns and Home Plmns. • MNP: allows manual activation/deactivation of the Mobile Number Portability functionality. • VlrMsgNotification: allows manual activation/deactivation of the XML Notifications on UL, GPRS-UL, SAI, Ready SM, Purge MS and CL.
	HLR System Features	Provisions USSD messaging handling parameters such as Service Code, Application Node, and Application Node address. Moreover, it allows to configure the following HLR features: FTN Management, FTN Digits Analysis, XML notification on NDC change, Short Number Translation on RegSS.
	Roaming Controls	Provisions PLMN and IMSI Rejection error causes, VLR/PLMN Definitions, OCPLMN templates, Allowed IMSI ranges and Service Screening Templates.
	MAP Policing	Defines custom templates by provisioning Application Context templates and AcTemplateMapping to associate each of these templates to a node number. It also displays the NodeNumber and NodeNumberAcMapping tables. It also enables the operator to force the Tekelec ngHLR to send MAP_Reset messages to peer nodes.

	Routing Controls	Allows the Network Operator to:
		• Define Destination Router addresses
		• Define Routing Templates for the GSM/IMS Router (MT-SMS/SRI/SRI-LCS/ATI routing). Defining a routing template consist mainly in setting the following:
		  • Routing trigger
		  • Routing type
		  • Destination Router
		  • Default Action
		• Define Routing exceptions (only applies for MT-SMS routing)
		• Define a subscriber IMSI for Redirect Routing (only applies to MT-SMS routing)

	Bearer Capabilities	Provisions different types of Bearer Capability information, each identified by a unique BearerCapName to which MSISDNs can be associated to when provisioning the subscriber profile.
	CAMEL	Provisions the HLR Camel USSD General Csi parameters, Camel GSM Service Control Functionality and the CamelServiceMaskTemplate for enhanced CAMEL handling.
	TemplatePDN Context	This window allows to define PDN Context Templates for the LTE-HSS profiles. Each PDN Context provisioned for a LTE-HSS profile must have a PDN Context Template assigned to it.
	Mobile Number Portability	Provisions the Mnp entity in order to provision the Number Portability data for each "ported" MSISDN and the ImsiForRedirect entity in order to provision the IMSI that must be returned in the SRI-ack when the Tekelec ngHLR redirects the interrogating node to the recipient's network.
	Subscriber Signaling Router	Activates/Deactivates SSR (Subscriber Signaling Router functionality) and provisions SSR Templates and assigns them to an IMSI or IMSI range and to a MSISDN or MSISDN range.
AUC	**A4/K4**	Provisions the A4/K4 Transport Encryption Algorithm by defining A4/K4 combinations.
	Algorithm	Provisions the Authentication algorithms that will be used to authenticate subscribers.
SS7	**CONFIG**	Allows to view the activation status of the SS7 and SIGTRAN links
	MAP	Provisions MAP general parameters, SAP, Application context, and Timer profile.
	TCAP	Provisions TCAP general parameters, SAP, and Timer profile.
	SCCP	Provisions SCCP general parameters, Timer profile, Network SAP, User SAPs, Route, Concerned Area, Global title entries and SCCP addresses.
	M3UA	This is part of the SIGTRAN protocol. It is used to provision M3UA general parameters, Network, Network SAP, SCT SAP, PSP, PS and Route.
	MTP3	Provisions MTP3 general parameters, Network SAP, Timer profile, Signalling points, Combined Linksets, Linksets, Links, and Routes.
	MTP2	Provisions MTP2 general parameters, Service Access Point (SAP), and Timer profiles.

	SAAL	Provisions SAAL general parameters and Service Access Point (SAP).
	TUCL	This is part of the SIGTRAN protocol. It is used to provision the TUCL general parameters and the TUCL Sap (TSap).
Oamp	**License Manager**	Displays the License information and allows to view the number of active subscribers at the end of each month. It also allows to provision active and total thresholds.
	User Management	Manage users, following the USM feature, the group they are in and their password as well as their access privileges.
	AuditManager	Provisions: The AuditManager entity: • The Audit log message format (CSV or XML) • The number of days that the old audit log files must be kept in the /export/audit director. • The debug information request in order to request the following debug information to be included in each audit line: slot, module, file and line. By default, this debug information is not included. The AuditInfo entity: • The new AuditInfo entity has been implemented to allow the Network Operator to view the information that is being audited and its audit status: Enable or Disable.
	NotificationManager	Manage notification subscription permissions/properties for each application and users.
	PMCounterValue	Allows to view the current value of OS Resource and HLR Subscriber counters.
	PMCounter Threshold	Allows to view and edit the thresholds implemented for the OS Resource counters.
Database	**Backup/Restore/ DRM**	Performs a manual backup and a restore of the entire database file or individually of some portions of the database. Can also perform an automatic backup of the subscriber's profile data. Also allows to manage the self healing functionality of the system (Database Monitoring Replication).
SIP	**Server Configuration**	Provides information on the SIP Configuration attributes and their values as well as on the Sip IP Configuration.
	Security	Provides information on the SIP Security Configuration attributes and their values.

	Registrar	Provides information on the Registrar Configuration and its Domain and provisions the RegistrationBinding.
	Redirect	Provides information on the SIP Redirect Configuration's attributes and their value.
	User Agent	Provides information on the SIP User Agent Configuration, the SIP User Agent Register Configuration, the User Agent PersistentContact and the IP User Agent Configuration attributes and their values. It also provides information on the UaRegistrationBinding.
	User Portability	Provides access to the NpAorUseRangePrefix table, which defines Address of Record user range prefixes.
	SIP Tas	Allows the Network Operator to conigure Telephony Application Server (TAS) data (Gt, Tt, Prefix, TasId, TasFQDN, OverrideTt, etc.). The SDM extracts the TAS data configured here when redirecting/relaying messages to an external TAS.
HSS	**HSS Configuration**	Provides information on the HSS Configuration, HSS Configuration TCP Listen Address and HSS Configuration SCTP Listen Address, their attributes and their values. Also allows the provisioning of HSS parameters such as HSS Configuration Destination Realm and HSS Configuration Destination Hosts.
	HSS AuC	Allows to configure the Authentication schemas and algorithms that will be used to authenticate IMS subscribers.
	HSS System Features	Provisions HSS Subscriber configuration parameters, such as HSS Charging Info, HSS S-CSCF Server, HSS Authorized Visited Network and HSS AS Permanent list. It also allows to configure the SPR by defining the Service Indications supported by the SPR from the Sh interface and from the OAM&P provisioning interface, setting the Auto Enrollment feature and data compression level, and configure internal receive queue, sequential write/read/write requests, as well as HTTP and XML-REST request processing.
	SharedInitial FilterCriteria	Provision the Shared Initial Filter Criteria feature by allowing to define Shared Initial Filter Criterias and for each of them a list of Shared Service Point Triggers.
LTE-HSS	**LTEHSS Configuration**	Provides information on the LTE-HSS Configuration, LTE-HSS Configuration TCP Listen Address and LTE-HSS Configuration SCTP Listen Address, their attributes and their values. Also allows the provisioning of LTE-HSS parameters such as LTE-HSS Configuration Destination

		Realm and LTE-HSS Configuration Destination Hosts. Finally this window offers access to another window through the PLMN tab. This window allows to define allowed PLMNs for specific IMSI Ranges. This is used to allow/disallow roaming to subscribers depending on their IMSI Range and the PLMNs defined in this window. Through the GMLCNodeList tab the operator can define valid GMLC nodes. These nodes are used to validate the GMLC number contained in the RIR (Routing Information Request) to ensure it belongs to a node authorized to request location services (LCS) routing information. Through the Realms tab the operator can define valid LTE-HSS Realms. A host, realm and an IMSI range can be defined. These are used when the LTE-HSS receives a diameter request message from a node in another network and needs to determine the host and realm values to send in the response. It is also used when the LTE-HSS initiates a request message.
	LTEHSS System Features	Allows the Network Operator to: • Activate and deactivate LTE-HSS logging • Modify LTE-HSS log file attributes • Activate and deactivate multiple realm support in the LTE-HSS
SLF	**SLF Configuration**	Provides information on the SLF Configuration, SLF Configuration TCP Listen Address and SLF Configuration SCTP Listen Address, their attributes and their values. Also allows the provisioning of SLF parameters such as SLF Configuration Destination Realm and SLF Configuration Destination Hosts.
AAA	**AAA Configuration**	Provides information on the AAA Configuration, AAA System Accounting Servers, AAA Network Access Servers and AAA NAS Accounting Servers, their attributes and their values.
	Provisioning Configuration	Provisions the Dynamic IP Address Allocation functionality by allowing to add, display, modify and delete AAA Address Allocation Policies, AAA Address Allocation Ranges and AAA Address Allocation Associations.
ENUM Server	**ENUM Server Configuration**	Allows to provision the following DNS data: • DNS Domain Name List • DNS ENUM User Template • DNS Black List Range • DNS Black List ENUM

	Provisioning Configuration	Allows to view and edit the ENUM Server and DNS Listen Addresses configuration data
EIR	**EIR Configuration**	The EIR configuration window defines: • The common EIR configuration • The IMEI range and associated equipment status for the range • The Diameter host authorized to establish new Diameter connection with EIR application. • Which equipment status to return in ECA if an EMEI has been configured in several lists (White/Grey/Black)
LTEEIR	**LTEEIR Configuration**	The LTE-EIR configuration window configures the Diameter protocol: • Defines Diameter host name and Diameter realm of the EIR for LTE. • Configures IP address for SCTP/TCP connections. • Defines Diameter host authorized to establish new Diameter connection with EIR application. • Defines list of authorized diameter realms
Diameter	**DRA Configuration**	The DRA configuration window configures the Diameter Relay Agent by defining the diameter host name of DRA to connect to the HSS

Subscription Management	**Subscriber Provisioning**	The Subscriber Provisioning window:
		• Defines SubscriptionIDs to represent subscribers.
		• Provisions SIM cards assigned or unassigned to a Subscription ID using one of the following operations:
		  • Assign SIM
		  • Unassign SIM
		  • Swap SIM
		  • Display Deferred Swap
		  • Delete HLR Subscriber using the Delete HLRSubscriber button
		  • Search subscriber profiles
		• View/Modify/Add/Delete Policy subscriber profiles
		• View policy quota and state data using the Policy PublicIdentity search
		• Delete quota data using the Reset Quota button in the Policy PublicIdentity search
		• View/Modify/Add/Delete an SPR Pool
		For each subscriber (SubscriptionID), provisions:

		• IMSIs for the SIM card assigned to the subscriber (SubscriptionID). • MSISDNs for the SIM card assigned to the subscriber (SubscriptionID). • IMSI-MSISDN associations (Primary and alternate) > Multiple IMSIs • HLR Subscriber Profile with a Service Profile in which services such as Call Forward, Call Barring, Closed User Group, Camel Service, Number ID, Call Completion, Call Waiting, and Change Service can be provisioned. Within the Service profile of an HLR Subscriber Profile, an LTE-HSS subscriber profile can also be provisioned. • SIP Subscribers and their AddressOfRecords • HSS Subscribers and their service profile by allowing to create Private Identities as well as Service Profiles and Public Identities. It also permits to create IMS-HSS Initial Filtering Criteria and link Public Identities for different service Profiles. • AAA users by creating AAA User IDs and specifying their Vendor Specific Attributes. • ENUM users • Link Public Identities to HSS Names for SLF Redirect Host Mapping.

Window display overview

Information shown on the screen provides a snapshot view. To view the current status, refresh the screen by clicking the application name on the main menu.

Note: The Shelf View and Active Alarm screens are dynamically updated. All the other screens provide a static view. Information shown on these screens provides a snapshot view. To view the current status, refresh the screen by clicking the application name on the main menu.

In the WebCI, the system entities are displayed as tables. In each window, a series of tables can be provisioned. The WebCI automatically stores the information provisioned in these tables in the system's corresponding database entities.

The following windows display tabs at the top that provide access to sub-categories of the window:

- HLR folder: HLR Configuration window
- SS7 folder: All windows
- SIP folder: Registrar and User Agent windows

Each tab displays different tables. This allows to keep the WebCI display more organized and the tables regrouped per category.

As an example, the figure below depicts the tabs in the HLR Configuration window:

The WebCI displays all the entities that can be edited by the operator for system configuration and subscriber provisioning. The operator can perform the following from the WebCI:

- System Configuration
- System Maintenance, Troubleshooting, Monitoring

SIM card and subscriber provisioning is usually performed in bulk with the SOAP/XML interface or with the Command File Loader. These interfaces are described in the *Subscriber Provisioning Reference Manual and User Guide*.

The different operations that can be performed to provision each of these tables are displayed in the form of a GUI button and are located nearby or within each table. After clicking on one of these buttons, a provisioning window will appear to allow you to set the values of the table's parameters to provision an entry in the table. In this provisioning window, the parameters identified by a * are mandatory parameters that have to be provisioned to be able to commit the entry.

Some WebCI windows also display buttons that are not specific to a table. These buttons are located independently from any table and they allow to perform operations when troubleshooting the system.

Other WebCI windows display some operations in a different format, with a symbol. For more details on the different operations format the WebCI displays, refer to the next section.

Shelf View

This window displays the information on each of the hardware platform's slots (processors) and the services running on each one of them. This window allows to configure the system with identities/services on each slot. This view also allows to perform Switch Overs.

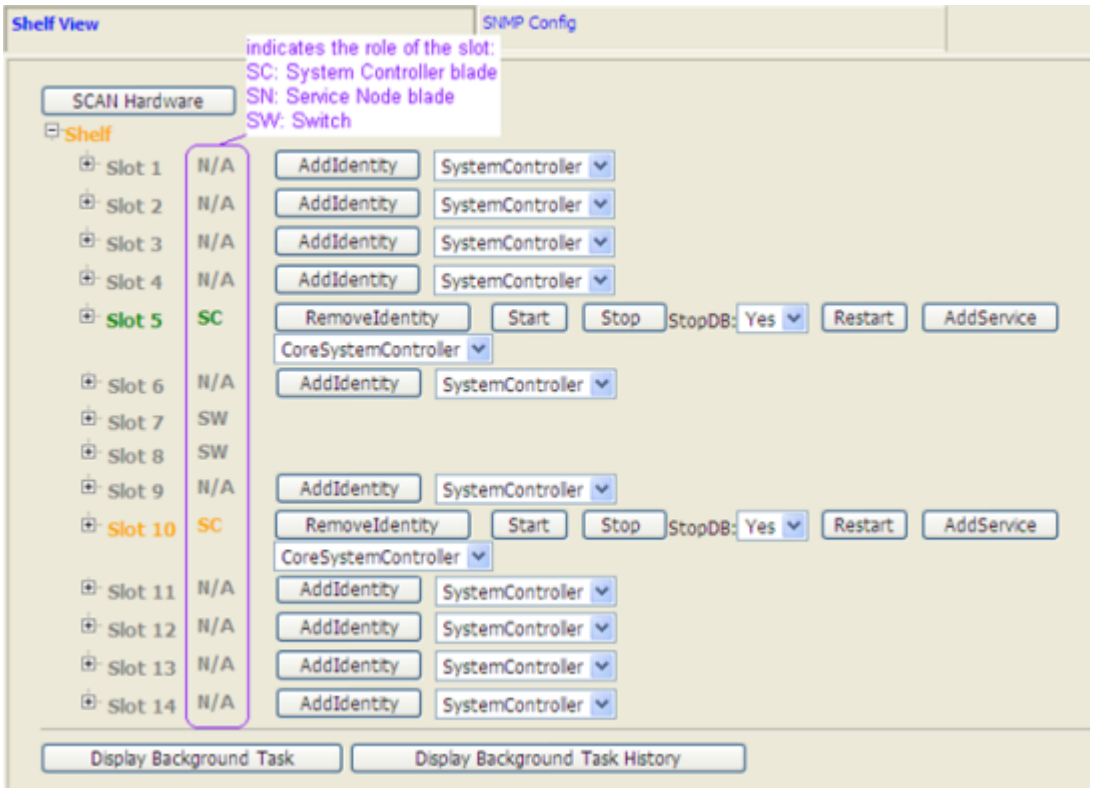
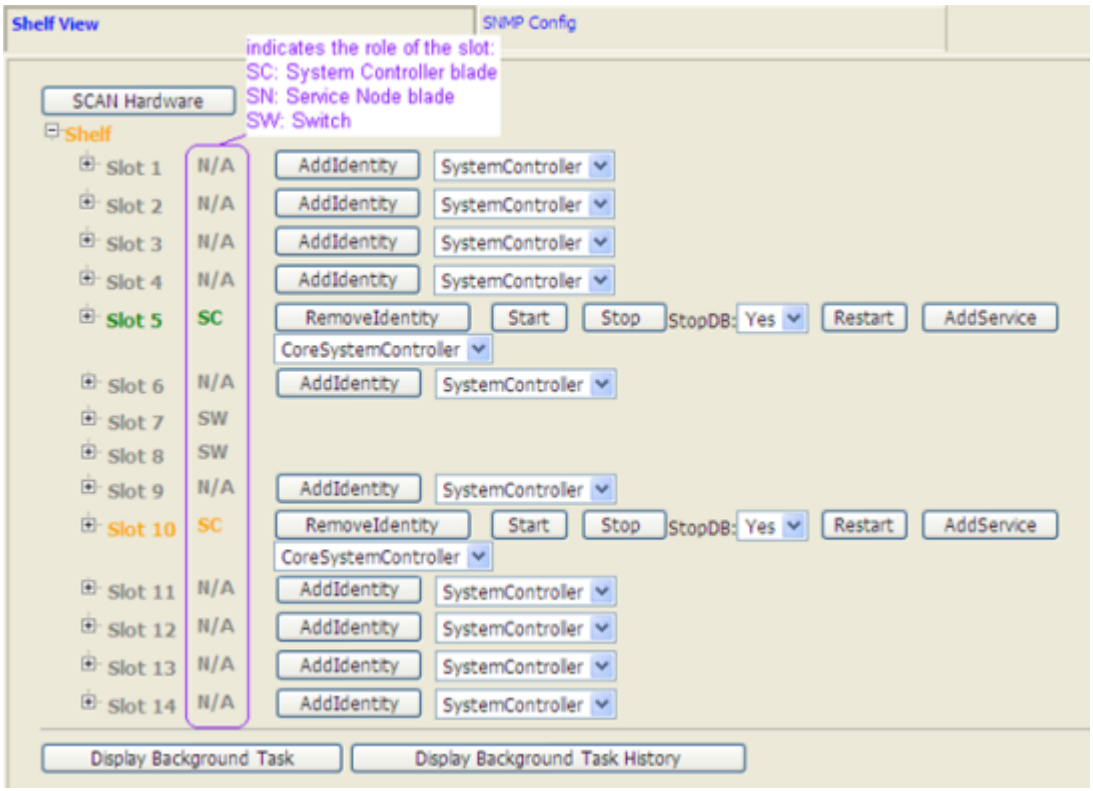


Figure 7: Shelf View Window

As you can see, in the Shelf View window, each slot is preceded by a ⊞ symbol. Clicking on it will display further information about the slot, such as: the services running on the slot and configuration operations that can be performed on the slot. Another ⊞ symbol precedes each slot's service(s), clicking on it will display further details about the processes running within each service and their state: ResourceState, HaRole, OpState, AdminState. For details about these different service states, refer to the "Services running on the system" section of the *SDM Product Description*.

Shelf View

The shelf View tab displays the slot (processor) information for each hardware platform and the services running on each. Use this window to configure the system identities and services per slot and perform switch overs.



In the Shelf View window, each slot is preceded by a Plus ⊞ symbol. Clicking the symbol will display further information about the slot, such as the services running on the slot and the configuration operations that can be performed on the slot. Another Plus ⊞ symbol precedes each slot's service(s), clicking the symbol will display further details about the processes running within each service and their state: ResourceState, HaRole, OpState, AdminState. For details about these different service states, refer to the "Services running on the system" section of the SDM Product Description.

Operations Available

The WebCI allows you to provision tables and perform different operations through buttons.

Some buttons provision the system entities and include add, delete, and modify operations. The buttons are located underneath the table or in each row within the table. They are labeled with the action to be performed, for example

to add an HLR configuration.

In addition to the provisioning buttons, some operations are represented by symbols. The table provides a list of operations performed by symbols and provides the symbol location within the WebCI.

Table 3: Operations performed by symbols

WebCI folder	WebCI window	Symbol	Location in window	Operation
None (Main WebCI page)	None		Top right corner of Main page.	Logs out of the WebCI and ends the session.
System	**Active Alarm View**		In the last column to the right in the Active Alarm table, for each alarm.	Clears the alarm described in the same row.
System	**Active Alarm View**		Top right corner of the Active Alarm View window.	Acknowledges all alarms.
System	**Active Alarm View**		In the last column to the right in the Active Alarm table, for each alarm.	Acknowledges the alarm described in the same row.
System	**Active Alarm View**		Top right corner of the Active Alarm View window.	Stops the Auto-Refresh mechanism.
System	**Active Alarm View**			Starts the Auto-Refresh mechanism.
Not specific	Not specific		Varies	Displays the previous page or the previous entries in the table.
Not specific	Not specific		Varies	Displays the next page or the next entries in the table.
SS7	**MAP > GSM MAP** **MAP ➤ Application Context** **MAP ➤ GsmMap Timer Profile** **TCAP ➤ Tcap Sap**		At the right of the table. It appears for each entry provisioned in this table.	Displays the SS7 layer's Timers Configuration table to allow you to edit the Timers.

	TCAP ➤ Tcap Timer Profile **SCCP ➤ Timer Profile** **M3UA ➤ SCT Sap** **MTP3 ➤ Timer Profile** **MTP2 ➤ MTP2 Sap** **MTP2 ➤ MTP2 Timer Profile**			
SS7	**MAP ➤ GsmMap Sap** **MAP ➤ Application Context** **TCAP ➤ Tcap Sap** **SCCP ➤ Network Sap** **SCCP ➤ User Saps** **SCCP ➤ Route** **SCCP ➤ Concerned Area** **M3UA ➤ Network Sap** **M3UA ➤ SCT Sap** **M3UA ➤ PS** **M3UA ➤ PSP** **MTP3 ➤ Network Sap** **MTP3 ➤ Signalling Point** **MTP3 ➤ Routes** **MTP3 ➤ Links** **MTP2 ➤ MTP2 Sap** **Sigtran ➤ Sigtran Local IP** **Sigtran ➤ Sigtran Remote IP**		At the right of the table. It appears for each entry provisioned in this table.	Displays the parameters that can be modified in the table to allow you to edit an already provisioned entry.
SS7	**MAP ➤ GsmMap Timer Profile** **TCAP ➤ Tcap Timer Profile** **SCCP ➤ Timer Profile**		At the right of the table. It appears for each entry provisioned in this table.	Deletes the entry already provisioned in the table.

	SCCP ➤ Route **SCCP ➤ Concerned Area** **SCCP ➤ Global Title Entries** **SCCP ➤ SCCP Addresses** **M3UA ➤ Network** **M3UA ➤ Network Sap** **M3UA ➤ SCT Sap** **M3UA ➤ PS** **M3UA ➤ PSP** **M3UA ➤ Route** **MTP3 ➤ Timer Profile** **MTP3 ➤ Signalling Point** **MTP3 ➤ Combined Linksets** **MTP3 ➤ Linksets** **MTP3 ➤ Routes** **MTP3 ➤ Links** **MTP2 ➤ MTP2 Sap** **MTP2 ➤ MTP2 Timer Profile** **TUCL ➤ Tucl Sap** **SAAL ➤ Saal Sap** **Sigtran ➤ Sigtran Local IP** **Sigtran ➤ Sigtran Remote IP**			
SS7	**TCAP ➤ Tcap Sap**		At the right of the table. It appears for each entry provisioned in this table.	Deletes unused TCAP dialogues.
SS7	**TCAP ➤ Tcap Sap**		At the right of the table. It appears for each entry	Deletes unused TCAP invokes.

			provisioned in this table.	
SS7	**SCCP ➤ Network Sap**		At the right of the table. It appears for each entry provisioned in this table.	Displays the parameters that can be edited to set the Sio Priorities.
SS7	**SCCP ➤ User Saps** **SCCP ➤ Concerned Area**		At the right of the table. It appears for each entry provisioned in this table.	Displays the Concerned PCs.
SS7	**SCCP ➤ Route** **SCCP ➤ Concerned Area**		At the right of the table. It appears for each entry provisioned in this table.	Displays the parameters that allow you to add/edit a backup Point Code for that SCCP Route.
SS7	**M3UA ➤ SCT Sap**		At the right of the table. It appears for each entry provisioned in this table.	Bind s and creates a relation between the Sap user in the corresponding layer and its Sap provider in the lower layer.
SS7	**M3UA ➤ SCT Sap**		At the right of the table. It appears for each entry provisioned in this table.	Deletes the relation between the Sap user in the corresponding layer and its Sap provider in the lower layer.
SS7	**M3UA ➤ PSP**		At the right of the table. It appears for each entry provisioned in this table.	Establishes the PSP association between the Tekelec ngHLR and the remote peer (PSP) through an SctSap.
SS7	**M3UA ➤ PSP**		At the right of the table. It appears for each entry provisioned in this table.	Terminates the association between the Tekelec ngHLR and the remote peer (PSP).
SS7	**M3UA ➤ PSP**		At the right of the table. It appears for each entry provisioned in this table.	Indicates to the peer that the Application Server process is up and that the SIGTRAN applications are ready to receive traffic.
SS7	**M3UA ➤ PSP**		At the right of the table. It appears for each entry	Indicates to the peer that the Application Server process is down and that the SIGTRAN

			provisioned in this table.	applications are no longer ready to receive traffic.
SS7	**M3UA ➤ PSP**		At the right of the table. It appears for each entry provisioned in this table.	Activates the Application Server process (ASP).
SS7	**M3UA ➤ PSP**		At the right of the table. It appears for each entry provisioned in this table.	Deactivates the Application Server process (ASP).
SS7	**M3UA ➤ PSP**		At the right of the table. It appears for each entry provisioned in this table.	The PSP Association is available to carry traffic.
SS7	**M3UA ➤ PSP**		At the right of the table. It appears for each entry provisioned in this table.	The PSP Association is not available to carry traffic.
SS7	**MTP3 ➤ Combined Linksets**		At the right of the table. It appears for each entry provisioned in this table.	Displays the linksets.
SS7	**MTP3 ➤ Linksets**		At the right of the table. It appears for each entry provisioned in this table.	Displays the links.
SS7	**MTP3 ➤ Linksets MTP3 ➤ Links**		At the right of the table. It appears for each entry provisioned in this table.	Activates the linkset/link.
SS7	**MTP3 ➤ Linksets MTP3 ➤ Links**		At the right of the table. It appears for each entry provisioned in this table.	Deactivates the linkset/link.
SS7	**MTP3 ➤ Links**		At the right of the table. It appears for each entry	Blocks the link.

			provisioned in this table.	
SS7	**MTP3 ➤ Links**		At the right of the table. It appears for each entry provisioned in this table.	Inhibits the link.
SS7	**MTP2 ➤ MTP2 Sap**		At the right of the table. It appears for each entry provisioned in this table.	Activates an MTP2 SAP to bind the MTP2 layer to the MTP3 layer.
SS7	**MTP2 ➤ MTP2 Sap**		At the right of the table. It appears for each entry provisioned in this table.	Deactivates an MTP2 SAP to unbind the MTP2 layer to the MTP3 layer.

Sorting Alarms

From the Active Alarm View and History Alarm View windows, any of the alarm items can be sorted according to the heading names. Clicking on the heading name will toggle between sorting in ascending (shown by up arrow ↑) and descending order (shown by the down arrow ↓).

Auto Refresh

The WebCI has an auto-refresh mechanism that automatically refreshes and updates the Active Alarm View window every 15 seconds. This allows the following:

- The Active Alarm View window to dynamically display current active alarms.
- The WebCI session to remain refreshed and opened even if there is no activity performed on the WebCI for a certain period of time. To achieve this, the user must leave the WebCI opened with the Active Alarm View window opened.

It is possible to manually deactivate/activate the auto-refresh mechanism by performing the following from the Active Alarm View window:

- Stop the auto refresh cycle, by clicking the action button (in the top right corner) when it is red.
- Start the auto refresh cycle, by clicking the action button when it is green.

Note: The auto-refresh mechanism is active by default.

The refresh timer is displayed only for Internet Explorer browser windows. To view timer information, the View Status toolbar must be set to showing.

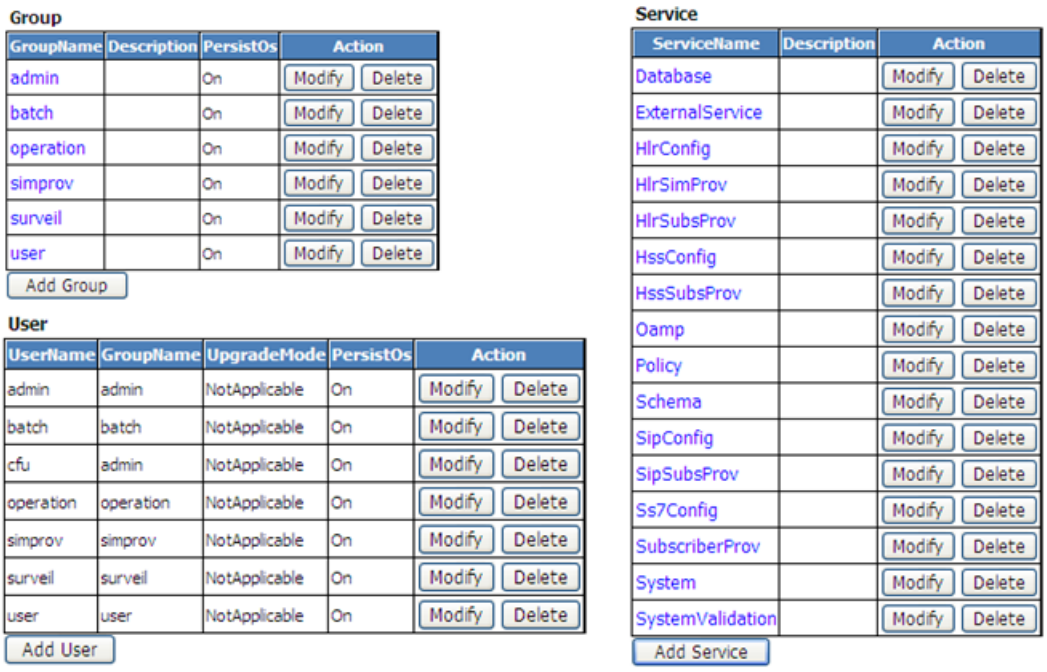
User Security Management

The SDM system offers its users high security by giving the administrator the capability to make the following user restrictions from any of the supported SDM user interfaces (CLI, WebCI, XML interfaces):

- Manage users by classifying them within groups with specific access privileges and services.
- Manage notifications sent to subscribed users about updates to certain applications (entities/attributes).

The following sections describe the entities and attributes available through the CLI and WebCI to manage user privileges.

User Security Management through WebCI



Group

GroupName	Description	PersistOs	Action
admin		On	Modify Delete
batch		On	Modify Delete
operation		On	Modify Delete
simprov		On	Modify Delete
surveil		On	Modify Delete
user		On	Modify Delete

Add Group

User

UserName	GroupName	UpgradeMode	PersistOs	Action
admin	admin	NotApplicable	On	Modify Delete
batch	batch	NotApplicable	On	Modify Delete
cfu	admin	NotApplicable	On	Modify Delete
operation	operation	NotApplicable	On	Modify Delete
simprov	simprov	NotApplicable	On	Modify Delete
surveil	surveil	NotApplicable	On	Modify Delete
user	user	NotApplicable	On	Modify Delete

Add User

Service

ServiceName	Description	Action
Database		Modify Delete
ExternalService		Modify Delete
HlrConfig		Modify Delete
HlrSimProv		Modify Delete
HlrSubsProv		Modify Delete
HssConfig		Modify Delete
HssSubsProv		Modify Delete
Oamp		Modify Delete
Policy		Modify Delete
Schema		Modify Delete
SipConfig		Modify Delete
SipSubsProv		Modify Delete
Ss7Config		Modify Delete
SubscriberProv		Modify Delete
System		Modify Delete
SystemValidation		Modify Delete

Add Service

Figure 8: User Manager

The User Management window provides information on the user, its username and password, on the different Groups, its identifier and name, and on the access privileges (access permission) associated to each Group for a specific Service. The User Management window displays the following tables: User, Service, Group and AccessPrivileges. These tables can only be modified by the Admin Group, while each user can change their own password.

Through the WebCI, the administrator of the system, already defined in the admin group, can:

- Create new groups and provision the desired access privileges for each one of them, by provisioning the Group table.
- Modify the access privileges provisioned for each group (including pre-defined groups), by clicking on each GroupName link. This means that the administrator of the system can modify the permissions defined for each service of a specific group.

- Delete groups (including pre-defined groups, except the 'admin' group)
- Create new users and associate them to the right group by provisioning the User table.
- Delete users (including pre-defined users, except the 'admin' user)
- Modify the password of a user or the group to which the user (including predefined users) is associated to, by clicking on the 'Modify' button in the User table.
- Create/Delete services by provisioning the Service table.
    - **Warning:** The predefined services cannot be deleted since these are internal services and a deletion could impact the system.

For instructions on how to provision these tables, refer to the 'Creating and Managing users for the User Interfaces' section of the *SDM System Configuration - User Guide*.

User Security Management through CLI

Users can be managed only by the users in Group Admin, except for the fact that each user can change their own password. Please refer to the "Users" section of the *SDM Product Description* for details on the Admin Group.

This section describes the CLI commands to manage users through the CLI.

User

Name
`User`

Description

This is used to define users and their user name and password.

CLI Navigation
```
Oamp[]> SecurityManager[]> User
```

CLI Inherited Attributes

None

CLI Command Syntax
```
Oamp[]> SecurityManager[]>  add User [UserName = string; Password = string;
GroupName = string]
```

Operations Permitted

Display, add

Attributes and Values

Table 4: User attributes

Mandatory Attributes	Value Range	Default	Description
`UserName`	Up to 20 characters except the following: "/ \ [] : ; | = , + * ^ <>"	N/A	Identifier that uniquely identifies a user.
`Password`	Minimum of 6 characters and up to 64 characters encrypted.	`UserName` (ex: `UserName admin, UserPasswd: admin`)	Encrypted password unique for each Group a user is associated to.
`GroupName`	Made of up to 64 characters in lowercase. Groups already predefined in the system: • operation • surveillance • admin • batch • simprov	N/A	Name of the Group to which the user is associated to. This gives access privileges to a user.
Optional Attributes	**Value Range**	**Default**	**Description**
`UpgradeMode`		Not Applicable	For future use.
`PersistOS`	Bool 0 , 1	0	This parameter indicates to the SDM system whether or not to store the user information in the Operating System (OS) in addition to being stored in the database. Once the user information is added to the OS, the user can login to the blade using terminal emulator. • 0=The user information is not stored in the OS, but only in the database. • 1= The user information is stored in the OS in addition to being stored in the database.

CLI Example

```
1 : Oamp[]> SecurityManager[]> display User[UserName = blue1]
```

Group

Name
`Group`

Description

This is used to define a user group (some are pre-defined at installation of the system), which consists of a group name and the right access granted for each service. A group may be associated to several users.

CLI Navigation
`Oamp[]> SecurityManager[]> Group`

CLI Inherited Attributes

None

CLI Command Syntax

```
Oamp[]> SecurityManager[]> display Group [GroupName = string]
```

Operations Permitted

Display, modify.

Attributes and Values

Table 5: Group attributes

Mandatory Attribute	Value Range	Default	Description
`GroupName`	Made of up to 64 characters in lowercase. Groups already predefined in the system: • user • operation • surveillance • admin • batch • simprov	N/A	Name of the Group that regroups users that have been categorized based on their system use and that have the same access privileges and access permission for the different entity services on the system. For more details on each of the predefined Groups, refer to the "Users" section of the *SDM Product Description*.
`PersistOS`	Bool 0 , 1	0	This parameter indicates to the SDM system whether or not to store the user

Mandatory Attribute	Value Range	Default	Description
			information in the Operating System (OS) in addition to being stored in the database. Once the user information is added to the OS, the user can login to the blade using terminal emulator. • 0=The user information is not stored in the OS, but only in the database. • 1= The user information is stored in the OS in addition to being stored in the database.
Optional Attribute	**Value Range**	**Default**	**Description**
`Description`	String (up to 256)	N/A	This parameter allows to give a clear description of the group.

CLI Example

```
1 : Oamp[]> SecurityManagement[]> display Group[GroupName = user]
```

Security Access Privileges

Name

`SecurityAccessPrivileges`

Description

This entity defines access privileges to a user group by making an association between a user group, a service, and an access permission. Each access privilege gives a single group the access permission (Read/Write/Execute) to a single service.

CLI Navigation

`Oamp[]> SecurityManager[]> Group []> SecurityAccessPrivileges`

CLI Inherited Attributes

`GroupName`

CLI Command Syntax

```
Oamp[]> SecurityManager[]> Group [GroupName = string] > display
SecurityAccessPrivileges [ServiceName=char; Permission=integer]
```

Operations Permitted

Display, add, modify

Attributes and Values

Table 6: SecurityAccessPrivileges attributes

Mandatory Attribute	Value Range	Default	Description
ServiceName	Integer except "0" Services that are already predefined in the system: • Database • ExternalService • HlrConfigHlr SimProv • HlrSubsProv • HssConfig • HssSubsProv • Oamp • Policy • Schema • SipConfig • SipSubsProv • Ss7Config SubscriberProv • System	N/A	Identifier that identifies a service and their associated entities. A service is associated to each user group to define to which entities it has access to. Please see *NOTE below for more details on the entities associated to the services.
Optional Attribute	**Value Range**	**Default**	**Description**
Permission	• `1 Read (Display)` • `2 Write (Add/ Modify/Delete)` • `3 ReadWrite` • `4 Execute (Access to entity own operations)` • `5 ReadExecute` • `7 Read WriteExecute`	N/A	Type of action a user group can do to the entities it has access to. Please see **NOTE below for more details on the access permissions allowed by a user group for all the different services.

Important: The User Security Management feature allows any module to supersede any access right, meaning that module could define their own access rights and those rights cannot be overwritten. For

example, if a particular entity cannot be added or deleted, the module will prevent the user from adding or deleting the entity.

CLI Example

```
 1 : Oamp[]>
SecurityManager[]> Group[GroupName=user]> display
SecurityAccessPrivileges[ServiceName = Oamp]
```

Predefined services and associated entities

An entity can belong only to one service. The following table displays the different pre-defined services and their associated entities:

Table 7: Predefined services and associated entities

Service	Entities
System	System, Shelf, Slot, SmModule, Alarm, AlarmHistory
Subscriber Provisioning (Subscription)	All entities that are used to provision Subscriptions (SubscriptionID)
HLR Subscriber Provisioning	All entities that are used to provision a HLR subscriber profile.
SIM Provisioning	All entities that are used to provision Sim cards and associate them with IMSIs.
HLR Configuration	All the HLR entities that are used to configure the Tekelec ngHLR.
SS7 Configuration	All SS7/SIGTRAN entities that are used to configure SS7 and SIGTRAN.
HSS Subscriber Provisioning	All the HSS subscriber entities
HSS Configuration	All the HSS entities which are used to configure the HSS.
SIP Subscriber Provisioning	All the SIP subscriber entities
SIP Configuration	All the SIP entities which are used to configure the SIP functionality
Database	Database entity (Backup/Restore/DRM operations)
OAMP	LicenseManagement, UserManagement, NotificationManagement, Performance Management counter.
Schema	All the entities used by the schema: • CacheAttribute • Constraint • ConstraintAttribute • DataType • Entity • LdapAttribute • LdapAttributeCriteriaRelation • LdapAttributeMapping • LdapAttributeMappingCriteria

Service	Entities
	• LdapNamingContexts • LdapObjectClass • LdapObjectClassCriteria • LdapObjectClassCriteriaRelation • LdapRdn • Namespace • Operation • Parameter • PhysicalAccessPath • RDbDataType • Reference • ReferenceParameter • ResourceManager • Schema • Schemaversion • SchemaVersionFile • Token • TokenMaxPerCategory
External Service	Entities that are used to manage external services defined by the Network Operator in the Global Schema.
SystemValidation	All entities used for system validation.
Policy	Subscriber, IdMap, FieldInformation

Access permissions per service and group

Each access privilege gives a single group the access permission (Read/Write/Execute) to a single service. The access privileges table is defined or fined tune by the operators when needed (when a new group is added or an existing group needs to be altered).

Table 8: Predefined access permissions to services per user group

Services/Group	User	Operation	Surveillance	Admin	Batch	Simprov
System	R	RWX	R	RWX		
OAMP	R	R	R	RWX	R	
Database		RWX		RWX		
HLR subscriber prov	RWX			RWX	RWX	
SIM provisioning	RWX			RWX	RWX	RWX

Services/Group	User	Operation	Surveillance	Admin	Batch	Simprov
HLR configuration	RWX		R	RWX		
SS7 configuration	RWX		R	RWX		
SIP subscriber prov	RWX			RWX	RWX	
SIP configuration	RWX		R	RWX		
HSS subscriber prov	RWX			RWX	RWX	
HSS configuration	RWX		R	RWX		
External Service				RWX	RX	
Subscriber Provisioning	RWX			RWX	RWX	
Schema				RWX		
Policy				RWX		

R: Read (Display) W: Write (Add/Modify/Delete) X: eXecute (Access to entity own operations)

Important: The User Security Management feature allows any module to supersede any access right, meaning that a module could define its own access rights and those rights cannot be overwritten. For example, if a particular entity cannot be added or deleted, the module will prevent the user from adding or deleting the entity.

Service

Name
`Service`

Description

In addition to the internal services pre-defined in the system, the Network Operator can use this entity to define/modify/delete external services that regroup entities manually added by the Network Operator in the system's Global Schema.

CLI Navigation
```
Oamp[]> SecurityManager[]> Service
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Oamp[]> SecurityManager[]> add Service [ServiceName = string; Description = string]
```

Operations Permitted

Add, display, modify, delete

Attributes and Values

Table 9: Service attributes

Mandatory Attributes	Value Range	Default	Description
`ServiceName`	Up to 20 characters except the following: "/ \ [] : ; | = , + * ^ <>" The pre-defined services are as follows: • System • OAMP • Database • External service • Schema • HLR Subscriber prov • SIM provisioning • HLR configuration • SS7 configuration • SIP subscriber prov • SUP configuration • HSS Subscriber prov • HSS configuration • Subscriber prov • Policy	N/A	Identifier that uniquely identifies a service.
Mandatory Attributes	**Value Range**	**Default**	**Description**
`Description`	`String` (up to 256)	N/A	Description that defines the service.

CLI Example

```
1 : Oamp[]> SecurityManager[]> display Service[ServiceName = HlrConfig]
```

Notification Security Management

The Oamp folder accesses the Notification Management functionality, which allows the management of users, applications, their notification registrations, and properties.

Notification Security Management through WebCI

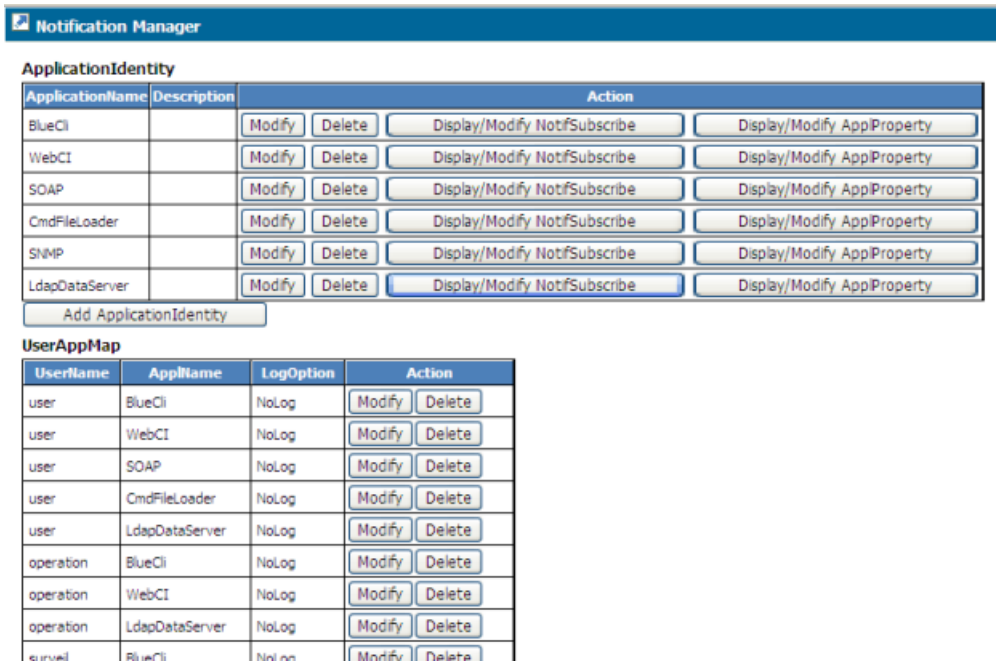


Figure 9: Notification Manager

The Notification Manager window provides information on the applications associated to each user (the applications allowed for each user) and on the applications' notification registration and properties. The user-application combinations are defined in the UserAppMap table. The external applications are defined in the ApplicationIdentity table, each with notification properties and registration permissions that can be defined/deleted in the ApplProperty and NotifSubscribe tables respectively.

For instructions on how to provision these tables, refer to the 'Creating and managing users/applications for the Notifications' section of the *SDM System Configuration - User Guide*.

Notification Security Management through CLI

This section describes the CLI commands that manage which user is allowed to request which type of notification through the CLI.

Only users in the Admin group can manage users, except that all users can change their own password. Refer to the “Users” section of the *SDM Product Description* for details on the Admin group.

Application Identity

Name

ApplicationIdentity

Description

This is used to define applications (application name and description) for which users associated to them will be able to subscribe to receiving notifications.

CLI Navigation

```
Oamp[]> NotificationManager[]> ApplicationIdentity
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Oamp[]> NotificationManager[]> add ApplicationIdentity [ApplName = string;
Description = string]
```

Operations Permitted

Display, add, modify, delete

Attributes and Values

Table 10: ApplicationIdentity attributes

Mandatory Attribute	Value Range	Default	Description
`ApplName`	Up to 20 characters except the following: "/ \ [] : ; | = , + * ^ <>" The pre-defined applications are: • BlueCli • WebCI • CmdFileLoader • SNMP • LdapDataServer • PolicyManager	N/A	Identifier that uniquely identifies an application.
Optional Attribute	**Value Range**	**Default**	**Description**
`Description`	Up to 20 characters except the following: "/ \ [] : ; | = , + * ^	N/A	Identifier that uniquely identifies an application.

Mandatory Attribute	Value Range	Default	Description
	<>" The pre-defined applications are: • BlueCli • WebCI • CmdFileLoader • SNMP • LdapDataServer • PolicyManager		

CLI Example

```
1 : Oamp[]> NotificationManager[]> display ApplicationIdentity[ApplName = BlueCli]
```

Notification Subscribe

Name

`NotificationSubscribe`

Description

This is used to define an NotificationSubscribe application's notification subscription capabilities: namespace, entity, Attribute. The application can only subscribe to notifications for changes/updates made to the entities' attributes or entity defined here.

CLI Navigation

```
Oamp[]> NotificationManager[]> ApplicationIdentity[]> NotificationSubscribe
```

CLI Inherited Attributes

`ApplName`

CLI Command Syntax

```
Oamp[]> NotificationManager[]> ApplicationIdentity [ApplName = char] > add
NotificationSubscribe [Namespace = char; Entity = char; Attribute= char]
```

Operations Permitted

Add, display, modify, delete

Attributes and Values

Table 11: NotificationSubscribe attributes

Mandatory Attribute	Value Range	Default	Description
`Namespace`	There are only two Namespaces in the Global Schema: • 'bn' • 'global' (this is only for the Subscription entity)	N/A	Namespace given for the entity in the Global Schema.
`Entity`	Name of entity in Global Schema.	N/A	Name of the entity for which notifications need to be sent if changes/updates are made.
`ApplName`	Up to 20 characters except the following: / \ [] : ; | = , + * ^ The pre-defined applications are: Unknown, Framework, SchemaManager, , SystemManager, DataProvider, DpController, OampEventViewer, OampEventMgr, OampManager, OampPerformanceManager, HlrServer, HlrProvManager, HlrWgs, AucServer, SS7Manager, SipServer, SipProvManager, NodeManager, TestModuleType, DpReplicator, BlueCli, WebCI, SOAP, CmdFileLoader, SNMP, HssServer, HssProvManager, SipUa, XmlDataServer, DpProxy, SubscriberManager, LdapDataServer, LteHssServer, LteProvManager, Drm, DataAccessServer, ExternalService, PolicyManager, RasServer, EirProvManager, DraProvManager	N/A	Name of the application that is registered to receive notifications on changes of the configured namespace/entity/attribute. This name should be the same as the name specified by the application in the *InterfaceModuleId* parameter when authenticating with the system through the *RequestUserAuc* operation.
Optional Attribute	**Value Range**	**Default**	**Description**
`Attribute`	Name of attribute belonging to the entity as defined in the Global Schema.	N/A	Name of the attribute for which notifications need to be sent if changes/updates are made.

CLI Example

```
1 : Oamp[]> NotificationManager[]> display ApplicationIdentity[ApplName = BlueCli]>
 add NotificationSubscribe[Namespace = bn;
Entity=MSISDN;Attribute=DefaultBsg]
```

Application Property

Name

`ApplicationProperty`

Description

This is used to define the properties of the notifications that must be sent out for each application. It allows the Network Operator to specify the following property for each application/entity for which notifications need to be sent: whether or not the previous value (before update) must be included in the notifications in addition to the current value (after update).

CLI Navigation

`Oamp[]> NotificationManager[]> ApplicationIdentity[]> ApplicationProperty`

CLI Inherited Attributes

`ApplName`

CLI Command Syntax

```
Oamp[]> SecurityManager[]> ApplicationIdentity [ApplName = char] > add
ApplicationProperty [Namespace = char; Entity = char; isValueBefore = 0,1]
```

Operations Permitted

Add, display, modify, delete

Attributes and Values

Table 12: ApplicationProperty attributes

Mandatory Attribute	Value Range	Default	Description
`Namespace`	There are only two Namespaces in the Global Schema: • 'bn' • 'global' (this is only for the Subscription entity)	N/A	Namespace given for the entity in the Global Schema.
`Entity`	Name of entity in Global Schema.	N/A	Name of the entity for which notifications need to be sent if changes/updates are made.

Mandatory Attribute	Value Range	Default	Description
Optional Attribute	**Value Range**	**Default**	**Description**
isValueBefore	Bool 0 , 1	0	This parameter indicates whether or not the previous value (before update of entity) must be sent in the notification in addition to the current value (after update of entity). For example, if the 'ValueBefore' property is set to 'On' for the MSISDN entity on the WebCI application, all the changes made to that entity (for example, on DefaultBsg) from this application will trigger a notification sending the previous DefaultBsg value (before update) and the current DefaultBsg value (after update).

CLI Example

```
1 : Oamp[]> NotificationManager[]> display ApplicationIdentity[ApplName = BlueCli]>
 add ApplicationProperty[Namespace = bn; Entity=MSISDN]
```

User Application Map

Name

UserApplicationMap

Description

This is used to define user-application combinations. Each user account must have one or several applications (as defined in the ApplicationIdentity entity) associated to it. The same user can have different applications associated to it with different logging properties. To achieve this, different entries with the same user name must be created in the UserApplicationMap entity.

CLI Navigation

Oamp[]> NotificationManager[]> UserApplicationMap

CLI Inherited Attributes

None

CLI Command Syntax

```
Oamp[]> NotificationManager[]> add UserApplicationMap [UserName=string;
ApplName=char; LogOption=0,1,2,3]
```

Operations Permitted

Display, add, modify, delete

Attributes and Values

Table 13: UserApplicationMap attributes

Mandatory Attributes	Value Range	Default	Description
`UserName`	Up to 20 characters except the following: "/ \ [] : ; | = , + * ^ <>" The pre-defined users are: • user • operation • surveillance • admin • batch • simprov	N/A	Identifier that uniquely identifies a user.
`ApplName`	Up to 20 characters except the following: "/ \ [] : ; | = , + * ^ <>" The pre-defined applications are: • Cli • WebCI • CmdFileLoader • SNMP • LdapDataServer • PolicyManager	N/A	Identifier that uniquely identifies an application.
Optional Attributes	**Value Range**	**Default**	**Description**
`LogOption`	• `0 NoLog` • `1 LogAll` • `2 LogRead` • `3 LogMod`	**0**	This parameter indicates which of the following logging options the SDM system should follow for each user-application combination: **0 NoLog**: No logs are saved by the system. **1 LogAll**: The system saves logs for all the actions taken by this user on this application. WARNING: This could impact the performance

Mandatory Attributes	Value Range	Default	Description
			of the system during high traffic. **2 LogRead**: The system saves logs only for the reading actions taken by this user on this application. **3 LogMod**: The system saves logs only for the modifying actions taken by this user on this application.

CLI Example

```
1 : Oamp[]> NotificationManager[]> add
UserApplicationMap[UserName=admin;ApplName=WebCI]
```

Chapter 3

Home Location Register (HLR)

Topics:

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- *Forward-to-number (FTN) rule provisioning for FTN digits analysis.....91*
- *HLR identities, HPLMN definitions, and IMSI ranges configuration.....97*
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This chapter provides details on the entities that store HLR configuration data. The following is described for each HLR entity:

- CLI and WebCI navigation path
- Allowed operations
- Entity attributes and values.

HLR configuration

HLR configuration

Name

HlrConfig

Description

This entity allows to provision the HLR configuration parameters used at system startup and to view the activation status of the HLR features. Most HLR features can be dynamically activated/deactivated during running time of the system. To achieve this, execute the ActivateFeature() and DeactivateFeature() operations (refer to the *HLR Operations* section of this document).

Also keep in mind that most of these HLR features will only fulfill their role when they are activated and provisioned. Refer to the *SDM System Configuration – User Guide* for instructions on how to provision HLR features.

CLI Navigation

```
Hlr[]> HlrConfig
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> display HlrConfig [HlrInstance = integer; RoutingNetworkType =
ANSI,ITU; SccpRoutingNetworkIndicator = National,International;
RoutingSubSystemNumber = integer; RoutingPointCode = integer; GtNumberingPlan
= 0,1,2,3,4,5,6,7,14; GtNatureOfAddress = integer; ImscAddr = integer;
MaxNumCallForwardAllowed = 0-5; MapMessageSegmentation = 0,1;
RegionalSubscription = 0,1; SuperCharger = 0,1 ; UssdForwardVlrNumber = 0,
1; RoutingOnSsn = 0,1; RoamingWelcomeMessage = 0,1,2; HlrSSMgmtFeature =
0,1,255; MapPolicing = 0,1; FtnTranslation = 0,1; SimKiTransportEncryption
= 0,1; SmsRouting = 0,1,255; UssdRouting = 0,1; VolDataOptimization = 0,1;
SaiAckSegmentation = 0,1; ActiveDeviceDetection = 0,1;
MobileNumberPortability = 255,0,1; SubscriberSignallingRouter = 255,0,1;
AccessRestrictionData = 0,1; DirectCallForwardRegistration = 0,1;
DomainSelection = 0,1; MapResetOptimization = 0,1; VlrMsgNotification =
0,1,2,3; EnhanceControlOfSccpRouting = 255,0,1; UpdateOfSccpCgAddrOnlyForUL
= 0,1,255; FtnProvValidation=0,1; SmsRelay = 0,1,255; AlertSCBuildCdPA =
0,1; SriRouting = 0,1,2,3,255; IMEIEnforcement = 0,1 ; MtRoamingRetry = 0,
1, 255 ; EnhancedSccpAllowedPlmn = 0,1,255]
```

Operations Permitted

Display.

Attributes and Values

Table 14: HlrConfig Mandatory Attributes

Attribute	Value Range	Default	Description
HlrInstance	up to 10 digits	1	Identifies a specific HLR Instance when multiple HLR blades are used to support the traffic load. In this version, only one instance is available.

Table 15: HlrConfig Optional Attributes

Attribute	Value Range	Default	Description
RoutingNetworkType	ANSI (2) or ITU (1)	ITU (1)	Network protocol. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database.
SccpRoutingNetwork Indicator	National (1) or International (0)	International (0)	Network Indicator. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted in order for the changes to be committed to the database.
RoutingSubSystem Number	up to 10 digits	6	SubSystem Number. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted in order for the changes to be committed to the database.
GtNumberingPlan	up to 10 digits 0,1,2,3,4,5,6,7,14	1	Global Title Numbering Plan. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted in order for the changes to be committed to the database.
GtNatureOfAddress	up to 10 digits	1	Global Title Nature of Address. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted in order for the changes to be committed to the database.
ImscAddr	up to 15 digits	15634110123	SMS Interworking MSC Address.

Attribute	Value Range	Default	Description
			This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database.
MaxNumCallForward Allowed	0 to 5	5	Specify maximum number of call forward legs allowed. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted in order for the changes to be committed to the database.
MapMessage Segmentation	0 or 1	1	This parameter indicates the activation status of the MAP Message Segmentation feature. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database. **0 (Deactivated)** = The Tekelec ngHLR segments large MAP messages at the MAP layer, restricting the SCCP layer to use only UDT. **1 (Activated)** = The Tekelec ngHLR segments large MAP messages like an ISD at the SCCP layer using XUDT.
RegionalSubscription	0 or 1	1	This parameter indicates the activation status of the Regional Subscription Support. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **0 = Deactivated.** The Regional Subscription is not supported. **1 = Activated.** The Regional Subscription is supported.
SuperCharger	0 or 1	1	This parameter indicates the activation status of the Super Charger feature. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database. **0 = Deactivated.** The Super Charger feature is deactivated. **1 = Activated.** The Super Charger feature is activated.

Attribute	Value Range	Default	Description
UssdForwardVlr-Number	0 or 1	1	This parameter indicates the activation status of the USSD Forward VLR Number feature. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **0 (Deactivated)** = The Tekelec ngHLR doesn't forward the VLR number to the next USSD node (e.g., gsmSCF). **1 (Activated)** = The Tekelec ngHLR forwards the VLR number to the next USSD node (e.g., gsmSCF).
RoutingOnSsn	0 or 1	1	This parameter indicates the activation status of the Routing on SSN feature. This feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **0 (Deactivated)** = The IntraPLMN routing is based on the GTT (Global Title Translation). **1 (Activated)** = The IntraPLMN routing is based on PC + SSN
RoamingWelcome Message	0, 1, 2	0	This parameter indicates the activation status and type of Roaming Welcome Message feature. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. • **0=Off**. • **1=Notify on CC changes or IMSI change.** This means that the service is enabled and notifications are sent only when the CC changes or when the IMSI changes. • **2=Notify on CC-NDC changes or IMSI change.** This means that the service is enabled and notifications are sent when both the CC-NDC change or when the IMSI changes.
MapPolicing	0 or 1	1	This parameter indicates the activation status of the MAP Policing feature. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations.

Attribute	Value Range	Default	Description
			• **0=Deactivated.** The MAP Policing is deactivated. • **1=Activated.** The MAP Policing is activated.
FtnTranslation	0 or 1	1	This parameter indicates the activation status of the FTN translation feature. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database. • **0= Deactivated.** The FTN translation feature is deactivated. • **1= Activated.** The FTN translation feature is activated.
SimKiTransport Encryption	0 or 1	0	This parameter indicates the activation status of the A4/K4 Transport Encryption Algorithm. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **1=Activated.** When enabled, it indicates the following: • When the AlgoId (A4/K4 index) provided is not 0, the Ki must be decrypted. • When the AlgoId (A4/K4 index) is not provided, the Ki must be rejected. • When the AlgoId (A4/K4 index) provided is equal to 0, the Ki must not be decrypted. **0=Deactivated.** When disabled, it indicates the following: • When the AlgoId (A4/K4 index) provided is not 0, the Ki must be rejected. • When the AlgoId (A4/K4 index) is not provided, the Ki must not be decrypted. • When the AlgoId (A4/K4 index) provided is equal to 0, the Ki must not be decrypted.
SmsRouting	0, 1, 255	0	This parameter indicates the activation status of the SMS Redirection functionality, which can be dynamically activated/deactivated during running-time of the system by executing the

Attribute	Value Range	Default	Description
			ActivateFeature()/ DeactivateFeature() operations from the CLI, or by modifying the SmsRouting's activation status in the HlrConfig entity. **Note:** This feature must be made available by Tekelec support staff before it can be dynamically changed (activated/deactivated) by the Operator. **Note:** The SMS Relay functionality has to be deactivated ('SmsRelay' set to 0 (deactivate)) prior to deactivating SMS Routing. • **0= Deactivated**. The SMS Redirection functionality is deactivated. • **1= Activated.** The SMS Redirection functionality is activated. • **255 = Unavailable** The SMS Redirection functionality is unavailable.
SmsRelay	0, 1, 255	255	This parameter indicates the activation status of the MT-SMS Relay functionality, which can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations from the CLI or by modifying the SmsRelay's activation status in the HlrConfig entity. **NOTE:** This feature must be made available by Tekelec support staff before it can be dynamically changed (activated/deactivated) by the Operator. **NOTE:**The SMS Routing functionality has to be activated ('SmsRouting' set to 1 (activate)) prior to activating SMS Relay. **0= Deactivated** The MT-SMS Relay functionality is deactivated. **1= Activated**. The MT-SMS Relay functionality is activated. **255=Unavailable**. The MT-SMS Relay functionality is unavailable.
AlertSCBuildCdPA	0 or 1	0	This parameter indicates the activation status of the *Alert Service Center CdPA* feature. The feature can be dynamically activated/ deactivated during running-time of the system by executing the ActivateFeature()/ DeactivateFeature() operations from the CLI, or

Attribute	Value Range	Default	Description
			by modifying the AlertSCBuildCdPA's activation status in the HlrConfig entity. The Alert Service Center CdPA must be set to 1 (Activated) for the MT-SMS Relay routing functionality. **0= Deactivated**. The Alert Service Center CdPA is deactivated. The Tekelec ngHLR uses the Alert Service Center address provided in the SCCP header. **1= Activated**. The Alert Service Center CdPA is activated. The Tekelec ngHLR uses the Alert Service Center address provided in the MAP header. The Alert Service Center address is used to rebuild the CdPA.
`UssdRouting`	`0` or `1`	`0`	This configuration flag indicates whether the Tekelec ngHLR sends the IMSI or MSISDN as the Destination Reference in the following messages: MAP_USSD_REQUEST MAP_USSD_NOTIFY This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database. **0:** The UssdRouting flag is turned OFF. The IMSI is sent as the Destination Reference in the USSD messages. **1:** The UssdRouting flag is turned ON. The MSISDN is sent as the Destination Reference in the USSD messages.
`VolDataOptimization`	`0` or `1`	`1`	This parameter indicates the activation status of the Volatile Data Optimization feature. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database. **0 (Deactivated):** The Volatile Data Optimization feature is deactivated. **1 (Activated):** The Volatile Data Optimization feature is activated.

Attribute	Value Range	Default	Description
SaiAckSegmentation	0 or 1	0	This parameter indicates the activation status of the MAP Segmentation on SAI-ack feature. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database. **0 (Deactivated):** The MAP Segmentation on SAI-ack feature is deactivated. **1 (Activated):** The MAP Segmentation on SAI-ack feature is activated.
ActiveDevice Detection	0 or 1	0	This parameter indicates the activation status of the Automatic Device Detection feature. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **1 (Activated):** The ADD feature is activated. The Tekelec ngHLR stores the IMEI-SV information if present in the MAP UL or GPRS UL. **0 (Deactivated):** The ADD feature is deactivated. The Tekelec ngHLR doesn't store the IMEI-SV information.
MobileNumber Portability	0, 1, 255	255	This parameter indicates the activation status of the MNP-SRF feature. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **255 (Unavailable)**: The Network Operator is unauthorized to activate the Mobile Number Portability feature. **0 (Deactivated)**: The Mobile Number Portability feature is deactivated, but the Network Operator can dynamically activate it at any time without an HLR restart. **Note:** Deactivating the MNP will not remove the data provisioned for the MNP. **1 (Activated)**: The Mobile Number Portability feature is activated and the Network Operator can deactivate it at any time during running-time.

Attribute	Value Range	Default	Description
`SubscriberSignalingRouter`	`0, 1, 255`	`255`	This parameter indicates the activation status of the Subscriber Signaling Router function. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **255 (Unavailable)**: The Network Operator is not authorized to activate the Subscriber Signaling Router function. **0 (Deactivated)**: The Subscriber Signaling Router function is deactivated, but the Network Operator can dynamically activate it using the ActivateSSR() operation (see *HLR Operations*) at any time without an HLR restart. **1 (Activated)**: The Subscriber Signaling Router function is activated and the Network Operator can deactivate it (using the DeactivateSSR() operation (see *HLR Operations*) at any time during running-time.
`AccessRestrictionData`	`0` or `1`	`1`	This parameter indicates the activation status of the Support of Access Restriction Data feature. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **0 (Deactivated):** The Tekelec ngHLR never includes the Access Restriction Data parameter in the ISD message sent to the VLR/SGSN during location update or restoration and in Tekelec ngHLR initiated ISD messages created due to a content change. **1 (Activated):** The Tekelec ngHLR includes the Access Restriction Data parameter in ISD messages.
`DirectCallForwardRegistration`	`Bool` `0` or `1`	`0`	This parameter indicates the activation status of the Call Forward re-activation with RegisterSS feature. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database.

Attribute	Value Range	Default	Description
			0 (Deactivated): The Tekelec ngHLR doesn't allow the Call Forward services to be re-activated directly with a RegisterSS. They must be re-activated as per the 3GPP standards. **1 (Activated):** The Tekelec ngHLR allows for the Call Forward services to be re-activated directly with a RegisterSS.
`DomainSelection`	`0` or `1`	`0`	This parameter indicates the activation status of the SIP Domain. The feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **0 (Deactivated):** The SIP Domain is not used. **1 (Activated):** The SIP Domain is activated and can be used by any SIP functionality.
`MapResetOptimization`	`0` or `1`	`0`	This parameter indicates the activation status of the MAP Reset Optimization mechanism. This parameter is not dynamically configurable during running time of the system. The HLR service must be restarted for the changes to be committed to the database. **0 (Deactivated):** The MAP Reset Optimization mechanism is deactivated. **1 (Activated):** The MAP Reset Optimization mechanism is activated. The MAP Reset Optimization mechanism keeps a count of the number of subscribers registered on a given node. That count is incremented upon an Update Location, decremented upon a Cancel Location, and stored in the database. This reduces the list of VLRs to which the Tekelec ngHLR sends a MAP reset since it is sent onlyThis parameter indicates the activation status of the XML Notifications on UL, UL-GPRS, SAI, Ready SM and Purge MS feature. to the nodes that have registered subscribers (count > 0).
`VlrMessage Notification`	`0, 1, 2, 3`	`0`	This parameter indicates the activation status of the VLR Message Notification options for the following MAP message types: UL, UL-GPRS, SAI, Ready SM, Purge MS and CL.

Attribute	Value Range	Default	Description
			This parameter is dynamically activated and deactivated by using the ActivateFeature() or DeactivateFeature() operation. **0 (Deactivated):** This feature is enabled, but deactivated (default) for the entire system. No VLR message XML notifications are sent and no VLR message notification logs are updated when a MAP message is received even if the SubsVlrMsgNotificationOn parameter is enabled for the subscriber for which the message has been received. **1 (Logging Only):** This feature is enabled for VLR message notification logging. A VLR message notification log is updated when a MAP message is received. The VLR message notification log is stored in a CSV file on the blade running the Hlr service. Individual subscribers must have the SubsVlrMsgNotificationOn parameter set to 'On' (enabled). **2 (Notification Only):** This feature is enabled for VLR message XML notifications. When a MAP message is received a VLR message XML notification is sent to an external application. Individual subscribers must have the SubsVlrMsgNotificationOn parameter set to 'On' (enabled). **3 (Logging and Notification):** This feature is enabled for both VLR message notification logging and VLR message XML notification generation. Both of these are created when a MAP message is received. A VLR message notification log is updated and stored on the blade running the Hlr service. A VLR message XML notification is sent to an external application. Individual subscribers must have the SubsVlrMsgNotificationOn parameter set to 'On' (enabled). For details on the 'SubsVlrMsgNotificationOn' parameter, refer to the Subscriber Profile section of the *SDM Subscriber Provisioning – Reference Manual*.
`EnhanceControlOfSccpRouting`	`0, 1, 255`	`255`	This parameter indicates the activation status of the Enhanced control of SCCP routing parameters feature The feature can be dynamically activated/deactivated during running-time of the

Attribute	Value Range	Default	Description
			system by executing the ActivateFeature()/DeactivateFeature() operations. **255 (Unavailable):** The feature is unavailable to the operator. It requires intervention by Tekelec personnel to authorize its activation. **0 (Deactivated):** The feature has been deactivated. The operator can activate it dynamically. **1 (Activated):** The feature has been activated. The operator can deactivate it dynamically.
`UpdateOfSccpCgAddrOnlyForUL`	`0,1,255`	`255`	This parameter indicates whether all messages or only the UL, UL-GPRS messages are allowed to modify the response calling address as part of the 'Enhanced Control of Sccp Routing' feature. This can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **0 (Deactivated)**: All messages will be allowed to modify the response calling address. **1 (Activated)**: Only UpdateLocation and UpdateLocation_GPRS will be allowed to modify the response calling address. **255 (Unavailable)**: This feature is unavailable to the operator. Contact the Tekelec *Customer Care Center* to make this feature available for activation.
`FtnProvValidation`	`0` or `1`	`0`	This parameter indicates whether or not the validation of provisioned FTNs is performed through the OAM interface for the entire system (all subscribers).* **0 (Deactivated)**: The HLR Provisioning Manager skips the validation of the provisioned FTNs through the OAM interface. **1 (Activated)**: The HLR Provisioning Manager performs the validation of the provisioned FTNs through the OAM interface. *The status set here can be overridden on a per subscriber basis by provisioning the 'FtnOverride' parameter in the Subscriber Profile's CallForwardBsg[] entity. For details on the 'FtnOverride' parameter, refer to the "Call Forward Basic Service Group" section of the SDM Subscriber Provisioning – Reference Manual.

Attribute	Value Range	Default	Description
SriRouting	integer 0,1,2,3,255	255	This attribute displays and allows to edit the activation status of the SRI/SRI-LCS/ATI Routing functionalities. Once authorized by the Tekelec *Customer Care Center*, this ngHLR's functionality can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **255 (Unavailable)**: The feature is unavailable to the operator. Contact the Tekelec *Customer Care Center* to make this feature available for activation. **0 (Deactivated)**: The feature has been deactivated. The operator can activate it dynamically. **1 (Activated - Relay)**: The feature has been activated for relaying SRI, SRI-LCS, or ATI messages. The operator can deactivate it dynamically. **2 (Activated - Redirect)**: The feature has been activated for redirecting SRI or SRI-LCS messages. The operator can deactivate it dynamically. **Note:** For the ATI messages, the Tekelec ngHLR doesn't support redirect capabilities. If the SriRouting attribute is set to 'Redirect', the Tekelec ngHLR may use the default relay to an external HLR process instead, depending on the other routing controls configuration. **3 (Activated - Template only)**: The feature has been activated for using an SriRouting template for SRI, SRI-LCS, or ATI messages. The operator can deactivate it dynamically. **Note:** If the flag "isExpiryTimestampSet" from the entity RegistrarConfig is set to '1', the Tekelec ngHLR tries to find the TasId in SIP registration binding but only if the "RegistrationExpiryTime" is greater than the current time. If the flag "isExpiryTimestampSet" is set to '0', the Tekelec ngHLR doesn't check the RegistrationExpiryTime.
HlrSSMgmtFeature	0, 1, 255	255	This parameter indicates the activation status of the XML notification on SS Management feature. The feature can be dynamically activated/deactivated during running-time of the

Attribute	Value Range	Default	Description
			system by executing the ActivateFeature()/DeactivateFeature() operations. **255 (Unavailable):** This feature cannot be activated/deactivated by the Network Operator. It is disabled. To purchase this feature and to make it available for activation/deactivation), contact the Tekelec *Customer Care Center*. **0=Deactivated**. The XML notifications on SS Management feature is enabled, but deactivated (default once available) for the entire system. **1=Activated**. The XML notifications on SS Management is activated.
`IMEIEnforcement`	`0,1`	`0`	This parameter is used to activate and deactivate the Map Equipment Identity Register (EIR). This can be dynamically activated or deactivated during running time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **0=Deactivated**. The Map Equipment Identity Register (EIR) feature is unavailable. **1=Activated**. `IMEIEnforcement`The Map Equipment Identity Register (EIR) feature is available.
`MtRoamingRetry`	`0, 1, 255`	`255`	This parameter indicates the activation status of the mobile terminated retry feature. This feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **255 (Unavailable):** This feature is unavailable to the Network Operator. To authorize it for activation/deactivation, contact the Tekelec *Customer Care Center*. **0=Deactivated:** The feature is deactivated. The operator can activate it dynamically. **1=Activated:** The feature is activated. The operator can deactivate it dynamically.

Attribute	Value Range	Default	Description
EnhancedSccpAlloweddPlmn	0, 1, 255	255	This parameter indicates the activation status of the enhanced SCCP allowed PLMN feature. This feature can be dynamically activated/deactivated during running-time of the system by executing the ActivateFeature()/DeactivateFeature() operations. **255 (Unavailable):** This feature is unavailable to the Network Operator. To authorize it for activation/deactivation, contact the Tekelec *Customer Care Center*. **0 (Deactivated):** The feature is deactivated. The operator can activate it dynamically. **1 (Activated):** The feature is activated. The operator can deactivate it dynamically.

CLI Example

```
:Hlr[]> display HlrConfig[HlrInstance = 1]
```

Roaming Message

Name

RoamingMsg

Description

To provision the Tekelec ngHLR with a list of country codes for which roaming welcome messages aren't required to be sent.

CLI Navigation

```
Hlr[]> HlrConfig> RoamingMsg
```

CLI Inherited Attributes

HlrInstance

CLI Command Syntax

```
Hlr[]> HlrConfig [HlrInstance = integer]> display RoamingMsg
[RoamingMsgCCOff=integer]
```

Operations Permitted

Add, Modify, delete and display.

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 16: RoamingMsg Attributes

Attribute	Value Range	Default	Description
`HlrInstance`	up to 10 digits	`1`	Identifies a specific HLR Instance when multiple HLR blades are used to support the traffic load. In this version, only one instance is available.
`RoamingMsgCCOff`	up to 3 digits	N/A	Country code that doesn't require a roaming welcome notification to be sent by the HLR.

CLI Example

```
Hlr[]:HlrConfig[HlrInstance = 1]> add RoamingMsg[RoamingMsgCCOff =11]
```

Enhanced control of SCCP routing configuration (phase 1)

Name

`EnhancedControlOfSccpRoutingConfig`

Description

To configure necessary data for the Tekelec ngHLR to use the SCCP called address to determine if the response SCCP calling address will be updated using the proper HlrNumber. The Enhanced Control Of SCCP Routing feature must be activated (see HlrConfig[] entity) for this to be used by the Tekelec ngHLR.

CLI Navigation

```
Hlr[]> HlrConfig> EnhancedControlOfSccpRoutingConfig
```

CLI Inherited Attributes

`HlrInstance`

CLI Command Syntax

```
Hlr[]> HlrConfig [HlrInstance = integer]> add
EnhancedControlOfSccpRoutingConfig [FilteringCallingPartyCheck=0,1;
FilteringPrefix=int; PrefixStrip=0,1; PrefixStripMsIsdnLength=int]
```

Operations Permitted

`Add, Modify, delete and display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 17: EnhancedControlOfSccpRoutingConfig Optional Attributes

Attribute	Value Range	Default	Description
FilteringCallingPartyCheck	0 (Off) 1 (On)	0 (Off)	This attribute indicates that the feature only applies for a specific calling address prefix. 0 (Off): No filtering on the calling address takes place, the feature will work for all incoming addresses 1 (On): Filtering will occur that will only permit calling addresses that match the FilteringPrefix. If the prefix is not matched, then this feature will be bypassed and the calling address of the response will be the called address of the request.
FilteringPrefix	up to 15 digits	None	This is the FilteringPrefix referred to above. If Filtering is On, only calling addresses that match the FilteringPrefix are allowed.
PrefixStrip	0 (Off) 1 (On)	0 (Off)	Prefix to remove from the called address. 0 (Off): No prefix will be stripped off from the called address. 1 (On): If the called address starts with a zero, all prefixed digits in excess of the PrefixStripMsIsdnLength (see below) will be stripped off.
PrefixStripMsIsdnLength	0-15	0	Number that represents the default called party address (MSISDN) length.

Forward-to-number (FTN) rule provisioning for FTN digits analysis

FTN Special Numbers

Name

`FtnSpecialNumbers`

Description

This entity allows to provision a list of disallowed numbers (e.g. 911, 112, etc…) as a forward_to_number.

CLI Navigation

```
Hlr[]> HlrFtn[]> FtnSpecialNumbers
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> HlrFtn[]> add FtnSpecialNumbers[]
```

Operations Permitted

`Add, display, modify, delete.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 18: FtnSpecialNumbers Mandatory Attributes

Attribute	Value Range	Default	Description
`SpecialNum`	`integer`	N/A	Specific disallowed number (e.g. 911, 112, etc).

CLI Example

```
Hlr[]> HlrFtn[]> add FtnSpecialNumbers[SpecialNum=123]
```

FTN Translation Rules

Name

`FtnTranslationRules`

Description

Short numbers and any national numbers can be sent in RegSS messages. This entity allows to define some translation rules that will be used by the Tekelec ngHLR to convert the forward_to_numbers (FTN) into a valid number. The Tekelec ngHLR includes a logic that will analyze received FTNs in Supplementary Service Registration messages and will apply the set of predefined and configured rules provisioned in this entity.

CLI Navigation

```
Hlr[]> HlrFtn[]> FtnTranslationRules
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> HlrFtn[]> add FtnTranslationRules[ShortNumber=char;LongNumber=char]
```

Operations Permitted

`Add, display, delete, modify` (only the LongNumber parameter can be modified).

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 19: FtnTranslationRules Mandatory Attributes

Attribute	Value Range	Default	Description
`ShortNumber`	`Varchar` (8)	N/A	A short number that is associated with a long number and used for translation. When the NOA is unknown, the FTN supplied is compared with this short number and if a match is found, the FTN is translated into the associated long number.
`LongNumber`	`Varchar` (16)	N/A	If the FTN supplied by the user matches the ShortNumber associated to this LongNumber, then the Tekelec ngHLR translates the ShortNumber into this LongNumber and stores the FTN in this longer format.

CLI Example

```
Hlr[]> HlrFtn[]> add FtnTranslationRules[ShortNumber=786;LongNumber=2437896]
```

FTN Exception Rules

Name

`FtnExceptionRules`

Description

To provision some exception rules in the FTN formats and replace some prefixes with a substitute number that will ensure that the Tekelec ngHLR stores the FTN in the correct international format.

CLI Navigation

```
Hlr[]> HlrFtn[]>FtnExceptionRules
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> HlrFtn[]> add FtnExceptionRules[MatchingPrefix=char;Substitute=char]
```

Operations Permitted

Add, display, delete, modify (only the Substitute parameter can be modified).

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 20: FtnExceptionRules Mandatory Attributes

Attribute	Value Range	Default	Description
`MatchingPrefix`	`Varchar` (8)	N/A	Prefix with which the National NOA will be compared with. In the case where the NOA is unknown, it is the prefix with which the digits following the first NDD digits will be compared with. and a translation of the matched pattern
`Substitute`	`Varchar` (16)	N/A	If a National NOA or the digits following the NDD digits of an Unknown NOA match with the corresponding MatchingPrefix, then this prefix will be substituted by the Substitute number.

CLI Example

```
Hlr[]> HlrFtn[]> add FtnExceptionRules[MatchingPrefix=33; Substitute=9876]
```

FTN Management Rules

Name

`FtnManagementRule`

Description

This entity allows the operator to define a FTN Management rule, which represents a list of allowed FTN(s) (white-list) defined in the AllowedFTN entity.

CLI Navigation

`Hlr[]>HlrFtn[]>FTNManagementRule[]`

CLI Inherited Attributes :

None

CLI Command Syntax

```
Hlr[]:HlrFtn[]> add FTNManagementRule[FTNRule = xmlstring]
```

Operation Permitted :

`Add, delete ,display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 21: FtnManagementRule Mandatory Attributes

Attribute	Value Range	Default	Description
`FTNRule`	`XML string`	N/A	Name that identifies the FTN management rule. The ngHLR decides whether to accept or refuse the registration of an FTN performed by a subscriber with a RegSS/ActSS, depending on the "FTN Management Rule" (the allowed FTN list) that is assigned to its subscriber profile.

CLI Example

```
Hlr[]> HlrFtn[]> add FTNManagementRule[FTNRule=ftnrule1]
```

Allowed Forward to Number

Name

`AllowedFTN`

Description

This entity allows the operator to define different lists of allowed FTN(s) (white-list) for a FTN management rule. Once this entity is provisioned, each subscriber profile can be associated to one of the FTN management rules defined in this entity. With this entity provisioned and with FTN management rules assigned to subscriber profiles, the Tekelec ngHLR will accept or refuse the registration of an FTN performed by a subscriber with a RegSS/ActSS, depending on the "FTN Management Rule" (the allowed FTN list) that is assigned to its subscriber profile. Refer to the "Subscriber Profile (Bearer Services, Teleservices, CallBarring, PreferredRoutingNetworkDomain" section in the *SDM Subscriber Provisioning – Reference Manual* for information on the Subscriber Profile entity and the parameter to provision to assign a FTN management rule to a subscriber profile.

CLI Navigation

```
Hlr[]>HlrFtn[]>FTNManagementRule[]>AllowedFTN
```

CLI Inherited Attributes :

`FTNRule`

CLI Command Syntax

```
Hlr[]:HlrFtn[]> FTNManagementRule[FTNRule = xmlstring]> add
AllowedFTN[ForwardToNumber=integer; MinimumLength=integer;
MaximumLength=integer]
```

Operations Permitted

`Add, delete ,display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 22: AllowedFTN Mandatory Attributes

Attribute	Value Range	Default	Description
`ForwardToNumber`	1-15 digits	N/A	Forward to Number (FTN) that you wish to define in the white-list for the FTN Management rule you specified.

Table 23: AllowedFTN Optional Attributes

Attribute	Value Range	Default	Description
MinimumLength	integer	N/A	Minimum length the FTN can have.
MaximumLength	integer	N/A	Maximum length the FTN can have.

CLI Example

```
Hlr[]> HlrFtn[]> FTNManagementRule[FTNRule=ftnrule1]> add
AllowedFTN[ForwardToNumber=23456789; MinimumLength=7; MaximumLength=9]
```

Restricted forward_to_number

Name

RestrictedFTN

Description

This entity allows the operator to globally restrict some FTNs (for all subscribers) by defining a global list of restricted FTNs (black-list). With the configuration of such a list, the Tekelec ngHLR doesn't accept subscribers to register a FTN (with RegSS/ActSS) that is in the restricted FTN list (black-list).

CLI Navigation

Hlr[]>HlrFtn[]>RestrictedFTN

CLI Inherited Attributes :

None

CLI Command Syntax

```
Hlr[]:HlrFtn[]> add RestrictedFTN[ForwardToNumber = integer]
```

Operation Permitted:

Add, delete, display.

Note: Not all users (User Groups) are allowed to perform these operations.

Attribute and Values

Table 24: RestrictedFTN Mandatory Attributes

Attribute	Value Range	Default	Description
ForwardToNumber	1-15 digits	*N/A*	Forward to Number (FTN) that you wish to define in the

Attribute	Value Range	Default	Description
			black-list for all the subscribers.

CLI Example

```
Hlr[]> HlrFtn[]> add RestrictedFTN[ForwardToNumber=23456789]
```

HLR identities, HPLMN definitions, and IMSI ranges configuration

HLR Number Configuration

Name

`HlrNumberConfig`

Description

To provision the HLR with multiple HLR identities. An HLR identity is represented by its address.

CLI Navigation

`Hlr[] > HlrConfig > HlrNumberConfig`

CLI Inherited Attributes

`HlrInstance`

CLI Command Syntax

```
Hlr[]:HlrConfig[HlrInstance = 1]> display HlrNumberConfig [HlrNumberConfigId=
integer; HlrAddrCC = integer; HlrAddrNDC = integer; HlrAddrSN = integer;
HlrAddrIDD = integer; HlrAddrNDD = integer]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 25: HlrNumberConfig Mandatory Attributes

Attribute	Value Range	Default	Description
`HlrNumberConfigId`	`integer`	N/A	Identification of one of the HLR identities (addresses) defined for the HLR.

Attribute	Value Range	Default	Description
HlrAddrCC	up to 3 digits	N/A	Country code of this HLR number.
HlrAddrNDC	1 to 6 digits	N/A	National Destination Code of this HLR identity.
HlrAddrSN	up to 15 digits	N/A	Subsystem Number of this HLR identity.
HlrAddrIDD	Up to 5 digits	N/A	International Direct Dialing number dialed by the subscriber to call FROM that country TO a different country. (equivalent to the "+" sign)
HlrAddrNDD	Up to 5 digits	N/A	National Direct Dialing number dialed by the subscriber to call within a country.

CLI Example

```
Hlr[]:HlrConfig[HlrInstance = 1]>display HlrNumberConfig[HlrNumberConfigId
=1]
```

Note: The combination of HlrAddrCC-HlrAddrNDC-HlrAddrSN is the HLR number in E.164 format.

Home PLMN

Name

HPLMN

Description

To create different HPLMN Identifications and names in the HLR to identify each of the different CC-NDC lists that correspond to the Home PLMN and that are associated to an IMSI Range.

CLI Navigation

Hlr[]>HlrConfig>PLMN

CLI Inherited Attributes

HlrInstance

CLI Command Syntax

```
Hlr[]:HlrConfig[HlrInstance = 1]>display HPLMN[HplmnId = integer; HplmnName=
string; InsideHplmnIndicator= string; OutsideHplmnIndicator= string]
```

Operations Permitted

`Add, modify (HplmnName), delete, and display`

Attributes and Values

Table 26: HPLMN Mandatory Attributes

Attribute	Value Range	Default	Description
`HplmnId`	`integer`	N/A	Identification of one of the lists of CC-NDC combinations corresponding to the Home PLMN.

Table 27: HPLMN Optional Attributes

Attribute	Value Range	Default	Description
`HplmnName`	`string`	N/A	Name of one of the lists of CC-NDC combinations corresponding to the Home PLMN.
`InsideHplmnIndication`	`String` (up to 15 digits)	N/A	Generic node number that indicates that the subscriber is located inside its Home PLMN.
`OutsideHplmnIndication`	`String` (up to 15 digits)	N/A	Generic node number that indicates that the subscriber is located outside its Home PLMN.
`PPRAddress`	`VARCHAR` (up to 17 characters)	NULL	The IP address of the PPR of the Home PLMN.
`HGMLCAddress`	`VARCHAR` (up to 17 characters)	NULL	The IP address of the GMLC of the Home PLMN.

CLI Example

```
Hlr[]:HlrConfig[HlrInstance = 1]> display HPLMN[HplmnId = 1]
```

Node Address

Name

`NodeAddress`

Description

To provision the HLR with a list of CC-NDC combinations that correspond to the HPLMN. Each list of CC-NDCs represents an HPLMN Identity. The ngHLR can define multiple HPLMNs using various CC-NDC combinations.

The node type is used by the Enhanced SCCP Allowed PLMN feature to identify whether the subscriber is in the home PLMN or in an allowed PLMN based on the CC-NDC values received in the request message.

CLI Navigation

`Hlr[]>HlrConfig>PLMN>NodeAddress`

CLI Inherited Attributes

`HlrInstance, HplmnId`

CLI Command Syntax

```
Hlr[]:HlrConfig[HlrInstance = 1]>HPLMN[HplmnId = 1]>display
NodeAddress[AddrCC= integer; AddrNDC= integer, NodeType=0,1,2]
```

Operations Permitted

`Add, display, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 28: NodeAddress Mandatory Attributes

Attribute	Value Range	Default	Description
`AddrCC`	1 to 15 digits	N/A	Country code of this HLR number.
`AddrNDC`	0 to (15-{CC length}) digits	N/A	National Destination Code of this HLR identity.

Table 29: NodeAddress Optional Attributes

Attribute	Value Range	Default	Description
`NodeType`	0, 1, 2	0	This field is used by the Enhanced SCCP Allowed PLMN feature to define the node type. The node type identifies whether the subscriber is in the home PLMN or in an allowed PLMN. It is one of the following:

Attribute	Value Range	Default	Description
			• 0= HPLM Check and Allowed PLMN • 1= HPLMN Check • 2= Allowed PLMN

CLI Example

```
Hlr[]:HlrConfig[HlrInstance = 1]> HPLMN[HplmnId = 1]>display
NodeAddress[AddrCC=1; AddrNDC=563; NodeType=0]
```

Note: You can add multiple CC-NDC to create a list of CC-NDC combinations for each HPLMN Identification defined. To do so, you must add a CC-NDC combination one at a time to the same HplmnId.

Home PLMN Country

Name

`HPLMNCountry`

Description

To create different HPLMN Country Identifications and names in the HLR to identify each of the different CC lists that correspond to the Home PLMN Country and that are associated to an IMSI Range.

CLI Navigation

```
Hlr[] > HlrConfig   PLMNCountry[]
```

CLI Inherited Attributes

`HlrInstance`

CLI Command Syntax

```
Hlr[]:HlrConfig[HlrInstance = 1]> add HPLMNCountry[HplmnCountryId = integer;
HplmnCountryName= string]
```

Operations Permitted

`Add, modify (HplmnName), delete, and Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 30: HPLMNCountry Mandatory Attributes

Attribute	Value Range	Default	Description
HplmnCountryId	integer	N/A	Identification of one of the lists of CCs corresponding to the Home PLMN Country.
HplmnCountryName	string	N/A	Name of one of the lists of CCs corresponding to the Home PLMN Country.

CLI Example

```
Hlr[]:HlrConfig[HlrInstance = 1]> add HPLMNCountry[HplmnCountryId = 1;
HplmnCountryName= HPLMNC1]
```

Country Node

Name

CountryNode

Description

To provision the HLR with a list of CC-NDC combinations that corresponds to the HPLMN. Each list of CC-NDC is represented by one of the HPLMN Identifications. This allows to define the HLR with multiple CC-NDC as HPLMN.

CLI Navigation

```
Hlr[] > HlrConfig   PLMNCountry > CountryNode[]
```

CLI Inherited Attributes

HlrInstance, HplmnCountryId

CLI Command Syntax

```
Hlr[]:HlrConfig[HlrInstance = 1]>HPLMNCountry[HplmnCountryId = 1]>display
CountryNode[AddressRange= integer]
```

Operations Permitted

Add, display, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 31: CountryNode Mandatory Attributes

Attribute	Value Range	Default	Description
AddressRange	1 to 15 digits	N/A	Country code of an HPLMN Country definition that will be associated to an IMSI Range.

CLI Example

```
Hlr[]:HlrConfig[HlrInstance = 1]> HPLMNCountry[HplmnCountryId = 1]> display
CountryNode[AddressRange=143]
```

Intra PLMN IMSI Range

This entity defines the supported IMSI ranges and associates each of them with one HLR identity (address) and one list of country code CC)-NDC combinations as Home PLMN.

Name

IntraPlmnImsiRange

Description

To define the supported IMSI ranges and associate each of them with one HLR identity (address) and with one list of CC-NDC combinations as HPLMN.

CLI Navigation

```
Hlr[]>HlrConfig>IntraPlmnImsiRange
```

CLI Inherited Attributes

HlrInstance

CLI Command Syntax

```
Hlr[]:HlrConfig[HlrInstance = 1]>display IntraPlmnImsiRange[HlrNumberConfigId
= integer; ImsiRange= integer; HplmnId= int; HplmnCountryId= int]
```

Operations Permitted

Add, display, modify, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 32: IntraPlmnImsiRange Mandatory Attributes

Attribute	Value Range	Default	Description
`HplmnId`	`integer`	N/A	Identification of one of the lists of CC-NDC combinations corresponding to the Home PLMN.
`HplmnCountryId`	`integer`	N/A	Identification of one of the lists of CCs corresponding to the Home PLMN Country.
`ImsiRange`	up to 15 digits	N/A	Range of IMSIs managed by this HLR.
`HlrNumberConfigId`	`integer`	N/A	Identification of one of the HLR identities (addresses) of the HLR defined in the HlrNumberConfig table.

CLI Example

```
Hlr[]:HlrConfig[HlrInstance = 1]>display IntraPlmnImsiRange[HplmnId = 1;
HplmnCountryId = 1;ImsiRange=3109104;HlrNumberConfigId=1]
```

Note: Multiple IMSI ranges can use the same HLR identity (address) and can share the same HPLMN and HPLMN Country definition. It is therefore possible to associate more than one IMSI Range to the same HLR identity and/or HPLMN definition and/or HPLMN Country definition. Please refer to the "Associating an HPLMN, HPLMN Country and HLR Identity to an IMSI range" section of the *SDM System Configuration - User Guide* , for the procedure on how to associate an IMSI Range to HLR identities and HPLMN.

CAMEL configuration

HLR Camel Configuration

Name

`HlrCamelConfig`

Description

To provision configuration elements for CAMEL.

CLI Navigation

```
Hlr[]> HlrCamelConfig
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]> modify HlrCamelConfig[] DchOverride = 0,1,2
```

Operations Permitted

`Display, modify.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 33: HlrCamelConfig Mandatory Attributes

Attribute	Value Range	Default	Description

`DchOverride`	`(0) Normal`
	`(1) Continue`
	`(2) Release`
		`(0) Normal`	Parameter that allows the Network Operator to set at a global level (for all subscribers and all messages) the default call handling to one of the following options:
			(0) Normal: the normal setting. This option is the equivalent of having the System DCH override feature disabled.
			(1) Continue: this option allows the calls to continue even if the SCP is unavailable. This prevents calls from failing when the SCP node is not reachable.
			(2) Release: this option allows the calls to be released.
			This configuration overrides the setting of the TDP CSI's DefaultCallHandling parameter provisioned on a per-subscriber basis.
			Note: This parameter does not change the subscriber data settings in the HLR database. It simply overrides the DCH value for all the following CSI types sent as part of ISD and

Attribute	Value Range	Default	Description
			SRI MAP operations: O-CSI, T-CSI, VT-CSI, GPRS-CSI, OSMS-CSI, D-CSII. The system DCH override feature applies only if the message includes some Camel information, otherwise the global DCH value has no impact.
[1]			

CLI Example

```
1 :Hlr[]>modify HlrCamelConfig[] DchOverride = 1
```

Camel GSM Service Control Functionality

Name

`CamelGsmScf`

Description

To provision Camel Server addresses for the GSM Service Control Functionality in the HLR.

CLI Navigation

```
Hlr[]> HlrCamelConfig[]> CamelGsmScf
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]> HlrCamelConfig[]> add CamelGsmScf[GsmScfId = integer; GsmScfAddress
= text; CallForwardNotifyMe=0,1; CallBarringNotifyMe=0,1; OdbNotifyMe=0,1;
CsiNotifyMe=0,1]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

[1] DCH is excluded for TDP: M-CSI, U-CSI, TIF-CSI, SS-CSI.

Attributes and Values

Table 34: CamelGsmScf Mandatory Attributes

Attribute	Value Range	Default	Description
GsmScfId	integer	N/A	Identification of the CAMEL server address.

Table 35: CamelGsmScf Optional Attributes

Attribute	Value Range	Default	Description
GsmScfAddress	up to 15 digits and/or letters (A-F)	N/A	Camel Server Addresses.
CallForwardNotifyMe	0 , 1	0	This flag can be provisioned to indicate to the Tekelec ngHLR whether or not the Camel Server needs to be notified if a Call Forward event takes place.
CallBarringNotifyMe	0 , 1	0	This flag can be provisioned to indicate to the Tekelec ngHLR whether or not the Camel Server needs to be notified if a Call Barring event takes place.
OdbNotifyMe	0 , 1	0	This flag can be provisioned to indicate to the Tekelec ngHLR whether or not the Camel Server needs to be notified if a Odb event takes place.
CsiNotifyMe	0 , 1	0	This flag can be provisioned to indicate to the Tekelec ngHLR whether or not the Camel Server needs to be notified if a CSI event takes place.

CLI Example

```
1 :Hlr[]> HlrCamelConfig[]> add CamelGsmScf[GsmScfId = 3; GsmScfAddress =
123456; CallBarringNotifyMe=1; CsiNotifyMe=1]
```

Camel USSD General Subscription Information

Name

`HlrCamelUGCsi`

Description

To link USSD service codes to the GsmScfid (GsmScf address) that is generally applied to all subscribers.

CLI Navigation
`Hlr[]> HlrCamelConfig[]> HlrCamelUGCsi`

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]> HlrCamelConfig[]> add HlrCamelUGCsi[GsmScfId = integer; ServiceCode
= 1-999]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 36: HlrCamelUGCsi Mandatory Attributes

Attribute	Value Range	Default	Description
`GsmScfId`	`integer`	N/A	Identification of the CAMEL server address.
`ServiceCode`	`1-999`	N/A	Service code.

CLI Example

```
1 : Hlr[]> HlrCamelConfig[]> add HlrCamelUGCsi[GsmScfId = 3; ServiceCode =
130]
```

HLR Enhanced CAMEL Handling

The following section provides information about the entity and its parameters that need to be provisioned for the HLR Enhanced CAMEL handling feature. It also briefly describes the HLR CLI commands used to provision this feature.

CAMEL Service Mask Template

Name

`CamelServiceMaskTemplate`

Description

This allows the operator to define TS/BS masks using templates with each subscriber referring to a specific template. This way, different TS/BS masks can be defined for different subscriber. This entity applies to the list of services (TeleServices or BearerServices) of the subscriber that refers to a specific CamelServiceMaskTemplate and that has the parameter "ActionOnUnsCamelPh" set to 'Apply Mask' in the CamelCsiData entity.

CLI Navigation

```
Hlr[]> HlrCamelConfig[]> CamelServiceMaskTemplate[]
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]> HlrCamelConfig[]> add CamelServiceMaskTemplate[TemplateId= integer;
TemplateName= string; BlockedTeleServiceList = TS00-TSDF;
BlockedBearerServiceList=BS00-BS36]
```

Operations Permitted

`Add, display, modify.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 37: CamelServiceMaskTemplate Optional Attributes

Attribute	Value Range	Default	Description
`TemplateId`	`integer`	N/A	Numerical identifier of a TS/BS mask template. This is what the ServiceMaskTemplateId parameter in the HLR Subscriber profile refers to, in order to assign a TS/BS mask for a specific subscriber.
`TemplateName`	`string`	N/A	Name of a TS/BS mask template.

Table 38: CamelServiceMaskTemplate Mandatory Attributes

Attribute	Value Range	Default	Description
BlockedTeleServiceList	TS00-TSDF	TS11	This parameter allows to define a specific TeleService that needs to be suppressed by the Tekelec ngHLR for the subscribers with the "ActionOnUnsCamelPh" parameter set to 'ApplyMask' in the CamelCsiData entity of its subscriber profile.
BlockedBearer ServiceList	BS00-BS36	BS11	This parameter allows to define a specific BearerService that needs to be suppressed by the Tekelec ngHLR for the subscribers with the "ActionOnUnsCamelPh" parameter set to 'ApplyMask' in the CamelCsiData entity of its subscriber profile.

CLI Example

```
Hlr[]> HlrCamelConfig[]> add CamelServiceMaskTemplate[TemplateId=1;
TemplateName=mask1; BlockedTeleServiceList = TS21 ;
BlockedBearerServiceList=BS14]
```

HLR System Features

Public Land Mobile Network (PLMN)

Name

Plmn

Description

To provision Public Land Mobile Network (PLMN) nodes.

CLI Navigation

Hlr[] > Plmn

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> add Plmn[PlmnId = text; NodeNmb_CC = integer; NodeNmb_NDC = integer;
NodeType = 0,1]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 39: Plmn Mandatory Attributes

Attribute	Value Range	Default	Description
`PlmnId`	up to 10 digits and/or letters	N/A	Logical name for a PLMN, e.g., Montreal.
`NodeNmb_CC`	up to 3 digits	N/A	Country Code (CC) of node.
`NodeNmb_NDC`	up to 3 digits	N/A	National Destination Code (NDC) of node.

Table 40: Plmn Optional Attributes

Attribute	Value Range	Default	Description
`NodeType`	`0` (NonGprsNetwork), `1` (GprsNetwork)	`0`	Specify type of PLMN node.

Example:

```
1 :Hlr[]> add Plmn[PlmnId = Montreal; NodeNmb_CC = 1; NodeNmb_NDC = 563;
NodeType = 1]
```

HLR Subscriber Count

Name

`HlrSubscriberCount`

Description

The Hlr Subscriber Count is an operation that counts the number of subscribers provisioned in the database. Counts are provided for the following types of subscribers: Imsi, MsIsdn, and Sim.

CLI Navigation

```
Hlr[] > HlrSubscriberCount
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[] > HlrSubscriberCount > [name of operation]
```

Operations Permitted

The following operations can be used to obtain a count of the number of subscribers provisioned.

`GetTotalNumberOfImsiCount()`

This operation provides a count of the number of Imsi entries stored in the SimImsiMap entity (All IMSIs for all SIMs).

`GetTotalNumberOfMsIsdnCount()`

This operation provides a count of the number of MsIsdn entries stored in the MSISDN entity (All MSISDNs for all SubscriptionIDs)

`GetImsiAssociatedWithSubsciberCount()`

This operation provides a count of the number of Imsi entries stored in the MsIsdnImsiProfileAssociation entity (for all the IMSIs used).

`GetMsIsdnAssociatedWithSubsciberCount()`

This operation provides a count of the number of MsIsdn entries stored in the MsIsdnImsiProfileAssociation entity (for all the MSISDNs used).

`GetSimIdCount()`

This operation provides a count of the number of SimId subscribers in Sim.

Example:

```
1 :Hlr[] > HlrSubscriberCount > GetTotalNumberOfImsiCount()
```

HLR USSD Routing Table

Name

`HlrUssdRtTable`

Description

To provision the USSD (Unstructured Supplementary Service Data) routing table for the HLR to direct USSD messages to the proper USSD application.

CLI Navigation

`Hlr[]> HlrUssdRtTable`

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> add HlrUssdRtTable [ServiceCode = 1-999; UssdAppNode = 2-4;
UssdAppNodeAddress = integer]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 41: HlrUssdRtTable Mandatory Attributes

Attribute	Value Range	Default	Description
`ServiceCode`	`1-999`	N/A	Service Code

`UssdAppNode`	`2 secHLR`
	`3 GMSC`
	`4 gsmSCF`
		N/A	Type of USSD Application Node
			2 = Secondary HLR
			3 = Gateway Mobile Switching Center
			4 = GSM Service Control Function

Table 42: HlrUssdRtTable Optional Attributes

Attribute	Value Range	Default	Description
`UssdAppNode-Address`	up to 15 digits and/or letters (A-F)	N/A	USSD Application Node Address

CLI Example

```
1 :Hlr[]> add HlrUssdRtTable [ServiceCode = 130; UssdAppNode = 3;
UssdAppNodeAddress = 5142233789]
```

Authentication Center Provisioning

A4/K4 Transport Encryption Algorithm

This section provides details on the Tekelec ngHLR's A4/K4 Transport Encryption Algorithm entity and parameters.

Prerequisites

1. The SimKiTransportEncryption control flag must be provisioned to enable or disable the A4/K4 support. This flag can be provisioned in the HlrConfig table, defined above in "*HLR configuration*".
2. Second, the AuC A4/K4 table must be provisioned to configure A4/K4 combinations, which will be used by the Tekelec ngHLR when decrypting the provided Ki value upon receiving a provisioning command for the Sim table. The AuC A4/K4 table and its parameters are also defined below.

   Note: This table can be provisioned while the feature is enabled or disabled.

3. Once the feature has been enabled and the A4K4 combinations have been defined with unique indexes (AlgoId), SIM cards can be provisioned using the A4K4 Transport Encryption Algorithm by referring to a specific A4K4 combination using the AlgoId. As described below, the Sim entity allows you to specify the AlgoId for each SIM card provisioned.

Name

A4K4

Description

Allows to configure a number of A4/K4 combinations, to which a unique ID is assigned, and that will be used by the Tekelec ngHLR to decrypt the provided Ki upon receiving a provisioning command for the Sim entity. This table must be provisioned in order to allow the processing of the encrypted Ki.

CLI Navigation

Hlr[]>A4K4

CLI Inherited Attributes

None

CLI Command Syntax

```
:Hlr[]> add A4K4[AlgoId= integer; A4= char ; K4= char]
```

Operations Permitted

Add, display, modify, delete

Attributes and Values

Table 43: A4K4 Mandatory Attributes

Attribute	Value Range	Default	Description
AlgoId	Integer *(2)*	N/A	Unique identifier used to locate in the A4K4 table the record pointed by the AlgoId (index) in the SIM Ki provisioning request.

Attribute	Value Range	Default	Description
A4	Char (8) : 1 (AES128)* 2 (AES192) 3 (AES256) 4 (DES)* 5 (3DES)*	N/A	Name of the transport algorithm (i.e. AES128, AES192, AES256, DES, 3DES).
K4	ASCII Hex characters (64)	N/A	K4 Transport key for the A4 Algorithm. Depending on the A4 algorithm, the K4 key has different lengths: • A4 AES128 = 32 • A4 AES192 = 48 • A4 AES256 = 64 • A4 DES = 16 • A4 3DES = 48 Once the K4 key has been provisioned in the Tekelec ngHLR, it is encrypted with A7/K7 before being stored in the database. A7 is a proprietary algorithm and K7 is hard-coded. Hence, when displaying the K4 key, it will appear encrypted. Example: K4 entered in the system(possible lengths: 16.32,48 or 64): 4FBAEFCC019D2E31 K4 displayed : 39f080daca08483b

Note: *NOTE: For now, only the A4 AES128, DES and 3DES algorithms are supported.

Note: More than one record with the same A4 type may exist in this table, which allows the flexibility to provision the SIM entity of a specific operator/provider under a specific index (AlgoId).

Algorithm

Name

`Algorithm`

Description

Refers to the Authentication algorithm for the Authentication Center (AuC) of the HLR.

CLI Navigation
`Hlr[]> Algorithm`

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]: Algorithm[AlgorithmName = text ; Filename = text ; Op32HexChar =
text; AlgorithmType = Unknown, XOR, Comp128, GsmMilenage, Milenage]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 44: Algorithm Mandatory Attributes

Attribute	Value Range	Default	Description
`AlgorithmName`	up to 32 digits and/or letters.	N/A	Specify name of the authentication algorithm to be used by the Authentication Center (AuC).
`AlgorithmType`	`0` (Unknown) or `1` (XOR) or `2` (Comp128) or `3`(GsmMilenage)* `4`(Milenage) `5`(UMTS_XOR)	N/A	Specify the type of the algorithm used in the authentication.
`FileName**`	up to 64 digits and/or letters (including the character "/").	N/A	Specify name (or path) of the dynamic shared library (file with extension .so)

Attribute	Value Range	Default	Description
			implementing the authentication algorithm.

*GsmMilenage: Deprecated AlgorithmType supporting milenage library defined prior to 1.5.3. All newly defined Milenage algorithms must have their AlgorithmType defined as 4 (Milenage).

**FileName mandatory attribute for an Algorithm of algorithm type: Unknown, XOR, Comp128 and GsmMilenage, but optional for an Algorithm of algorithm type: Milenage.

Table 45: Algorithm Optional Attributes

Attribute	Value Range	Default	Description
`Op32HexChar`	Must be 32 digits and/or letters (a to f).	`NULL`	Operator variant for GSM Milenage algorithm.

CLI Example

```
:Hlr[]> add Algorithm [AlgorithmName = TestAlgorithm; AlgorithType = Unknown;
FileName = /blue/lib/testAlgo.so; Op32HexChar =
1234567890abcdef1234567890abcdef]
```

Roaming Controls

This section describes each of the HLR entities used to provision Roaming Controls (Operator Controlled PLMNs, roaming restrictions and Service Screening restrictions). The following information is provided: entity name, description, CLI/WebCI navigation, CLI inherited attributes, CLI command syntax, operations permitted, attributes (with value ranges, defaults, and description), and an example.

HLR OCPLMN Configuration

Name

`HlrOCPlmn_Config`

Description

To enable/disable the Roaming restrictions and the Service Screening restrictions and to provision the Operator defined PLMN/IMSI Error causes that will be sent back when the UL is rejected due to a PLMN/IMSI that is not allowed.

WebCI Navigation:
HLR folder ➤ Roaming Controls ➤ Hlr Roaming Controls Config table

CLI Navigation

```
Hlr[]>HlrOCPlmn_Config>OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId=integer]>
BearService []
```

CLI Inherited Attributes

`HlrInstance`

CLI Command Syntax

```
Hlr[]> display HlrOCPlmn_Config[RoamRestrictEnable=0,1;
RoamServiceScreeningEnable=0,1;
PlmnErrorCause=integer;ImsiErrorCause=integer]
```

Operations Permitted

`Display,modify`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 46: HlrOCPlmn_Config Mandatory Attributes

Attribute	Value Range	Default	Description
`RoamRestrict Enable`	`0, 1`	`0`	Allows to enable/disable dynamically the validation of the Roaming restrictions (PLMN-IMSI validation). 0 (disabled): The Tekelec ngHLR doesn't validate the roaming PLMN and the "allowed" IMSIs defined for that roaming PLMN. 1 (enabled): The Tekelec ngHLR validates if the roaming PLMN and IMSI are allowed.
`RoamService ScreeningEnable`	`0, 1`	`0`	Allows to enable/disable dynamically the Service Screening restrictions. 0 (disabled): The Tekelec ngHLR doesn't execute the Service Screening procedure after the PLMN-IMSI validation. The Tekelec ngHLR never applies the Service Screening Template assigned to the subscriber's roaming PLMN. The services sent in the ISD message are as provisioned in the Subscriber Profile. 1 (enabled): The Tekelec ngHLR executes the Service Screening procedure after the PLMN-IMSI validation is successful. If a Service Screening Template other than 'Not Defined' is assigned to the roaming PLMN, the Service Screening Template is retrieved and applied against the provisioned Subscriber's services. The Update Location continues with thus tailored Subscriber Profile, as modified by the service screening rules.

Attribute	Value Range	Default	Description
PlmnErrorCause	0-255	0	Error Cause sent by system upon Rejection of the Plmn.
ImsiErrorCause	0-255	3	Error Cause sent by system upon Rejection of the Imsi.

CLI Example

```
Hlr[]> HlrOCPlmn_Config[]>modify . ImsiErrorCause = 80
```

Operator-Controlled (OC) PLMN

Name

OCPlmn

Description

To define the roaming PLMNs with Node Ranges (VLR/GMSC address ranges).

Note: At system start-up, a "Default PLMN" is created. The "Default PLMN" is a PLMN for which no VLRs/GMSCs can be defined.

WebCI Navigation from the GUI's Menu:
HLR folder ➤ Roaming Controls ➤ Plmn Definitions table

CLI Navigation
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_[]

CLI Inherited Attributes

HlrInstance

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]> display OCPlmn_[PlmnId =integer;PlmnName= string]
```

Operations Permitted

Add, display, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 47: OCPlmn Mandatory Attributes

Attribute	Value Range	Default	Description
PlmnId	up to 10 digits	N/A	The instance identifier of this entity. Generated by the Tekelec ngHLR. Read only
PlmnName	string	N/A	The name of the Plmn that is used to identify a roaming OC PLMN (an OCPlmn definition). **Note:** The following characters must not be used in the PlmnName string: &, ", ', >, <.When used, an error may be generated.

CLI Example

```
Hlr[]> HlrOCPlmn_Config[]>display OCPlmn_[PlmnId=1]
```

VLR Number

Name

VlrNumber

Description

To provision the VLR address (for GSM/UMTS networks) or GMSC address (for GPRS network) range associated with an existing OC PLMN.

Note: A VLR/GMSC address range can only be created after specifying an already defined OC PLMN entry.

CLI Navigation

Hlr[]>HlrOCPlmn_Config[]>OCPlmn_[PlmnId=integer]>VlrNumber[]

CLI Inherited Attributes

HlrInstance

CLI Command Syntax

Hlr[]>HlrOCPlmn_Config[]> OCPlmn_[PlmnId =integer] >VlrNumber[NodeRange=integer]

WebCI Navigation from the GUI's Menu:
HLR folder ➤ Roaming Controls ➤ Plmn Definitions table

Operations Permitted

`Add, display, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 48: VlrNumber Mandatory attributes

Attribute	Value Range	Default	Description
`PlmnId`	up to 10 digits	N/A	OC PLMN entry. Read only
`NodeRange`	Can vary from 1 to 15 digits.	N/A	The VLR address (for GSM/UMTS networks) or GMSC address (for GPRS network) associated to a specific OC Plmn entry. This is the field that allows the operator to define a list of Node Ranges for a Plmn. It is with these Node Ranges that the Tekelec ngHLR compares the Node address received in the UL with, in order to determine the roaming PLMN. This comparison is done based on the "Best match" algorithm where the best one is the longest matching Node number.

CLI Example

Hlr[]> HlrOCPlmn_Config[]> OCPlmn_[PlmnId =integer]> `add VlrNumber[NodeRange=123456]`

Service Screening Template Definitions

Name

`OCPlmn_ServiceScreenTemplate`

Description

This table can be used to define Service Screening Templates. The Service Screening Templates are used by the OCPLMN Templates in order to customize the Subscriber Profile based on the PLMN where the subscriber is roaming. A Service Screening Template can be assigned to each of an OCPLMN Template's roaming PLMN.

A Service Screening Template allows the customization of the following services

- CSI Key To Suppress from O-CSI

- BAOC per BSG
- Camel – max Camel Version Allowed
- ODB (All Outgoing, All Outgoing Intl, Premium)
- TeleServices (TS91, TS92), Bearer Services (BS1F, BS17)
- Other services - CLIP, CLIR, COLP, COLR, CW, HOLD, MPTY, REGSUBSCRIPTION, CFB, CRNRc, CFNRy.

  At system start-up a Service Screening Template with Name = "Not Defined" and Id = 0 is created without any customization of services (no customization of services can be added for this template). The template used as default for the creation of any OCPLMN Templates.

  Moreover, by default, all the Service Screening Templates are created without any BAOC customization (empty BAOC BSG List) and without any Camel Data customization (empty CSI key list to suppress) or any other service customization.

WebCI Navigation
HLR folder ➤ Roaming Controls window ➤ Service Screening Templates Definitions

CLI Navigation
`Hlr[]>HlrOCPlmn_Config[]>OCPlmn_ServiceScreenTemplate[]`

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]> add
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateName=string;
MaxCamelVersion=integer]
```

Operations Permitted

`Add, delete, modify, display`

Attributes and Values

Table 49: OCPlmn_ServiceScreenTemplate Mandatory Attributes

Attribute	Value Range	Default	Description
`ServiceScreenTemplateName`	`string`	N/A	Unique name that identifies the Service Screening Template.
`ServiceScreenTemplateId`	`integer`	N/A	Read-Only. This is the ID of the Service Screening Template that is automatically generated by the system.

Table 50: OCPlmn_Service_Screen_Template Optional Attributes

Attribute	Value Range	Default	Description
MaxCamelVersion	1 , 2 or 3	3	Maximum Camel version that is supported.

CLI Example

```
Hlr[]>HlrOCPlmn_Config[]> add
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateName=servtemp1]
```

CSI Suppress

Name

CSISuppress

Description

To provision the CSI-Suppress feature by allocating a ServiceKeyToSuppress to a Service Screening Template. The table contains the Service Keys for which the CSIs have to be suppressed.

WebCI Navigation
HLR folder ➤ Roaming Controls window ➤ Service Screening Templates Definitions

CLI Navigation

```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateName=string]> CSISuppress
```

CLI Inherited Attributes

ServiceScreenTemplateName

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateName=string]> add
CSISuppress[ServiceKeyToSuppress=int]
```

Operations Permitted

Add, delete, modify, display

Note: Not all users (User Groups) are allowed to perform these operations.

Table 51: CSISuppress Mandatory Attributes

Attribute	Value Range	Default	Description
ServiceScreenTemplateId	up to 10 digits	N/A	Read-only. The instance identifier of the Service Screening Template for which the CSI service key applies to. This ID is generated by the Tekelec ngHLR.
ServiceKeyToSuppress	integer	N/A	ID number in the CAMEL Server of the CAMEL service for which the Originating-CSI needs to be suppressed.

CLI Example

```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId=2]> display
CSISuppress[]
```

BAOC BSG Override

Name

BAOCBsgOverride

Description

To provision a mask of SS-Barring (BAOC) for a Service Screening Template. The list of BAOC BSGs provisioned for a Service Screening Template are added to the Subscriber's explicitly provisioned or not provisioned BAOC when the Service Screening Template is applied.

WebCI Navigation

HLR folder ➤ Roaming Controls window ➤ Service Screening Templates Definitions

CLI Navigation

```
Hlr[] >
HlrOCPlmn_Config[]>OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId
=integer]>BAOCBsgOverride []
```

CLI Inherited Attributes

ServiceScreenTemplateId

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId
=integer]> add BAOCBsgOverride[BSG= integer]
```

Operations Permitted

`Add, delete, modify, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 52: BAOCBsgOverride Mandatory Attributes

Attribute	Value Range	Default	Description

`BSG`	`(1) Speech`
	`(2) ShortMessage Service`
	`(6) Facsimile Services`
	`(7) AllDataCircuit synchronous`
	`(8) AllDataCircuit Synchronous`
	`(12) VoiceGroup Services`
		N/A	Bearer Service Group that will be barred for the IMSI (subscriber) when roaming in the PLMN for which this mask applies for. This mask is applied regardless of the BSG provisioning in the subscriber profile.

CLI Example

```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId =1] > add
BAOCBsgOverride[BSG=2]
```

Supplementary Service

Name

`SupplementaryService`

Description

This entity can be used to customize, for each Service Screening Template, supplementary services (CLIP, CLIR, COLP, COLR, CW, HOLD, MPTY, REGSUBSCRIPTION (REGIONAL SUBSCRIPTION), CFB, CRNRc, CFNRy) with a combination of Send/NotSend and Action parameters:

1) Service sent / Service NOT sent to the VLR/SGSN node.

2) If the service is NOT sent, or sent, but reported as "Not Supported by the VLR " in the ISD Response, the following actions can be applied:

1. Reject Roaming

2. Send Roaming Restriction Due to Unsupported Feature (RRDUF)
3. Send BAOC for all BSG except SMS
4. No Action

WebCI Navigation
HLR folder ➤ Roaming Controls window ➤ Service Screening Templates Definitions

CLI Navigation
```
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId
=integer]>SupplementaryService []
```

CLI Inherited Attributes

```
ServiceScreenTemplateId
```

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId
=integer]> add SupplementaryService[ServiceType= integer; SendService=bool;
Action= integer]
```

Operations Permitted

```
Add, delete, modify, display
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 53: SupplementaryService Mandatory Attributes

Attribute	Value Range	Default	Description
ServiceType	1 (ReginalSubscription) 17 (CLIP) 18 (CLIR) 19 (COLP) 20 (COLR) 41 (CFB) 42 (CFNRy) 43 (CFNRc) 65 (CallWaiting) 66 (CallHold) 81 (MPTY) 97 (CUG)	N/A	Type of Supplementary service to be customized.

Table 54: SupplementaryService Optional Attributes

Attribute	Value Range	Default	Description
SendService	0, 1	1	Allows to provision the Tekelec ngHLR to send or not send the supplementary service to the roaming VLR/SGSN node. 0 (Not Send): The Tekelec ngHLR doesn't send the supplementary service to the roaming VLR/SGSN node. 1 (Send): The Tekelec ngHLR sends the supplementary service to the roaming VLR/SGSN node.
Action	1 (NoAction) 2 (RejectRoaming) 3 (ApplyBAOC) 4 (RoamRestrDueTo UnsFeature)	1	Action the Tekelec ngHLR must apply if the service is NOT sent, or sent, but reported as "Not Supported by the VLR" in the ISD Response.

CLI Example:

```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId =1] > add
SupplementaryService[ServiceType=65; SendService=1]
```

Bearer Service

Name

BearService

Description

This entity can be used to customize, for each Service Screening Template, BearerServices with a combination of Send/NotSend and Action parameters:

1. Service sent / Service NOT sent to the VLR/SGSN node.
2. If the service is NOT sent, or sent, but reported as "Not Supported by the VLR " in the ISD Response, the following actions can be applied:
   - Reject Roaming
   - Send Roaming Restriction Due to Unsupported Feature (RRDUF)
   - Send BAOC for all BSG except SMS

- No Action

WebCI Navigation
HLR folder ➤ Roaming Controls window ➤ Service Screening Templates Definitions

CLI Navigation
```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId=integer]> BearService
[]
```

CLI Inherited Attributes

```
ServiceScreenTemplateId
```

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId
=integer]> add BearService[ServiceType= integer; SendService=bool; Action=
integer]
```

Operations Permitted

```
Add, delete, modify, display
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 55: BearService Mandatory Attributes

Attribute	Value Range	Default	Description
ServiceType	17 (BS11) 18 (BS12) 19 (BS13) 20 (BS14) 21 (BS15) 22 (BS16) 23 (BS17) 25 (BS19) 26 (BS1A) 27 (BS1B) 28 (BS1C) 29 (BS1D) 30 (BS1E)	N/A	Type of Bearer service to be customized.

Attribute	Value Range	Default	Description
	31 (BS1F)		
	33 (BS21)		
	34 (BS22)		
	35 (BS23)		
	36 (BS24)		
	37 (BS25)		
	38 (BS26)		
	39 (BS27)		
	41 (BS29)		
	42 (BS2A)		
	43 (BS2B)		
	44 (BS2C)		
	45 (BS2D)		
	46 (BS2E)		
	47 (BS2F)		
	48 (BS30)		
	49 (BS31)		
	50 (BS32)		
	51 (BS33)		
	52 (BS34)		
	53 (BS35)		
	54 (BS36)		
	56 (BS38)		
	64 (BS40)		
	72 (BS48)		
	209 (BSD1)		
	210 (BSD2)		
	211 (BSD3)		
	212 (BSD4)		
	213 (BSD5)		
	214 (BSD6)		
	215 (BSD7)		
	216 (BSD8)		

Attribute	Value Range	Default	Description
	217 (BSD9) 218 (BSDA) 219 (BSDB) 220 (BSDC) 221 (BSDD) 222 (BSDE) 223 (BSDF)		

Table 56: BearService Optional Attributes

Attribute	Value Range	Default	Description
SendService	0, 1	1	Allows to provision the Tekelec ngHLR to send or not send the Bearer service to the roaming VLR/SGSN node. **0 (Not Send)**: The Tekelec ngHLR doesn't send the Bearer service to the roaming VLR/SGSN node. **1 (Send)**: The Tekelec ngHLR sends the Bearer service to the roaming VLR/SGSN node.
Action	1 (NoAction) 2 (RejectRoaming) 3 (ApplyBAOC) 4(RoamRestrDue ToUnsFeature)	1	Action the Tekelec ngHLR must apply if the service is NOT sent, or sent, but reported as "Not Supported by the VLR" in the ISD Response.

CLI Example

```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId =1] > add
BearService[ServiceType=23; SendService=1]
```

Tele Service

Name

TeleService

Description

This entity can be used to customize, for each Service Screening Template, TeleServices (TS91, TS92) with a combination of Send/NotSend and Action parameters:

1. Service sent / Service NOT sent to the VLR/SGSN node.
2. If the service is NOT sent, or sent, but reported as "Not Supported by the VLR " in the ISD Response, the following actions can be applied:
   - Reject Roaming
   - Send Roaming Restriction Due to Unsupported Feature (RRDUF)
   - Send BAOC for all BSG except SMS
   - No Action

WebCI Navigation
HLR folder ➤ Roaming Controls window ➤ Service Screening Templates Definitions

CLI Navigation

```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId=integer]> TeleService
[]
```

CLI Inherited Attributes

`ServiceScreenTemplateId`

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId
=integer]> add TeleService[ServiceType= integer; SendService=bool; Action=
integer]
```

WebCI Navigation
HLR folder ➤ Roaming Controls window ➤ Service Screening Templates Definitions

Operations Permitted

`Add, delete, modify, display`

Attributes and Values

Table 57: TeleService Mandatory Attributes

Attribute	Value Range	Default	Description
`ServiceType`	`17` (TS11) `18` (TS12) `33` (TS21) `34` (TS22)	N/A	Type of Teleservice to be customized.

Attribute	Value Range	Default	Description
	97 (TS61) 98 (TS62) 99 (TS63) 145 (TS91) 146 (TS92) 209 (TSD1) 210 (TSD2) 211 (TSD3) 212 (TSD4) 213 (TSD5) 214 (TSD6) 215 (TSD7) 216 (TSD8) 217 (TSD9) 218 (TSDA) 219 (TSDB) 220 (TSDC) 221 (TSDD) 222 (TSDE) 223 (TSDF)		

Table 58: TeleService Optional Attributes

Attribute	Value Range	Default	Description
SendService	0, 1	1	Allows to provision the Tekelec ngHLR to send or not send the Teleservice to the roaming VLR/SGSN node. **0 (Not Send)**: The Tekelec ngHLR doesn't send the Teleservice to the roaming VLR/SGSN node. **1 (Send)**: The Tekelec ngHLR sends the Teleservice to the roaming VLR/SGSN node.

Attribute	Value Range	Default	Description
Action	1 (NoAction) 2 (RejectRoaming) 3 (ApplyBAOC) 4 (RoamRestrDue ToUnsFeature)	1	Action the Tekelec ngHLR must apply if the service is NOT sent, or sent, but reported as "Not Supported by the VLR" in the ISD Response.

CLI Example

```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId =1] > add
TeleService[ServiceType=145; SendService=1]
```

ODB Service

Name

ODBService

Description

This entity can be used to customize, for each Service Screening Template, ODBServices (All Outgoing, All Outgoing Intl, Premium) with a combination of Send/NotSend and Action parameters:

1. Service sent / Service NOT sent to the VLR/SGSN node.
2. If the service is NOT sent, or sent, but reported as "Not Supported by the VLR" in the ISD Response, the following actions can be applied:
   - Reject Roaming
   - Send Roaming Restriction Due to Unsupported Feature (RRDUF)
   - Send BAOC for all BSG except SMS
   - No Action

WebCI Navigation
HLR folder ➤ Roaming Controls window ➤ Service Screening Templates Definitions

CLI Navigation

```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId=integer]> ODBService
[]
```

CLI Inherited Attributes

```
ServiceScreenTemplateId
```

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId
=integer]> add ODBService[ServiceType= integer; SendService=bool; Action=
integer]
```

Operations Permitted

`Add, delete, modify, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 59: ODBService Mandatory Attributes

Attribute	Value Range	Default	Description
`ServiceType`	`1` (AllOutgoingCalls) `2` (AllOutgoingIntlCalls) `3` (PremiumRateInfo) `4` (PremiumRate Entertainment) `5` (PremiumRate InfoAnd Entertainment)	N/A	Type of ODB Service to be customized.

Table 60: ODBService Optional Attributes

Attribute	Value Range	Default	Description

`SendService`	`0`
	,
	`1`
		`1`	Allows to provision the Tekelec ngHLR to send or not send the ODB Service to the roaming VLR/SGSN node.
			0(Not Send): The Tekelec ngHLR doesn't send the ODB Service to the roaming VLR/SGSN node.
			1(Send): The Tekelec ngHLR sends the ODB Service to the roaming VLR/SGSN node.

`Action`	`1` (NoAction) `2` (RejectRoaming) `3` (ApplyBAOC)	`1`	Action the Tekelec ngHLR must apply if the service is NOT sent, or sent, but reported as "Not Supported

Attribute	Value Range	Default	Description
	4(RoamRestrDue ToUnsFeature)		by the VLR" in the ISD Response.

CLI Example

```
Hlr[]> HlrOCPlmn_Config[]>
OCPlmn_ServiceScreenTemplate[ServiceScreenTemplateId =1] > add
ODBService[ServiceType=1; SendService=1]
```

OCPLMN Template Definitions

Name

OCPlmn_Template

Description

This table can be used to create OCPLMN Templates.

Note: At system start-up, an OCPLMN Template with OCPLMN Template Name = "Not Defined" is created by the system. The Template is used as default for all new subscribers. It is created for the purpose to denote that the subscriber does not have any Roaming restrictions or Service Screening to be applied. By using OCPLMN template = "Not Defined, the feature can be turned OFF on a per subscriber basis. The "Not Defined OCPLMN Template" cannot have any PLMNs assigned to it.

WebCI Navigation from the GUI's Menu:
HLR folder ➤ Roaming Controls ➤ OCPlmn Template Definitions table

CLI Navigation

```
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_Template[]
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]> add OCPlmn_Template[TemplateName=integer]
```

Operations Permitted

```
Add, delete, display.
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 61: OCPlmn_Template Mandatory Attributes

Attribute	Value Range	Default	Description
`TemplateName`	`string`	N/A	Unique name that identifies the OCPLMN template.
`OCPlmnTemplateId`	`integer`	N/A	Read-Only. This is the ID of the OCPLMN Template that is automatically generated by the system.

CLI Example

```
Hlr[]> HlrOCPlmn_Config[]> add OCPlmn_Template [TemplateName=Template1]
```

OCPLMN Data

Name

OCPlmn_Data

Description

This entity allows to assign the following to an OCPLMN Template:

- Roaming PLMNs (must already be defined in the Plmn Definitions (OCPlmn_[] entity))
- Service Screening Templates (one Service Screening Template can be assigned for each roaming PLMN and the Service Screening Template must already be defined in the OCPlmn_ServiceScreenTemplate[ ] entity)

  Note: No roaming PLMNs can be assigned to the “Not Defined” OCPLMN Template.

  Each OCPLMN Template must have a “Default PLMN” and therefore the first PLMN that is to be assigned to an OCPLMN Template must be the “Default PLMN”. If a VLR is not found in any of the PLMNs defined for the used OCPLMN Template, it is considered as belonging to the “default PLMN.”

  The roaming PLMNs assigned to an OCPLMN Template are the “Allowed PLMNs” from which the Tekelec ngHLR will process Update Location from.

  Note: For the "Default PLMN", it is possible to associate different service restrictions, (for example, TeleService, BearerService, Supplementary Service restrictions), for VLR and SGSN node types. It is a general rule that the same PLMN cannot be associated more than one time, an exception has been made for the "Default PLMN". This exemption means that two entries can be provisioned in the OCPLMN_Data entity with the same "Default PLMN." These two entries must have different Service Screening templates and different Applicable Node Types, which can only be either VLR_Only or SGSN_Only. The node type in either case cannot be VLR_SGSN.

WebCI Navigation from the GUI’s Menu:
HLR folder ➤ Roaming Controls ➤ OCPlmn Template Definitions table

CLI Navigation

```
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_Template[OCPlmnTemplateId=integer]>OCPlmn_Data[]
```

CLI Inherited Attributes

OCPlmnTemplateId

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]> OCPlmn_Template[OCPlmnTemplateId=integer]> add
OCPlmn_Data[PlmnId= integer; ServiceScreenTemplateId= integer;
ApplicableNodeType= 0,1,2]
```

Operations Permitted

`Add, delete, display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 62: OCPlmn_Data Mandatory Attributes

Attribute	Value Range	Default	Description
`PlmnId`	up to 10 digits	N/A	OC PLMN entry. Read only

Table 63: OCPlmn_Data Optional Attributes

Attribute	Value Range	Default	Description
`ServiceScreenTemplateId`	up to 10 digits	N/A	OC PLMN entry. Read only
`ApplicableNodeType`	`0` (VLR_SGSN) `1` (VLR_only) `2` (SGSN_only)	N/A	This allows to restrict to which type of Node the roaming restrictions and service screening restrictions will apply to. **Note:** The two default PLMN values for the same OCPLMN_Data are: VLR_Only or SGSN_Only.

CLI Example

```
Hlr[]>HlrOCPlmn_Config[]> OCPlmn_Template[OCPlmnTemplateId=1]> add
OCPlmn_Data[PlmnId= 0; ServiceScreenTemplateId= servtemp1;
ApplicableNodeType= 0]
```

Allowed IMSI

Name

AllowedImsi

Description

This entity allows to provision a list of "allowed IMSI ranges" for each roaming PLMN assigned to an OCPLMN Template. For the IMSIs in the "Allowed IMSI Range" the Update Location will be allowed.

WebCI Navigation from the GUI's Menu:
HLR folder ➤ Roaming Controls ➤ OCPlmn Template Definitions table

CLI Navigation

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_Template[OCPlmnTemplateId=integer]>
OCPlmn_Data[PlmnId=integer]> AllowedImsi []
```

CLI Inherited Attributes

```
PlmnId, OCPlmnTemplateId
```

CLI Command Syntax

```
Hlr[]>HlrOCPlmn_Config[]> OCPlmn_Template[OCPlmnTemplateId=integer]>
OCPlmn_Data[PlmnId=integer]>AllowedImsi[MCC=integer; MNC= integer]
```

Operations Permitted

```
Add, delete, display.
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 64: AllowedImsi Mandatory Attributes

Attribute	Value Range	Default	Description
MCC	0 or 3 digits	N/A	Mobile Country Code of the Allowed Imsi entry. Empty MCC means wild card. Read only
MNC	0-3 digits	N/A	Mobile Network Code of the Allowed Imsi entry. Empty MNC means wild card. Read only

CLI Example

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_Template[OCPlmnTemplateId=2]>
OCPlmn_Data[PlmnId=0]> add AllowedImsi[MCC=123;MNC=3]
```

VLR/SGSN nodes calculation affected by Roaming Control changes

Firstly, this section describes in detail the entity in which is stored temporarily the list of affected VLR/SGSN nodes calculated by the Tekelec ngHLR.

Secondly, it describes the operations that can be performed in order to request the Tekelec ngHLR to calculate the list of affected VLR/SGSN Nodes for specific roaming control changes.

OCPLMN Node Number

Name

OCPlmnNodeNumber

Description

The Tekelec ngHLR stores the number of all the VLR/SGSN nodes with which the Tekelec ngHLR has communicated with since entering in service. This entity can also store temporarily the list of affected VLR/SGSN nodes last calculated by the Tekelec ngHLR. It can store the result of the last performed operation:

- ComputePlmnChanges()
- ComputeOCPlmnTemplateChanges()
- ComputeServiceScreeningTemplateChanges()

CLI Navigation

```
Hlr[]>HlrOCPlmn_Config[]>OCPlmn_ConfigChanges[]>OCPlmnNodeNumber
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]>display OCPlmnNodeNumber[]
```

Operations Permitted

```
Display
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 65: OCPlmnNodeNumber Mandatory Attributes

Attribute	Value Range	Default	Description
`NodeClass`	`7` (VLR) `8` (MSC) `149` (SGSN) `150` (GGSN)	N/A	Identifies the type of node affected by the roaming controls change.
`NodeNmb`	`String`	N/A	Node number (in E.164 format) that is affected by the roaming controls change.
`HlrNumber`	`String`	N/A	Number of the Tekelec ngHLR.

VLR/SGSN Nodes Operations

The following steps must be followed in order to calculate the affected VLR/SGSN nodes for a specific roaming controls configuration change:

In order to request the Tekelec ngHLR to calculate the VLR/SGSN nodes affected by a specific roaming control configuration change, one of the following operations must first be executed:

- ComputePlmnChanges()
- ComputeOCPlmnTemplateChanges()
- ComputeServiceScreeningTemplateChanges()

If you wish to view the list of VLR/SGSN nodes calculated by the Tekelec ngHLR, you must display the OCPlmnNodeNumber[] entity (see description above).

Finally, you must perform one of the following operations depending on what you wish to do with this list of affected VLR/SGSN nodes:

- ReplaceCurrentNodeList()
- AppendCurrentNodeList()
- DiscardCurrentNodeList()

ComputePlmnChanges()

The ComputePlmnChanges() operation can be used by the Network Operator to request to the Tekelec ngHLR to calculate the list of VLR/SGSN nodes that would be affected by a change in the Plmn Definitions. This operation can be executed for one roaming configuration change at a time.

Command syntax:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]> ComputePlmnChanges()PPlmn=
<PLMN Id>; PAction=<Action>
```

When executing the ComputePlmnChanges operation, the following parameters can be specified with the following corresponding values:

Mandatory parameters:

- **PPlmn** {ID of the PLMN for which you wish to calculate the list of VLR/SGSN nodes affected by a change in its configuration}
- **PAction**{type of action that would change the roaming configuration and for which you wish the Tekelec ngHLR to calculate the list of affected VLR/SGSN nodes}:
  - 0 (Delete Plmn)
  - 1 (Delete Vlr)
  - 2 (Add Vlr)

Optional parameter:

- PNodeRange
  - {Case1: Node Range # to which the 'Delete Node Range' action applies to. The Tekelec ngHLR will calculate the list of VLR/SGSN nodes that would be affected by the deletion of this Node Range
  - {Case2: New Node Range # that would be added to the PLMN and for which you wish to calculate the list of affected VLR/SGSN nodes}

    This parameter must be specified in the case where you wish to calculate the list of VLR/SGSN nodes affected by a change of a Node Range. It only needs to be specified in the cases where the 'Action' parameter is set to 'Delete Node Range' or 'Add Node Range'.

Example:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]> ComputePlmnChanges()PPlmn=
1; PAction= 1; PNodeRange=123422
```

ComputeOCPlmnTemplateChanges()

The ComputeOCPlmnTemplateChanges() operation can be used by the Network Operator to request to the Tekelec ngHLR to calculate the list of VLR/SGSN nodes that would be affected by a change in the OCPLMN Template definitions. This operation can be executed for one roaming configuration change at a time.

Command syntax:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]>
ComputeOCPlmnTemplateChanges()PPlmn= <PLMN Id>; PTemplate=<PLMN Template
ID>; PAction=<action>
```

When executing the ComputeOCPlmnTemplateChanges operation, the following parameters can be specified with the following corresponding values:

Mandatory parameters:

- PTemplate {ID of the PLMN Template for which you wish to calculate the list of VLR/SGSN nodes affected by a change in its configuration}
- PPlmn {ID of the PLMN for which you wish to calculate the list of VLR/SGSN nodes affected by a change in its configuration}
- Action {type of action that would change the roaming configuration and for which you wish the Tekelec ngHLR to calculate the list of affected VLR/SGSN nodes}:
  - 0 (Delete Plmn Reference)

- 1 (Delete Imsi)
- 2 (Add/Delete Service Template Reference)

Optional parameters:

- PImsiRange {IMSI range (MCC+MNC) to which the 'Delete Imsi' action applies to. The Tekelec ngHLR will calculate the list of VLR/SGSN nodes that would be affected by the deletion of this IMSI Range}

  This parameter must be specified in the case where you wish to calculate the list of VLR/SGSN nodes affected by a deletion of an allowed Imsi range. It only needs to be specified in the case where the 'Action' parameter is set to 'Delete Imsi.

Example:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]>
ComputeOCPlmnTemplateChanges()PPlmn= 1; PTemplate=temp1; PAction= 0
```

ComputeServiceScreeningTemplateChanges()

The ComputeServiceScreeningTemplateChanges() operation can be used by the Network Operator to request to the Tekelec ngHLR to calculate the list of VLR/SGSN nodes that would be affected by a change in the Service Screening Template Definitions. This operation can be executed for one roaming configuration change at a time.

Command syntax:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]>
ComputeServiceScreeningTemplateChanges()PTemplate= <Service Screening
Template-ID#>; PAction=<action>
```

When executing the ComputeServiceScreeningTemplateChanges operation, the following parameters can be specified with the following corresponding values:

Mandatory parameters:

- PTemplate {ID of the Service Screening Template for which you wish to calculate the list of VLR/SGSN nodes affected by a change in its configuration}
- PAction {type of action that would change the roaming configuration and for which you wish the Tekelec ngHLR to calculate the list of affected VLR/SGSN nodes}:
  - 0 (Modify Service ScreeningTemplate)

Example:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]>
ComputeServiceScreeningTemplateChanges()PTemplate= sstemp1; PAction=0
```

DisplayCurrentNodeList()

The DisplayCurrentNodeList() operation can be used by the Network Operator to display in the HLR Provisioning Manager's traces (HlrProvManager.xml) the list of affected VLR/SGSN nodes that was last calculated by the Tekelec ngHLR. In order to view this list, the Network Operator must access the traces. For instructions on how to view traces, refer to the "Accessing traces" section in the *SDM Monitoring, Maintaining, Troubleshooting — User Guide* document.

Prerequisite: The HLR provisioning traces must be activated. Contact the Tekelec *Customer Care Center* if the system doesn't generate traces for the HLR provisioning.

Command syntax:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]>DisplayCurrentNodeList()
```

ReplaceCurrentNodeList()

The ReplaceCurrentNodeList() operation can be used by the Network Operator to replace the NodeNumberSubset entity's list of nodes (list of nodes to which MAP_RESET messages are sent upon the execution of the SendMapReset() operation with option=Node Subset) with the calculated list of affected VLR/SGSN nodes.

Prerequisite: One of the ComputePlmnChanges(), ComputeOCPlmnTemplateChanges() or ComputeServiceScreeningTemplateChanges() operations to calculate the list of affected VLR/SGSN nodes must have been executed.

Command syntax:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]>ReplaceCurrentNodeList()
```

AppendCurrentNodeList()

The AppendCurrentNodeList() operation can be used by the Network Operator to add the calculated list of affected VLR/SGSN nodes to the already existing list of nodes in the NodeNumberSubset entity (list of nodes to which MAP_RESET messages are sent upon the execution of the SendMapReset() operation with option=Node Subset).

Prerequisite:

One of the ComputePlmnChanges(), ComputeOCPlmnTemplateChanges() or ComputeServiceScreeningTemplateChanges() operations to calculate the list of affected VLR/SGSN nodes must have been executed.

Command syntax:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]>AppendCurrentNodeList()
```

DiscardCurrentNodeList()

The DiscardCurrentNodeList() operation can be used by the Network Operator to discard the calculated list of affected VLR/SGSN nodes.

Prerequisite: One of the ComputePlmnChanges(), ComputeOCPlmnTemplateChanges() or ComputeServiceScreeningTemplateChanges() operations to calculate the list of affected VLR/SGSN nodes must have been executed.

Command syntax:

```
Hlr[]> HlrOCPlmn_Config[]> OCPlmn_ConfigChanges[]>DiscardCurrentNodeList()
```

MAP Policing configuration

Application Context (AC) Template

This section describes each of the HLR CLI commands used to provision the MAP Policing feature.

Note: The MAP Policing feature can be enabled or disabled in the HlrConfig[] entity described in *HLR Configuration*. The following section provides information about the entities and their parameters that need to be provisioned for the MAP Policing feature when it is enabled.

Name

AcTemplate

Description

This configuration table is used to define/associate a name with a specific template.

CLI Navigation

```
Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]> AcTemplate
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> HlrConfig[HlrInstance=int]>MapPolicing[] > display
AcTemplate[TemplateId= integer; TemplateName=string; AlrOn=0,1; PsiMsgOn=0,1;
BcInSriAck=0,1]
```

Operations Permitted

```
Add, display, modify, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 66: AcTemplate Mandatory Attributes

Attribute	Value Range	Default	Description
TemplateId	integer	0	Identifier of a template.
TemplateName	string	N/A	Name of the template.

Table 67: AcTemplate Optional Attributes

Attribute	Value Range	Default	Description
AlrOn	0 or 1	1	This flag indicates whether the Tekelec ngHLR needs to block the ALR request sent in the ATI or SRI message from the node or node range associated to this template. '1': The Tekelec ngHLR doesn't block the ALR request and returns the ALR information when requested by the incoming message. '0': The Tekelec ngHLR blocks the ALR request in the incoming message and never returns the ALR information in the reply message.
PsiMsgOn	0 or 1	1	This flag indicates whether the Tekelec ngHLR needs to block the PSI request sent in the ATI or SRI message from the node or node range associated to this template. '1': The Tekelec ngHLR doesn't block the PSI request and sends a PSI message to the VLR or SGSN when requested in the ATI or SRI message. '0': The Tekelec ngHLR blocks the PSI request and doesn't send a PSI message.
BcInSriAck	0 or 1	1	Flag that indicates whether the GSM-BC and BS information is to be included in the SRI-ack response or not. This flag is dynamic and can be modified during running time. 0: The Tekelec ngHLR won't include the GSM-BC and BS information in the SRI-ack response.

Attribute	Value Range	Default	Description
			1: The Tekelec ngHLR includes the GSM-BC and BS information in the SRI-ack response when possible.

CLI Example:

```
Hlr[]>HlrConfig[HlrInstance=1]>MapPolicing[]> add
AcTemplate[TemplateId=1;TemplateName=temp1]
```

ACTemplate Definition

Name

`AcTemplateDefinition`

Description

This allows the operator to configure a default maximum MAP version, per Application Context (AC) that is applied to the entire Tekelec ngHLR. This configuration table defines a template as a set of application contexts with their associated MAP version. These default maximum values are applied for all transactions with unknown Network Elements (all NE with an address not corresponding to the address node ranges defined in the AcTemplateMapping table). At startup, a default template is defined* and the operator can customize these templates by modifying the MAP versions for the Application Contexts.

You can have access to the AcTemplateDefinition entity by following one of these navigation paths:

- Individual AcTemplateDefinition for a specific template:
  - `*Hlr[] > HlrConfig[] > MapPolicing[]> AcTemplate[] > AcTemplateDefinition`
- General AcTemplateDefinition for all the templates:
  - `*Hlr[] > HlrConfig[] > MapPolicing[]> AcTemplateDefinition`

CLI Inherited Attributes

- For the AcTemplateDefinition of a specific template:`TemplateId`.
- For the AcTemplateDefinition of all the templates: None.

CLI Command Syntax

- Individual AcTemplateDefinition for a specific template:

  ```
  Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]>
  AcTemplate[TemplateId=integer]>display AcTemplateDefinition[AcId= integer;
  AcVersion=integer]
  ```

- General AcTemplateDefinition for all the templates:

Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[] >display
AcTemplateDefinition[TemplateId=integer; AcId= integer; AcVersion=integer]

Operations Permitted

Display, modify

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 68: AcTemplateDefinition Mandatory Attributes

Attribute	Value Range	Default	Description
TemplateId	Integer	0	Identifier of a template.
AcId	1 NetworkLoc UpContext 2 Location Cancellation Context 3 Roaming Number EnquiryContext 5 Location InfoRetrieval Context 10 ResetContext 14 InfoRetrieval Context 16 Subscriber DataMngt Context 18 Network Functional SsContext 19 Network Unstructured SsContext 20 ShortMsg GatewayContext 23 ShortMsg AlertContext 24 MwdMngt Context	N/A	Identifier of an Application Context.

Attribute	Value Range	Default	Description
	26 ImsiRetrieval Context 27 MsPurging Context 28 SubscriberInfo EnquiryContext 29 AnyTimeInfo EnquiryContext 32 GprsLocation UpdateContext 33 GprsLocation InfoRetrieval Context 34 Failure ReportContext 35 GprsNotifyContext 39 Authentication FailureReport Context		
AcVersion	0 NotSupported 1 V1 2 V2 3 V3 4 V4	V1 for the AcId: 14,19 V2 for the AcId: 23,10,19,18. V4 for the AcId: 33 V3 for all the other ACs.	The default maximum MAP Version that is used by the Tekelec ngHLR per Application Context. **Note:** By setting the default maximum MAP version to "NotSupported" for an AC, the operator can block that AC.

CLI Example

```
Hlr[]>HlrConfig[HlrInstance=1]>MapPolicing[]> AcTemplate[TemplateId=1]> add AcTemplateDefinition[AcId=3;AcVersion=2]
```

*By default, a templateId=0 is created with all of the Application Contexts with the maximum MAP version allowed by the SS7 Stack. In the cases where the MAP Policing feature is disabled or enabled, but without any MAP Policing tables provisioned, the Tekelec ngHLR uses the default AcTemplateDefinition, shown below, to know which MAP Version to use for which AC (Application Context) during a MAP transaction with any NE (Network Element).

Table 69: Default Values of the AcTemplateDefinition table for MAP Policing.

Application Context Name	Default Maximum MAP version per Application Context. (Global HLR configuration)	TemplateId
NetworkLocUpContext	V3	0
LocationCancellationContext	V3	0
RoamingNumberEnquiryContext	V3	0
LocationInfoRetrievalContext	V3	0
ResetContext	V2	0
InfoRetrievalContext	V1	0
SubscriberDataMngtContext	V3	0
NetworkFunctionalSsContext	V2	0
NetworkUnstructuredSsContext	V1	0
ShortMsgGatewayContext	V3	0
ShortMsgAlertContext	V2	0
MwdMngtContext	V3	0
ImsiRetrievalContext	V2	0
MsPurgingContext	V3	0
SubscriberInfoEnquiryContext	V3	0
AnyTimeInfoEnquiryContext	V3	0
GprsLocationUpdateContext	V3	0
GprsLocationInfoRetrievalContext	V4	0
FailureReportContext	V3	0
GprsNotifyContext	V3	0
AuthenticationFailureReportContext	V3	0

AC Template Mapping

Name

ACTemplateMapping

Description

This table allows the operator to configure a maximum MAP version, per Application Context (by referring to a templateId defined in the AcTemplateDefinition entity) and per network element address range. During MAP transactions with a Network Element (NE), the Tekelec ngHLR will limit the MAP versions to the values defined in this table, if that NE is covered by a range defined in this table. Basically, the AcTemplateMapping table associates an existing template (defined previously in the AcTemplate and AcTemplateDefinition tables) with a node range.

CLI Navigation

```
Hlr[] > HlrConfig[] > MapPolicing[]> AcTemplateMapping
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]>HlrConfig[HlrInstance=int]> MapPolicing[]>display
AcTemplateMapping[TemplateId=integer; NodeRange= integer]
```

CLI Operations Permitted

Add, display, delete, modify.

Note: Not all users (User Groups) are allowed to perform these operations.

CLI Attributes and Values

Table 70: ACTemplateMapping Mandatory Attributes

Attribute	Value Range	Default	Description
`TemplateId`	`integer`	`0`	Identifier of a template.
`NodeRange`	`String` (up to 15 digits)	N/A	Identifier of an Application Context.

CLI Example

```
Hlr[]>HlrConfig[HlrInstance=int]> MapPolicing[]> add
AcTemplate[TemplateId=1;TemplateName=temp1]
```

Node Number

Name

NodeNumber

Description

This table is dynamic and contains a list of all the nodes for which an "Update Location" message has been received. This table is used internally by the NodeNumberAcMapping table.

CLI Navigation

```
Hlr[] > HlrConfig[] > MapPolicing[]> NodeNumber
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]>display NodeNumber[]
```

Operations Permitted

```
Display
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 71: NodeNumber Mandatory Attributes

Attribute	Value Range	Default	Description

`AcDataPresent`	`0`
	,
	`1`
		`0`	This is used internally to indicate if the AC values are present in the NodeNumberAcMapping table.
			0=AC values are not present in the NodeNumberAcMapping table.
			1=AC values are present in the NodeNumberAcMapping table.

`NodeClass`	`7` (VLR) `8` (MSC) `149` (SGSN) `150` (GGSN)	N/A	Identifies the type of node with which MAP transactions are exchanged.
`NodeNmb`	`String`	N/A	Node number in E.164 format.

Attribute	Value Range	Default	Description
HlrNumber	String	N/A	Number of the Tekelec ngHLR.
ExtQosSupported	0 , 1	0	Indicates if the external quality of service is supported or not. 0= not supported 1= supported

CLI Example

```
Hlr[]>HlrConfig[HlrInstance=1]>MapPolicing[]>display NodeNumber[]
```

Node Number AC Mapping

Name

NodeNumberAcMapping

Description

This dynamic table contains the current MAP version values (negociated or not) to be used in any transaction with the specified node. During a MAP transaction, the Tekelec ngHLR proceeds with MAP Version Fallback when needed, and dynamically stores the last negotiated MAP version for a given AC, to be used for subsequent transactions.

CLI Navigation

```
Hlr[] > HlrConfig[] > MapPolicing[]> NodeNumberAcMapping
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]>display NodeNumberAcMapping[]
```

Operations Permitted

```
Display
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 72: NodeNumberAcMapping Mandatory Attributes

Attribute	Value Range	Default	Description
AcId	1 NetworkLocUpContext 2 Location Cancellation Context 3 Roaming NumberEnquiry Context 5 Location InfoRetrieval Context 10 ResetContext 14 InfoRetrieval Context 16 Subscriber DataMngt Context 18 Network Functional SsContext 19 Network Unstructured SsContext 20 ShortMsg GatewayContext 23 ShortMsg AlertContext 24 MwdMngt Context 26 ImsiRetrieval Context 27 MsPurging Context 28 SubscriberInfo EnquiryContext 29 AnyTimeInfo EnquiryContext	N/A	Identifier of an Application Context.

Attribute	Value Range	Default	Description
	32 GprsLocation UpdateContext 33 GprsLocation InfoRetrieval Context 34 FailureReport Context 35 GprsNotify Context 39 Authentication FailureReport Context		
NodeClass	7 (VLR) 8 (MSC) 149 (SGSN) 150 (GGSN)	N/A	Identifies the type of node with which MAP transactions are exchanged.
NodeNmb	String	N/A	Node number in E.164 format.
AcVersion	0 NotSupported 1 V1 2 V2 3 V3 4 V4	V1 for the AcId: 14,19 V2 for the AcId: 23,10,19,18. V4 for the AcId: 33 V3 for all the other ACs.	The default maximum MAP Version that is used by the Tekelec ngHLR per Application Context. **Note:** By setting the default maximum MAP version to "NotSupported" for an AC, the operator can block that AC.

CLI Example

```
Hlr[]>HlrConfig[HlrInstance=1]>MapPolicing[]>display NodeNumberAcMapping[]
```

NodeNumberSubset

Name

NodeNumberSubset

Description

This entity is used to define a specific list of nodes and their number. This list of nodes is used by the Tekelec ngHLR when the SendMapReset() operation is executed with the 'Node Number Subset' option. This entity can be cleared or provisioned by adding/deleting one entry at a time or by executing the ManageNodeNumberSubset () operation. Refer to section "*MAP Policing Operations*" for details on these operation.

CLI Navigation

```
Hlr[] > HlrConfig[] > MapPolicing[]> NodeNumberSubset
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]> add
NodeNumberSubset[NodeNmb=string;NodeClass=string; HlrNumber=string]
```

Operations Permitted

```
Add, display, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 73: NodeNumberSubset Mandatory Attributes

Attribute	Value Range	Default	Description
NodeClass	7 (VLR) 8 (MSC) 149 (SGSN) 150 (GGSN)	N/A	Identifies the type of node with which MAP transactions are exchanged.
NodeNmb	Stringin E.164 format.	N/A	Node number of the Node to which the Tekelec ngHLR needs to send a MAP_Reset when the SendMapReset() operation is executed.
HlrNumber	Stringin E.164 format.	N/A	Number of the HLR for which the remote Node should refresh all of the subscriber data, previously received by that HLR, after receiving a MAP_Reset message.

CLI Example

```
Hlr[]>HlrConfig[HlrInstance=1]>MapPolicing[]> add
NodeNumberSubset[NodeClass=7;NodeNmb=15634110001; HlrNumber=15634210100]
```

MAP Policing Operations

The following section provides a description of the operations that can be performed on the Tekelec ngHLR system for the MAP Policing feature.

RestoreACDefaults ()

The RestoreACDefaults operation allows the operator to manually restore the MAP versions stored in the dynamic NodeNumberAcMapping table back to the original default maximum values, which were defined as a template in the AcTemplateDefinition table.

Command syntax:

```
Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]>RestoreACDefaults()
```

SendMapReset()

The SendMapReset operation is used to send a MAP_RESET message to VLRs or SGSNs in order to inform them that a failure occurred. When executing this operation, you can choose to send MAP_RESET messages to all nodes, to only one node by specifying its Node Number and the HLR Number, and finally to a list of nodes imported from the NodeNumberSubset entity.

Command syntax:

```
Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]>SendMapReset()
```

When executing the SendMapReset operation, the following parameters can be specified with the following corresponding values:

Mandatory parameter:

- `Option`
  - 0 All Nodes
  - 1 Node Number
  - 2 Node Number Subset

Optional parameters:

These parameters must be specified in the case where you set the Option parameter to 'Node Number'.

- NodeNum {Node # to which you want the Tekelec ngHLR to send a Map Reset}
- HlrNum {# of the Hlr for which the remote Node should refresh all of the subscriber data previously received by that Hlr}

In the case where you choose to set the Option parameter to 'Node Number Subset', the Tekelec ngHLR sends a MAP Reset to all of the Node Numbers defined in the NodeNumberSubset entity. For more information on the NodeNumberSubset, refer to "*Application Context (AC) Template*". For information on how to provision this entity, refer to the "MAP Reset" section of the "HLR Application Configuration" chapter in the *SDM System Configuration - User Guide*.

Example:

```
Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]>SendMapReset() Option= 1;
NodeNum=34234235; HlrNum=15634210100
```

ManageNodeNumberSubset()

The ManageNodeNumberSubset operation is used to clear the NodeNumberSubset entity or to import all elements from the NodeNumber entity. This operation helps to easily and quickly clear the NodeNumberSubset entity or helps you to provision it. For more information on the NodeNumberSubset and NodeNumber entities, refer to "*Application Context (AC) Template*" in this document and to know how to provision it, refer to the "MAP Reset" section of the "HLR Application Configuration" chapter in the *SDM System Configuration - User Guide*.

Command syntax:

```
Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]>SendMapReset()
```

Mandatory parameter:

When executing the ManageNodeNumberSubset operation, the following parameter is mandatory and must be specified with either one of the following values:

- `Option:`
  - 0 Clear table
  - 1 Import all elements from Node Number table

Example:

```
Hlr[]>HlrConfig[HlrInstance=int]>MapPolicing[]>ManageNodeNumberSubset()
Option= 1
```

GSM Bearer Capabilities configuration

GSM Bearer Capabilities

The following section provides information about the entities and their parameters that need to be provisioned for the Phase 1 GSM Bearer Capabilities feature. It also briefly describes the HLR CLI commands used to provision this feature. For more information on the Bearer Capability Information element and all of its characteristics, refer to the 3GPP standard TS 24.008, version 5.

Name

`GsmBearerCapabilities`

Description

This allows the operator to define Bearer Capabilities information that he wishes for the Tekelec ngHLR to send to the VLR through the Provide Roaming Number message.

CLI Navigation

`Hlr[] > GsmBearerCapabilities[]`

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> add GsmBearerCapabilities[BearerCapName= varchar; B3_RadioChannelReq=
1,2,3; B3_CodingStandard= 0 ; B3_TransferMode= 0,1 ; B3_InfoTransferCap=
0,1,2,3,5; B4_Compression= 0,1 ; B4_Structure= 0,3 ; B4_DuplexMode= 0,1 ;
B4_Config= 0 ; B4_NIRR= 0,1 ; B4_Establishment= 0 ; B5_AccessIdentity= 0 ;
B5_RateAdaptation= 0,1,2,3 ; B5_SignallingAccessProtocol= 1 ;
B5a_OtherInfoTransferCap= 0 ; B5a_OtherRateAdaptation= 0,1,2 ;
B5b_RateAdaptationHeader= 0,1 ; B5b_MultiFrameEstSupport= 0,1 ;
B5b_OperationMode= 0,1 ; B5b_LogicalLinkIdNegotiation= 0,1 ;
B5b_AssignorAssignee= 0,1 ; B5b_NegotiationType= 0,1 ; B6_Layer1Identity=
1 ; B6_UserInfoLayer1Protocol= 0 ; B6_SyncAsync= 0,1 ; B6a_NumStopBits= 0,1
; B6a_Negotiation= 0 ; B6a_NumDataBits= 0,1 ; B6a_UserRate= 1,2,3,4,5,6 ;
B6b_IntermediateRate= 2,3 ; B6b_NicOnTx= 0,1 ; B6b_NicOnRx= 0,1 ; B6b_Parity=
0,2,3,4,5 ; B6c_ConnectionElement= 0,1,2,3 ; B6c_ModemType= 0,1,2,3,5,6,7,8
; B6d_OtherModemType= 0,2 ; B6d_FixedNetworkUserRate=
0,1,2,3,4,5,6,7,8,9,10,11 ; B6e_ChannelCoding_14_4= 0,1 ;
B6e_ChannelCoding_9_6= 0,1 ; B6e_ChannelCoding_4_8= 0,1 ;
B6e_MaxNumTrafficChannel= 0,1,2,3,4,5,6,7 ; B6f_UserInitiatedModificationInd=
0,1,2,3,4 ; B6f_AirInterfaceUserRate= 0,1,2,3,5,6,7,8,9 ;
B6g_ChannelCodingExt_28_8= 0,1 ; B6g_ChannelCodingExt_32_0= 0,1 ;
B6g_ChannelCodingExt_43_2= 0,1 ; B6g_ChannelCodingAsymetryInd= 0,1,2,3 ;
B7_Layer2Identity= 2 ; B7_UserInfolayer2Protocol= 8,10,12 ; RawData_B3=
decimal ; RawData_B2= decimal ; RawData_B1= decimal ; RawData_B0= decimal
; B3a_Coding= 0,1 ; B3a_CTM= 0,1 ; B3a_SpeechVersionInd=
0,1,2,4,5,6,7,8,11,15]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 74: GsmBearerCapabilities Mandatory Attributes

Attribute	Value Range	Default	Description
`BearerCapName`	`Varchar` (15)	`null`	Identifier of Bearer Capability information.

Table 75: GsmBearerCapabilities Optional Attributes

Attribute	Value Range	Default	Description
B3_RadioChannelReq	1 (Full Rate Only) 2 (Dual Rate (Half Rate Preferred)) 3 (Dual Rate (Full Rate Preferred))	null	Defines the type of radio channel that you want to be requested. For Speech Information Transfer Capability, the type of radio channel defined here is ignored.
B3_CodingStandard	0 (Gsm)	null	Defines the coding standard used.
B3_TransferMode	0 (Circuit Mode) 1 (Packet Mode)	Null	Defines the transfer mode used.
B3_InfoTransferCap	0 (Speech) 1 (Unrestricted Digital Information) 2 (3.1 kHz Audio) 3 (Facsimile Groupe 3) 5 (Other ITC)	Null	Defines the type of data that can be transmitted.
B4_Compression	0 (Not Possible/Not Allowed) 1 (Possible/Allowed)	Null	Indicates if the compression of the data is allowed or not.
B4_Structure	0 (Service Data Unit Integrity) 3 (Unstructured)	Null	Defines whether the data is structured or not.
B4_DuplexMode	0 (Half Duplex) 1 (Full Duplex)	Null	Defines whether the transmission is done on both sides (full duplex) at the same time or only on one side (half duplex).
B4_Config	0 (Point to point)	Null	This indicates the point to point configuration used for mobile communication.
B4_NIRR	0 (NotApplicable/No meaning is associated with this value)	Null	Defines whether or not a negociation is done for the intermediate rate requested.

Attribute	Value Range	Default	Description
	1 (StandardNegotiation, data up to and including 4.8 kb/s, full rate, non-transparent, 6kb/s radio interface rate is requested)		
B4_Establishment	0 (Demand)	Null	This indicates that the establishement is done on demand.
B5_AccessIdentity	0 (octet identifier)	Null	Reserved value. This indicates the access identity.
B5_RateAdaptation	0 (None) 1 (V.110 I.460/X30 Rate Adaptation) 2 (ITU-T X31 Flag Stuffing) 3 (Other)	Null	This defines the protocol used for rate adaptation.
B5_SignallingAccess Protocol	1 (I.440/450)	Null	This indicates the protocol used for signaling access when establishing connection.
B5a_OtherInfoTransferCap	0 (restricted digital information)	Null	This indicates if any other type of Information Transfer Capabilities are used.
B5a_OtherRateAdaptation	0 (V.120) 1 (H.223 and H.245) 2 (PIAFS)	Null	This defines the protocol used for rate adaptation.
B5b_RateAdaptationHeader	0 (Header Not Included) 1 (Header Included)	Null	This defines whether the header is included or not in each frame.
B5b_MultiFrameEstSupport	0 (Not Supported) 1 (Supported)	Null	This indicates whether multiple frame establishement is supported or not.

Attribute	Value Range	Default	Description
B5b_OperationMode	0 (Bit Transparent) 1 (Protocol Sensitive)	Null	This defines the operation mode used, whether a protocol is used or not to transmit the control frames.
B5b_LogicalLink IdNegotiation	0 (Default Negotiation, LLI=256 only) 1 (Full Protocol Negotiation)	Null	Defines how the logical link is negotiated.
B5b_AssignorAssignee	0 (Default Assignee) 1 (Assignor Only)	Null	Defines who is the message originator.
B5b_NegotiationType	0 (In-band) 1 (Temporary Signalling Connection)	Null	Defines how the negotiating is done.
B6_Layer1Identity	1 (layer1)	Null	Defines the layer level, layer 1.
B6_UserInfoLayer1Protocol	0 (default)	Null	Defines the protocol used in layer 1.
B6_SyncAsync	0 (Synchronous) 1 (Asynchronous)	Null	Defines the way the data is transmitted.
B6a_NumStopBits	0 (1 Stop bit) 1 (2 Stop Bits)	Null	Defines the number of bits that are added between the octets during transmission. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6a_Negotiation	0 (In band negotiation not possible)	Null	Defines that in band negotiation is not possible. Used to describe bearer capabilities in the

Attribute	Value Range	Default	Description
			interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6a_NumDataBits	0 (7 Data Bits) 1 (8 Data Bits)	Null	Defines the number of data bits transmitted between the stop bits. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6a_UserRate	1 (0.3 kbps) 2 (1.2 kbps) 3 (2.4 kbps) 4 (4.8 kbps) 5 (9.6 kbps) 6 (12.0 kbps)	Null	Defines the bandwidth supported for the data transmission. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6b_IntermediateRate	2 (8 kbps) 3 (16 kbps)	Null	Describes which intermediate Network Independent clock transmission rate is supported by the terminal, for A/Gb and GERAN lu mode. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.

Attribute	Value Range	Default	Description
B6b_NicOnTx	0 (Data Not Required) 1 (Data Required)	Null	The terminal accepts (1)/cannot accept (1) data with a Network Independent Clock on Transmission (Tx). Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6b_NicOnRx	0 (Data Not Accepted) 1 (Data Accepted)	Null	The terminal accepts (1)/cannot accept (1) data with a Network Independent Clock on Reception (Rx). Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6b_Parity	0 (Odd) 2 (Even) 3 (None) 4 (Forced To 0) 5 (Forced To 1)	Null	Defines the parity that is used in the data. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6c_ConnectionElement	0 (Transparent) 1 (Non Transparent) 2 (Both-Transparent Preferred) 3 (Both-Non Transparent Preferred)	Null	Defines which data bit rate is supported by the terminal modem. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to

Attribute	Value Range	Default	Description
			3GPP 24.008 for additional details and references.
B6c_ModemType	0 (None) 1 (V.21) 2 (V.22) 3 (V.22 Bis) 5 (V.26 Ter) 6 (V.32) 7 (Undefined Interface) 8 (Autobauding Type 1)	Null	Defines the type of modem supported. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6d_OtherModemType	0 (None) 2 (V.34)	Null	Defines the other type of modem that can be supported. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6d_FixedNetworkUserRate	0 (Not Applicable) 1 (9.6 kbps (X.1 V.110)) 2 (14.4 kbps (X.1 V.110)) 3 (19.2 kbps (X.1 V.110)) 4 (28.8 kbps (X.1 V.110)) 5 (38.4 kbps (X.1 V.110)) 6 (48.0 kbps (X.1 V.110)) 7 (56.0 kbps (X.1 V.110))	Null	Defines the fixed bandwidth and standard that is supported for the modem communication. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.

Attribute	Value Range	Default	Description
	8 (64.0 kbps (Bit Transparent)) 9 (33.3 kbps (Bit Transparent)) 10 (32.0 kbps (I.460)) 11 (31.2 kbps (V.34))		
B6e_ChannelCoding_14_4	0 (Not Acceptable) 1 (Acceptable)	Null	Indicates if 14.4 kbps is acceptable bandwidth or not. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6e_ChannelCoding_9_6	0 (Not Acceptable) 1 (Acceptable)	Null	Indicates if 9.6 kbps is acceptable bandwidth or not. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6e_ChannelCoding_4_8	0 (Not Acceptable) 1 (Acceptable)	Null	Indicates if 4.8 kbps is acceptable bandwidth or not. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6e_MaxNumTrafficChannel	0 (1 Traffic Channel) 1 (2 Traffic Channels) 2 (3 Traffic Channels)	null	Defines the maximum number of traffic channels that can be supported.

Attribute	Value Range	Default	Description
	3 (4 Traffic Channels) 4 (5 Traffic Channels) 5 (6 Traffic Channels) 6 (7 Traffic Channels) 7 (8 Traffic Channels)		Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6f_UserInitiated ModificationInd	0 (Not Applicable) 1 (Up to 1 Traf Chan/F) 2 (Up to 2 Traf Chan/F) 3 (Up to 3 Traf Chan/F) 4 (Up to 4 Traf Chan/F)	Null	Indicates if the number of channels used in the GSM circuit can be modified by the user and if so, the number of channels that can be supported. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6f_AirInterfaceUserRate	0 (Not Applicable/no meaning associated with this value) 1 (9.6 kbps) 2 (14.4 kbps) 3 (19.2 kbps) 5 (28.8 kbps) 6 (38.4 kbps) 7 (43.2 kbps) 8 (57.6 kbps) 9 (Interpreted As 38.4kbps)	Null	This specifies the bandwidth per channel that can be supported. Used to describe bearer capabilities in the interworking context of ITU-T recommendations V110 and X.1 and X30. Please refer to those recommendation and to 3GPP 24.008 for additional details and references.
B6g_ChannelCodingExt_28_8	0 (Not Acceptable) 1 (Acceptable)	Null	Indicates if 28.8 kbps is acceptable bandwidth or not.
B6g_ChannelCodingExt_32_0	0 (Not Acceptable) 1 (Acceptable)	Null	Indicates if 32.0 kbps is acceptable bandwidth or not.

Attribute	Value Range	Default	Description
B6g_ChannelCodingExt_43_2	0 (Not Acceptable) 1 (Acceptable)	Null	Indicates if 43.2 kbps is acceptable bandwidth or not.
B6g_ChannelCoding AsymetryInd	0 (Symmetry) 1 (Uplink Biased Asymmetry) 2 (Downlink Biased Asymmetry) 3 (Unused)	Null	Defines the way the bandwidth is reserved. Whether the priority is uplink, downlink or symmetric.
B7_Layer2Identity	2 (Layer 2)	Null	Identifies the layer level.
B7_UserInfolayer2Protocol	8 (ISO 6429 Codeset 0) 10 (Videotex Profile 1) 12 (Character Oriented Protocol - No Flow Control Mechanism)	Null	Defines the protocol to be used
RawData_B3	Decimal (4 octets)	Null	This parameter only needs to be provisioned for non-standard Bearer Capability information or for BC information that is not supported by the Tekelec GUI. Low level coding must be known to provision this parameter. Please contact Tekelec' support team to provision this parameter.
RawData_B2	Decimal (4 octets)	Null	This parameter only needs to be provisioned for non-standard Bearer Capability information or for BC information that is not supported by the Tekelec GUI. Low level coding must be known to provision this parameter. Please contact Tekelec' support team to provision this parameter.

Attribute	Value Range	Default	Description
RawData_B1	Decimal (4 octets)	Null	This parameter only needs to be provisioned for non-standard Bearer Capability information or for BC information that is not supported by the Tekelec GUI. Low level coding must be known to provision this parameter. Please contact Tekelec' support team to provision this parameter.
RawData_B0	Decimal (4 octets)	Null	This parameter only needs to be provisioned for non-standard Bearer Capability information or for BC information that is not supported by the Tekelec GUI. Low level coding must be known to provision this parameter. Please contact Tekelec' support team to provision this parameter.
B3a_Coding	0 (ITC Extension) 1 (Other Extension)	Null	Defines the way the information transfer capability is encoded.
B3a_CTM	0 (Text Telephony Not Supported) 1 (Text Telephony Supported)	Null	Indicates whether the CTM text telephony indication is supported or not.
B3a_SpeechVersionInd	0 (Full Rate v1) 1 (Half Rate v1) 2 (Full Rate v2) 4 (Full Rate v3) 5 (Half Rate v3) 6 (Full Rate v4) 7 (Half Rate v4) 8 (Full Rate v5) 11 (Half Rate v6) 15 (Not Supported)	null	Defines the speech version that can be supported in the Gsm circuit.

Note: All traffic-related attributes are optional in the Bearer Capability element. This implies that defining an "empty" Bearer Capability element with only a name, will in fact create a "speech" Bearer Capability in its simplest form.

CLI Example

```
Hlr[]> add GsmBearerCapabilities[BearerCapName=Bearer1; B3_RadioChannelReq=1;
B3_CodingStandard= 0 ; B3_TransferMode= 1 ; B3_InfoTransferCap= 1]
```

Bearer Cap Name

Name

`GsmBearerCapabilitiesB3x`

Description

This table allows the operator to provision the Gsm Bearer Capability element with multiple speech versions. Once the B3a_SpeechVersionInd is provisioned in the GsmBearerCapabilities [] table, the GsmBearerCapabilitiesB3x can be provisioned. The Gsm Bearer Capability element supports multiple octets 3x (octet 3b, 3c,etc. as per the 3GPP standard 24.008) for which different speech versions can be provisioned.

CLI Navigation

`Hlr[]>GsmBearerCapabilities[]>GsmBearerCapabilitiesB3x[]`

CLI Inherited Attributes

`BearerCapName`

CLI Command Syntax

```
Hlr[]> GsmBearerCapabilities[BearerCapName= varchar] > add
GsmBearerCapabilitiesB3x [B3x_Index= 0-9 ; B3x_Coding= 0;
B3x_SpeechVersionInd= 0,1,2,4,5,6,7,8,11,15]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 76: GsmBearerCapabilitiesB3x Mandatory Attributes

Attribute	Value Range	Default	Description
`BearerCapName`	`Varchar` (15)	`null`	Identifier of Bearer Capabilitiy information.

Attribute	Value Range	Default	Description
B3x_Index	Int unsigned (0 to 9)	0	Identifies the octet 3x (x: b,c,d,e,f…) of the bearer capability information element.

Table 77: GsmBearerCapabilitiesB3x Optional Attributes

Attribute	Value Range	Default	Description
B3x_Coding	0 (ITC Extension)	null	Reserved. This indicates the way the information transfer capability is encoded.
B3x_SpeechVersionInd	0 (Full Rate v1) 1 (Half Rate v1) 2 (Full Rate v2) 4 (Full Rate v3) 5 (Half Rate v3) 6 (Full Rate v4) 7 (Half Rate v4) 8 (Full Rate v5) 11(Half Rate v6) 15(Not Supported)	null	Indicates the speech version that can be supported in the GSM circuit.

CLI Example

```
Hlr[]> GsmBearerCapabilities[BearerCapName=Bearer1]> add
GsmBearerCapabilitiesB3x [B3x_Index=0; B3x_Coding=0; B3x_SpeechVersionInd=2]
```

Flexible MT-SMS Rerouting Configuration

Destination Router

Name

DestinationRouter

Description

This entity allows the Network Operator to define a list of Destination Router addresses to which SRI, SRI-LCS, MT-SMS, and ATI requests are routed or relayed when one or more of the SmsRouting, SmsRelay, or SriRouting functionalities are activated.

Once the addresses are defined, the Network Operator can create Routing Templates and associate them to the existing Destination Router defined in this entity by assigning a RouterName (or RouterID from the CLI) to each template.

WebCI Navigation

HLR ➤ Routing Controls

CLI Navigation

```
Hlr[]> DestinationRouter[]
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> display DestinationRouter [RouterName= varchar; RouterAddress=varchar;
SkipPSI=0,1 ; RouterId= int; Tt=int; OverrideTt=0,1; DefaultImsi=varchar;
Prefix=varchar]
```

Operations Permitted

```
Add, display, modify, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 78: DestinationRouter Mandatory Attributes

Attribute	Value Range	Default	Description
`RouterName`	`Varchar`	Not Defined	Name of the Destination Router (SMS Router when processing a MAP SRI_for_SM).
`RouterAddress`	`E.164 address` `Varchar`	`0`	Address of Destination Router to which the Tekelec ngHLR will relay the MT-SMS, SRI, SRI-LCS, or ATI request if the following is met: • One or more of SmsRouting, SmsRelay, or SriRouting functionalities are activated • the routing template's trigger is met • the subscriber is HLR- or SIP-registered

Attribute	Value Range	Default	Description
RouterId	Small integer	0	The ID number that identifies the Destination Router (SMS Router when processing a MAP SRI_for_SM).

Table 79: DestinationRouter Optional Attributes

Attribute	Value Range	Default	Description
SkipPSI	0, 1	0	Ability to skip the PSI procedure when an ATI message comes from a Destination Router. 0: The Tekelec ngHLR doesn't skip the PSI procedure and sends back a PSI request after receiving a MAP_ATI Req. Only once the PSI procedure is performed, the Tekelec ngHLR sends back a MAP_ATI ack. 1: The Tekelec ngHLR skips the PSI procedure when sending an ATI ack.
Tt	Integer 0-255	255	Translation Type.
Override Tt	0, 1	1	0: The Tekelec ngHLR does not change the Translation type. 1: The Tekelec ngHLR changes the Translation type.
DefaultImsi	Varchar 5 to 15	00000	IMSI returned by the Tekelec ngHLR in the MAP SRI/SRI-LCS/MT-SMS ACK message for the redirect mode. **Note:** When writing up the MT-SMS Ack message, the Tekelec ngHLR first checks if there is an IMSI provisioned in the IMSIForRedirectRouting table for the subscriber's MSISDN. If there is, the Tekelec ngHLR returns that provisioned IMSI in the MT-SMS Ack message instead of the defaultImsi. If there is no provisioned IMSI in the IMSIForRedirectRouting table, the Tekelec ngHLR returns the defaultImsi in the MT-SMS Ack message.
Prefix	Varchar, 0 to 9,	1	Applies to the redirect mode for SRI messages only. It is used along with the MSISDN in order to make up the MSRN (Prefix+MSISDN) in the SRI-Ack message. The prefix must be E. 164.

Attribute	Value Range	Default	Description
	overdecadic digits A, B, C, D, E		Overdecadic digits represent hexadecimal values and are encoded exactly as such.

Table 80: Destination Router permanent entry

Entry cannot be updated or deleted. It is used by the Tekelec ngHLR for the default Routing Template.

Router ID	Router Name	Router Address	Tt	Override Tt	Prefix	Default Imsi
0	Not Defined	0	255	1		00000

CLI Example

```
Hlr[]> add DestinationRouter[RouterName= Router1; RouterId=1;
RouterAddress=18293; SkipPSI=0; Tt=55; OverrideTt=0; DefaultImsi=123456]
```

MT-SMS Routing Template

Name

MtSMSRoutingTemplate (also known as RoutingTemplate in the WebCI)

Description

This entity allows the operator to define MT-SMS Routing templates with information such as the routing trigger, the routing type and routing exceptions. Each subscriber profile can then be provisioned with one of the Routing Templates defined in this entity. This dictates to the Tekelec ngHLR which behaviour to adapt when receiving an MT-SMS request for that subscriber. The operator can also associate each Routing Template to an existing Destination Router, defined in the DestinationRouter entity, by assigning it a RouterName (or RouterId in the CLI). This will indicate to the Tekelec ngHLR which Destination Router to communicate with in order to reroute the MT-SMS request.

WebCI Navigation

```
HLR   Routing Template
```

CLI Navigation

```
Hlr[]   MtSmsRoutingTemplate[ ]
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> display MtSmsRoutingTemplate[TemplateName= varchar; RouterId= int;
TemplateId= int; RoutingTrigger= 0,1,2,3,4,5,6]; RoutingType= varchar]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 81: MtSmsRoutingTemplate Mandatory Attributes

Attribute	Value Range	Default	Description
`TemplateName`	`Varchar` (15)	Not Defined	Name of the template defined.
`RouterId (used in the CLI)` Or `RouterName (used in the WebCI`	`RouterID: Small integer` `RouterName: varchar`	`RouterID: 0` `RouterName: (Not Defined)`	Identifier of DestinationRouter address. To each template, a RouterId (RouterName in the WebCI) must be assigned. This RouterId refers to the DestinationRouter address defined in the DestinationRouter entity.
`TemplateId`	`Small integer`	`0`	Unique numerical identifier of the MT-SMS Routing template.

Table 82: MtSmsRoutingTemplate Optional Attributes

Attribute	Value Range	Default	Description
`RoutingTrigger`	`0` (Never) `1` (Always) `2` (SipRegistered) `3`(RoamingOutHPLMN) `4`(RoamingOutHplmn OrSipRegistered) `5`(InHplmn) `6`(InHplmnOrSipRegistered	`0` (Never)	Template flag that triggers the rerouting of an MT-SMS. 0: The MT-SMS is never redirected or related to DestinationRouter. For subscribers with an MT-SMS Routing template assigned to them that has its flag TriggerSmsRedirect = Never, the SMS redirect is turned OFF. 1: The SMS is always redirected or relayed to DestinationRouter. 2: The SMS is only redirected or relayed to an SMS Relay when it is SIP Registered. 3: The SMS is only redirected or relayed to an SMS Relay

Attribute	Value Range	Default	Description
			when the subscriber is roaming out of the Home PLMN. 4: The SMS is only redirected or relayed to an SMS Relay when the subscriber is SIP Registered or when the subscriber is roaming out of the HPLMN. 5: The SMS is redirected or relayed to a Destination Router when the subscriber is in the HPLMN network . 6: The SMS is redirected or relayed to a Destination Router when the subscriber is in the HPLMN network or is SIP registered.
RoutingType	0(Redirect) 1(Relay)	0(Redirect)	Type of MT-SMS Routing the Tekelec ngHLR must perform which is either redirect or relay. 0 (Redirect): The Tekelec ngHLR performs the MT-SMS Redirection functionality . 1 (Relay) = The Tekelec ngHLR performs the MT-SMS Relay functionality . For details on the behaviours the Tekelec ngHLR adapts for each Routing Type, refer to the "MT-SMS Routing" section of the SDM Product Description.

CLI Example

```
Hlr[]> add MtSmsRoutingTemplate[TemplateName= template1; RouterId=1;
templateId=1; RoutingTrigger=3; RoutingType=0]
```

Routing Exception

Name

RoutingException

Description

This entity allows the operator to provision the prefix of GT addresses of the Originator SMSGMSC that will be part of the exception list. The Tekelec ngHLR never reroutes an MT-SMS request sent from an Originator SMS-GMSC that is defined in this exception list.

WebCI Navigation
HLR ➤ Routing Controls ➤ Routing Template

CLI Navigation
`Hlr[]>RoutingTemplate[templateId=smallint]>RoutingException[]`

CLI Inherited Attributes

`TemplateId`

CLI Command Syntax

```
Hlr[]> RoutingTemplate[TemplateId= smallint]> RoutingException[OrigAddress=
char]
```

Operations Permitted

Add, display, delete.

Attributes and Values

Table 83: SmscRedirectException Mandatory Attributes

Attribute	Value Range	Default	Description
`OrigAddress`	`Char` (15)	N/A	MT-SMS Routing Exception. Address of an Originator SMS-GMSC for which the Tekelec ngHLR does not reroute (redirection/relay) an MT-SMS request received by it, no matter what the configuration of the Flexible MT-SMS Rerouting feature is set to. **Note:** No OrigAddress can be defined for the default Template (TemplateId=0, TemplateName=Not Defined) **Note:** For the MT-SMS Relay functionality, the SCCP CgPA is compared to the SMS-GMSC exception list. The CgPA is normalized (from

Attribute	Value Range	Default	Description
			national to international by adding the country code) prior to comparison. **Note:** For the MT-SMS Redirect functionality, it is the SC (Service Center) address that is compared to the SMS-GMSC exception list. The SC address is normalized (from national to international by adding the country code) prior to comparison. In the case where a match is found, the Tekelec ngHLR handles MT-SMS requests as per the standard MT-SMS process.

CLI Example

```
Hlr[]> RoutingTemplate[TemplateId= 1]> add RoutingException[OrigAddress=
12384765]
```

Routing Controls

The Tekelec ngHLR can be configured as a GSM or IMS router using redirect or relay routing for the following messages:

- SRI MT-SMS
- SRI
- SRI-LCS
- ATI

The Destination Router, Routing Template, and Routing Exception entities provision the GSM/IMS Routing functionality.

Destination Router

Name

`DestinationRouter`

Description

This entity allows the Network Operator to define a list of Destination Router addresses to which SRI, SRI-LCS, MT-SMS, and ATI requests are routed or relayed when one or more of the SmsRouting, SmsRelay, or SriRouting functionalities are activated.

Once the addresses are defined, the Network Operator can create Routing Templates and associate them to the existing Destination Router defined in this entity by assigning a RouterName (or RouterID from the CLI) to each template.

WebCI Navigation

HLR ➤ Routing Controls

CLI Navigation

```
Hlr[]> DestinationRouter[]
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> display DestinationRouter [RouterName= varchar; RouterAddress=varchar;
SkipPSI=0,1 ; RouterId= int; Tt=int; OverrideTt=0,1; DefaultImsi=varchar;
Prefix=varchar]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 84: DestinationRouter Mandatory Attributes

Attribute	Value Range	Default	Description
`RouterName`	`Varchar`	Not Defined	Name of the Destination Router (SMS Router when processing a MAP SRI_for_SM).
`RouterAddress`	`E.164 address` `Varchar`	`0`	Address of Destination Router to which the Tekelec ngHLR will relay the MT-SMS, SRI, SRI-LCS, or ATI request if the following is met: • One or more of SmsRouting, SmsRelay, or SriRouting functionalities are activated • the routing template's trigger is met • the subscriber is HLR- or SIP-registered

Attribute	Value Range	Default	Description
RouterId	Small integer	0	The ID number that identifies the Destination Router (SMS Router when processing a MAP SRI_for_SM).

Table 85: DestinationRouter Optional Attributes

Attribute	Value Range	Default	Description
SkipPSI	0, 1	0	Ability to skip the PSI procedure when an ATI message comes from a Destination Router. 0: The Tekelec ngHLR doesn't skip the PSI procedure and sends back a PSI request after receiving a MAP_ATI Req. Only once the PSI procedure is performed, the Tekelec ngHLR sends back a MAP_ATI ack. 1: The Tekelec ngHLR skips the PSI procedure when sending an ATI ack.
Tt	Integer 0-255	255	Translation Type.
Override Tt	0, 1	1	0: The Tekelec ngHLR does not change the Translation type. 1: The Tekelec ngHLR changes the Translation type.
DefaultImsi	Varchar 5 to 15	00000	IMSI returned by the Tekelec ngHLR in the MAP SRI/SRI-LCS/MT-SMS ACK message for the redirect mode. **Note:** When writing up the MT-SMS Ack message, the Tekelec ngHLR first checks if there is an IMSI provisioned in the IMSIForRedirectRouting table for the subscriber's MSISDN. If there is, the Tekelec ngHLR returns that provisioned IMSI in the MT-SMS Ack message instead of the defaultImsi. If there is no provisioned IMSI in the IMSIForRedirectRouting table, the Tekelec ngHLR returns the defaultImsi in the MT-SMS Ack message.
Prefix	Varchar, 0 to 9,	1	Applies to the redirect mode for SRI messages only. It is used along with the MSISDN in order to make up the MSRN (Prefix+MSISDN) in the SRI-Ack message. The prefix must be E. 164.

Attribute	Value Range	Default	Description
	overdecadic digits A, B, C, D, E		Overdecadic digits represent hexadecimal values and are encoded exactly as such.

Table 86: Destination Router permanent entry

Entry cannot be updated or deleted. It is used by the Tekelec ngHLR for the default Routing Template.

Router ID	Router Name	Router Address	Tt	Override Tt	Prefix	Default Imsi
0	Not Defined	0	255	1		00000

CLI Example

```
Hlr[]> add DestinationRouter[RouterName= Router1; RouterId=1;
RouterAddress=18293; SkipPSI=0; Tt=55; OverrideTt=0; DefaultImsi=123456]
```

Routing Template

Name

`RoutingTemplate`

Description

This entity allows the Network Operator to define routing trigger, routing type, and default action.

The Routing template can provision a subscriber profile to act as defined when receiving an SRI, SRI-LCS, MT-SMS, or ATI request. The Network operator can also associate each Routing Template to an existing Destination Router, defined in the DestinationRouter entity, by assigning it a RouterName (or RouterId in the CLI). The Tekelec ngHLR will use the assigned Destination Router to reroute the MAP request.

WebCI Navigation
HLR ➤ Routing Template

CLI Navigation

```
Hlr[]>RoutingTemplate[]
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hlr[]> display MtSmsRoutingTemplate[TemplateName= varchar; RouterId= int;
TemplateId= int; RoutingTrigger= 0,1,2,3,4,5,6]; RoutingType= varchar;
DefaultAction= 0,1]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 87: RoutingTemplate Mandatory Attributes

Attribute	Value Range	Default	Description
`TemplateName`	`Varchar` (15)	Not Defined	Name of the template defined.
`RouterId (CLI)` Or `RouterName (WebCI)`	`RouterID: Small integer` `RouterName: varchar`	`RouterID: 0` `RouterName: (Not Defined)`	Identifier of DestinationRouter address. To each template, a RouterId (CLI) or RouterName (WebCI) must be assigned. This RouterId or RouterName refers to the DestinationRouter address defined in the DestinationRouter entity. RouterId or RouterName indicates to the Tekelec ngHLR with which Destination Router to communicate to reroute the MT-SMS request. **Note:** In the WebCI, the RouterName is used instead of the RouterId to refer to the Destination Router. The difference between the CLI and the WebCI is that the CLI uses a numeric identifier to represent a Destination
`TemplateId`	`Small integer`	`0`	Unique numerical identifier of the Routing template.

Table 88: RoutingTemplate Optional Attributes

Attribute	Value Range	Default	Description
`Routing Trigger`	`0` (Never) `1` (Always) `2` (Sip Registered) `3` (Roaming OutHPLMN)	`0`	Template flag that triggers the rerouting of SRI, SRI-LCS, MT-SMS, or ATI messages. 0: The message is never redirected or relayed to DestinationRouter. For subscribers with an MT-SMS Routing template assigned and set to

Attribute	Value Range	Default	Description
	4 (Roaming OutHplmnOr SipRegistered) 5 (InHplmn) 6 (InHplmnOr SipRegistered		TriggerSmsRedirect = Never, the SMS redirect is turned OFF. 1: The message is always redirected or relayed to DestinationRouter. 2: The message is only redirected or relayed when the subscriber is TAS-registered or SIP-registered. 3: The message is only redirected or relayed to an SMS Relay when the subscriber is roaming out of the Home PLMN. 4: The message is only redirected or relayed when the subscriber is TAS-registered or SIP-registered or when the subscriber is roaming out of the HPLMN. 5: The message is redirected or relayed to a Destination Router when the subscriber is in the HPLMN network . 6: The message is redirected or relayed when the subscriber is TAS-registered or in the HPLMN network or is SIP-registered.
RoutingType	0 (Redirect) 1 (Relay)	0	Type of routing, which the Tekelec ngHLR must perform: 0 (Redirect): Redirection functionality . 1 (Relay) = Relay functionality . For detailed routing behavior of each routing type, refer to the *GSM/IMS Router* section of the *SDM Product Description*.
DefaultAction	0 (Process locally) 1 (Relay with CdPA)	0	The default action if trigger conditions are not met. 0: Process locally 1: Relay with modified Tt All other values are rejected.

The Routing template contains a permanent entry. It cannot be updated or deleted. It is used by the Tekelec ngHLR for the default SMSTemplateId to specify that there is no routing template for the subscriber. When the Tekelec ngHLR looks for the SMSTemplateId value, it first checks the MSISDN table and then the Subscriber Profile.

Table 89: RoutingTemplate permanent entry

Template Id	Template Name	Routing Trigger	RouterId	Routing Type	Default Action
0	Not Defined	Never	0	Redirect	Process Locally

CLI Example

```
Hlr[]> add MtSmsRoutingTemplate[TemplateName= template1; RouterId=1;
templateId=1; RoutingTrigger=3; RoutingType=0; DefaultAction=0]
```

Routing Exception

Name

RoutingException

Description

This entity allows the operator to provision the prefix of Gt addresses of the Originator SMS-GMSC that will be part of the exception list. The Tekelec ngHLR never reroutes an MT-SMS request sent from an Originator SMS-GMSC that is defined in this exception list.

WebCI Navigation
HLR ➤ Routing Controls ➤ Routing Template

CLI Navigation
`Hlr[]>RoutingTemplate[templateId=smallint]>RoutingException[]`

CLI Inherited Attributes

`TemplateId`

CLI Command Syntax

```
Hlr[]> RoutingTemplate[TemplateId= smallint]> RoutingException[OrigAddress=
char]
```

Operations Permitted

Add, display and delete.

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 90: SmscRedirectException Mandatory Attributes

Attribute	Value Range	Default	Description
`OrigAddress`	`Char` (15)	N/A	MT-SMS Routing Exception. Address of an Originator SMS-GMSC for which the Tekelec ngHLR does not reroute (redirection/relay) an MT-SMS request received by it, no matter what the configuration of the Flexible MT-SMS Rerouting feature is set to. **Note:** No OrigAddress can be defined for the default Template (TemplateId=0, TemplateName=Not Defined) **Note:** For the MT-SMS Relay functionality, the SCCP CgPA is compared to the SMS-GMSC exception list. The CgPA is normalized (from national to international by adding the country code) prior to comparison. **Note:** For the MT-SMS Redirect functionality, it is the SC (Service Center) address that is compared to the SMS-GMSC exception list. The SC address is normalized (from national to international by adding the country code) prior to comparison. In the case where a match is found, the Tekelec ngHLR handles MT-SMS requests as per the standard MT-SMS process.

CLI Example

```
Hlr[]> RoutingTemplate[TemplateId= 1]> add RoutingException[OrigAddress=
12384765]
```

IMSI for Redirect Routing

Name

`IMSIforRedirectRouting`

Description

This entity allows the operator to provision a subscriber IMSI (instead of the default IMSI).

WebCI Navigation

HLR ➤ Routing Controls ➤ IMSIForRedirectRouting

CLI Navigation

`Hlr[]> IMSIForRedirectRouting[]`

CLI Inherited Attributes

None

CLI Command Syntax

`Hlr[]> IMSIForRedirectRouting[MsIsdn = char]`

Operations Permitted

`Add, Display, Modify, Delete`

Note: Not all users (User Groups) are allowed to perform these operations

.

Table 91: IMSIforRedirectRouting mandatory attributes

Attribute	Value Range	Default Value	Description
`MsIsdn`	VARCHAR(15)	Empty string	MsIsdn of the subscriber.
`Imsi`	VARCHAR(15)	Empty string	IMSI of the subscriber that the Tekelec ngHLR returns instead of the defaultimsi in the MAP SRI/SRI-LCS/MT-SMS Ack message for the redirect mode. IMSI must be 5 to 15 digits only.

CLI Example

```
HLR[]> add IMSIForRedirectRouting[Imsi = 310910421000100; MsIsdn =
15634210100]
```

Roaming Welcome Notification configuration

Roaming Message Exception CC

The following section provides information about the entities and their parameters that need to be provisioned for the Roaming Welcome Notification feature (including the XML Notifications on NDC and IMSI change). It also briefly describes the HLR CLI commands used to provision this feature.

Refer to the*SDM Roaming Welcome Message XML Interface Description* document included with your SDM user documentation for a more detailed description of how the Tekelec ngHLR provides XML interfaces for sending external notifications when a subscriber is successfully roaming in a different country.

Name

`RoamingMsgExceptionCC`

Description

This allows the operator to define a list of country codes (CCs) that are an exception to the roaming welcome notification service. This means that when the Tekelec ngHLR's RoamingMsgOn configuration parameter is set to "Notify on CC changes" (refer to the "*HLR configuration*" section of this document), the Tekelec ngHLR will never send a notification for the CCs in this list.

CLI Navigation

`Hlr[]>HlrConfig[]>RoamingMsgExceptionCC[]`

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]:HlrConfig[]> add RoamingMsgExceptionCC[CountryCode = integer]
```

Operations Permitted

`Add, display, delete`

Attributes and Values

Table 92: Roaming Msg ExceptionCC Mandatory Attributes

Attribute	Value Range	Default	Description
`CountryCode`	1-3 digits	*N/A*	Country Code of the VLR from which the subscriber is registered during a Location Update.

CLI Example

```
Hlr[]:HlrConfig[]> add RoamingMsgExceptionCC[CountryCode = 55]
```

Roaming Message Exception CC-NDC

Name

RoamingMsgExceptionCCNDC

Description

This allows the operator to define a list of CC-NDCs that are an exception to the roaming welcome notification service. This means that when the Tekelec ngHLR's RoamingMsgOn configuration parameter is set to "Notify on CC-NDC changes" (refer to the "*HLR configuration*" section of this document), the Tekelec ngHLR will never send a notification for the CC-NDCs in this list.\

CLI Navigation

```
Hlr[]>HlrConfig[]>RoamingMsgExceptionCCNDC[]
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]:HlrConfig[]> add RoamingMsgExceptionCCNDC[CountryCode = integer; NDC=
integer]
```

Operations Permitted

```
Add, display, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 93: RoamingMsgExceptionCCNDC Mandatory Attributes

Attribute	Value Range	Default	Description
`CountryCode`	1-3 digits	*N/A*	Country Code of the VLR from which the subscriber is registered from during a Location Update.
`NDC`	1-14 digits or *	*N/A*	National Destination Code of the VLR from which the subscriber is registered from during a Location Update. In the case where you wish to restrict an entire country

Attribute	Value Range	Default	Description
			when the Tekelec ngHLR is set to "Notify on CC-NDC changes", the operator needs to enter the Country Code and enter "*" (wildcard) as the NDC.

*Total of CC + NDC must not exceed 14 digits

CLI Example

```
Hlr[]:HlrConfig[]> add RoamingMsgExceptionCCNDC[CountryCode = 55; NDC=6]
```

Roaming Message NDC Extraction Rule

Name

RoamingMsgNDCExtractionRule

Description

This allows the operator to define for a specific CC the method that the Tekelec ngHLR needs to use to extract the NDC. In the case where the Tekelec ngHLR is set to "Notify on CC-NDC changes", the Tekelec ngHLR extracts the CC as per the ITU assignment rules and verifies in the RoamingMsgNDCExtractionRule entity which method is defined for this CC in order to extract the NDC from the VLR GT (e.164 global title).

CLI Navigation

```
Hlr[]>HlrConfig[]>RoamingMsgNDCExtractionRule[]
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]:HlrConfig[]> add RoamingMsgNDCExtractionRule[CountryCode = integer;
NDCMethod=0,1; NDCLength=integer]
```

Operations Permitted

```
Add, display, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 94: RoamingMsgNDCExtractionRule Mandatory Attributes

Attribute	Value Range	Default	Description
`CountryCode`	1-3 digits	`0`	Country Code of the VLR from which the subscriber is registered from during a Location Update. If the Tekelec ngHLR doesn't find the CC sent in the UL in this entity, it uses the default CC (CC=0), for which only the FixedLength method can be used. **Note that the NDCLength can be modified for the default CC.**
`NDCMethod`	`0` (Fixed Length) `1` (NDC List)	`0` (FixedLength)	This parameter indicates which method is defined for this CC in order to extract the NDC from the VLR GT (e.164 global title): The "FixedLength" method. With this method, the Tekelec ngHLR finds the NDC digit length defined for the CC and extracts the NDC with the known length. With this method, the 'NDCLength' parameter must absolutely be defined. The "NDCList" method. With this method, the Tekelec ngHLR finds the list of NDC for the CC extracted and verifies if the VLR GT NDC is in this list. If it's in this list, the NDC can be extracted from the VLR GT, otherwise the Tekelec ngHLR sends a notification. This list of NDCs must be defined by the operator manually for a specific Country Code. To define this list, the operator must provision the RoamingMsgNDClist entity

Attribute	Value Range	Default	Description
			with a list of shared country codes and their corresponding NDC list in which roaming welcome messages are sent if the CC-NDC changes.

*Total of CC + NDC must not exceed 15 digits

Table 95: RoamingMsgNDCExtractionRule Optional Attributes

Attribute	Value Range	Default	Description
NDCLength	0-14 digits	3	With this parameter, the operator can define the NDC digit length for a specific CC or can define the default NDC digit length applicable to all other CCs. This parameter must be defined if the 'NDCMethod' is set to FixedLength.

CLI Example

```
Hlr[]:HlrConfig[]> add RoamingMsgNDCExtractionRule[CountryCode = 66;
NDCMethod = 0; NDCLength = 13]
```

RoamingMsgNDCList

Name

RoamingMsgNDCList

Description

This entity must be provisioned for the CC for which the roaming message NDC extracting rule is the NDC list method. This entity allows the operator to define a list of shared country codes and their corresponding NDC list in which roaming welcome messages are sent if the CC-NDC changes. With the NDC List method, the Tekelec ngHLR finds the list of NDC for the CC extracted and verifies if the VLR GT NDC is in this list. If it's in this list, the NDC can be extracted from the VLR GT, otherwise the Tekelec ngHLR uses the default CC (CC=0) for which only the Fixed Length method can be used.

CLI Navigation

```
Hlr[]> HlrConfig[]> RoamingMsgNDCExtractionRule[CountryCode=integer]>
RoamingMsgNDCList[]
```

CLI Inherited Attributes

CountryCode

CLI Command Syntax

```
Hlr[]:HlrConfig[]> RoamingMsgNDCExtractionRule[CountryCode=integer]> add
RoamingMsgNDCList[NDC = integer]
```

Operations Permitted

```
Add, display, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 96: RoamingMsgNDCList Mandatory Attributes

Attribute	Value Range	Default	Description
NDC	1-14 digits	N/A	National Destination Code part of the NDC list from which the Tekelec ngHLR verifies if the VLR GT NDC is in this list.

*Total of CC + NDC must not exceed 14 digits

CLI Example

```
Hlr[]:HlrConfig[]> add RoamingMsgNDCExtractionRule[CountryCode = 66] ]> add
RoamingMsgNDCList[NDC=999]
```

MAP SRI Interworking with SIP Subscribers configuration

HLR SIP Subscriber Info

The following section provides information about the entity and its parameters that need to be provisioned for the MAP SRI Interworking with SIP Subscribers feature. It also briefly describes the HLR CLI commands used to provision this feature.

Name

```
HlrSipSubscriberInfo
```

Description

This allows the operator to define the state, location and non reachable reason for each HlrNumberConfig entry (Hlr address) defined in the system. This indicates to the Tekelec ngHLR what information it must include in the MAP SRI-ack in the case where the subscriber is reachable only in the SIP domain. By provisioning this entity, the Tekelec ngHLR can send back, for a subscriber only reachable in the SIP domain, a SRI-ack with the state/location (as per provisioned in the

HlrSipSubscriberInfo entity), which allows the call to continue and for the Tekelec ngHLR to route it to the SIP domain.

CLI Navigation

```
Hlr[]>HlrConfig[HlrInstance = <value>]>HlrNumberConfig[HlrNumberConfigId =
<value>]>HlrSipSubscriberInfo[]
```

CLI Inherited Attributes

`HlrInstance,HlrNumberConfigId`.

CLI Command Syntax

```
Hlr[]:HlrConfig[HlrInstance=integer]> HlrNumberConfig[HlrNumberConfigId =
integer]>display HlrSipSubscriberInfo[]
```

Operations Permitted

`Display, modify`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 97: HlrSipSubscriberInfo Optional Attributes

Attribute	Value Range	Default	Description

`SubsState`	`1 AssumedIdle`
	`2 CamelBusy`
	`3 NetDetNotReachable`
	`4 NotProvidedFromVlr`
	`255 None`
		`255`	The state of the SIP subscriber.

`NotReachableReason`	`0 MsPurged`
	`1 ImsiDetached`
	`2 RestrictedArea`
	`3 NotRegistered`
	`255 None`
		`255`	The not reachable reason. This attribute is only valid when SubsState is NetDetNotReachable and in that case, the value must be 0-3.

`SubsLocation`	0-20 Digits	`Null`	The default location of the SIP subscriber.

CLI Example

```
:Hlr[]:HlrConfig[HlrInstance = 1]:HlrNumberConfig[HlrNumberConfigId =
1]>modify HlrSipSubscriberInfo[] SubsState = 3; NotReachableReason = 2;
SubsLocation = 15149359700
```

Subscriber Signaling Router (SSR) configuration

Subscriber Signaling Router (SSR)

The following section provides information about the entities and their parameters that need to be provisioned for the SSR. It also briefly describes the HLR CLI commands used to provision this function.

Name

SSRTemplate

Description

This allows the operator to define SSR Templates with each different rules for which messages must be redirected or not, whether or not messages must be forwarded and where, etc..

CLI Navigation

Hlr[] >SubscriberSignalingRouter[]> SSRTemplate[]

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]:SubscriberSignalingRouter[]> add SSRTemplate[SSRTemplateDesc= string;
ForwardingAddress= e.164; BlockUserChange= 0,1,2,3; Forward= 0,1,2,3;
ForwardSAIOverride= 0,1; ForwardATIOverride= 0,1]
```

WebCI Navigation

HLR folder ➤ Subscriber Signaling Router window ➤ SSR Template table

Operations Permitted

Add, display, modify, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 98: SSRTemplate Mandatory Attributes

Attribute	Value Range	Default	Description
SSRTemplateDesc	string	N/A	Identifier of the SSR Template.
ForwardingAddress	e.164	N/A	Address of the node to which the SSR must redirect the messages to.

Table 99: SSRTemplate Optional Attributes

Attribute	Value Range	Default	Description
BlockUserChange	0 (Never) 1 (Always) 2 (BeforeUL) 3 (After UL)	0	Specifies under which conditions the SSR must block User change requests**. 0 (Never): The SSR never blocks the User change requests**. 1(Always): The SSR always blocks the User change requests**. 2 (BeforeUL): The SSR only blocks the User change requests** until an Update Location is received for the user, all subsequent messages (including UL) are processed locally. 3 (After UL): The SSR only blocks the User change requests** after an Update Location has been received. Messages are handled locally until an Update Location is received for the user, all subsequent messages (including UL) are blocked.
BlockAdminChange			For future use.
Forward	0 (Never) 1 (Always) 2 (BeforeUL)	0	Specifies under which conditions the SSR must forward messages*.

Attribute	Value Range	Default	Description
	3 (After UL)		0 (Never): The SSR never forwards messages. 1(Always): The SSR always forwards messages*. 2 (BeforeUL): The SSR only forwards messages* until an Update Location is received for the user, all subsequent messages (including UL) are processed locally. 3 (After UL): The SSR only forwards messages* after an Update Location has been received. Messages are handled locally until an Update Location is received for the user, all subsequent messages (including UL) are forwarded.
ForwardSAIOverride	0 , 1	0	Specifies whether or not the Forward rule must be overridden for SAI messages. 0(0ff): The SAI messages are to be forwarded in the case where the Forward rule specifies to forward all MAP messages. 1(On): The SAI messages are to never be forwarded even if the Forward rule specifies otherwise. This overrides the setting of the Forward parameter.
ForwardATIOverride	0 , 1	0	Specifies whether or not the Forward rule must be overridden for ATI messages. 0(0ff): The ATI messages are to be forwarded in the case where the Forward rule specifies to forward all MAP messages. 1(On): The ATI messages are to never be forwarded even if

Attribute	Value Range	Default	Description
			the Forward rule specifies otherwise. This overrides the setting of the Forward parameter.
Mirroring			For future use.

*

Note: Forward messages are for all MAP messages (the Begin message).

**

Note: Block user changes is for RegisterSS, EraseSS, ActSS, DeactSS message.

CLI Example

```
:Hlr[]:SubscriberSignalingRouter[]> add SSRTemplate[SSRTemplateDesc=temp1;
ForwardingAddress=15634213333]
```

SSR Per Sub Data

Name

SSRPerSubData

Description

This allows the operator to associate a subscriber (SubscriptionID) to a SSR Template.

CLI Navigation

Hlr[] >SubscriberSignalingRouter[]> SSRPerSubData[]

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]:SubscriberSignalingRouter[]> add SSRPerSubData[SubscriptionID= string;
SSRTemplateDesc= string]
```

WebCI Navigation:
HLR folder ➤ Subscriber Signaling Router window ➤ SSRPerSubData table

Operations Permitted

Add, display, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 100: SSRPerSubData Mandatory Attributes

Attribute	Value Range	Default	Description
SubscriptionID	string	N/A	Identifier of the subscriber. Unique key.

Table 101: SSRPerSubData Optional Attributes

Attribute	Value Range	Default	Description
SSRTemplateDesc	string	N/A	Identifier of the SSR Template.

CLI Example

```
:Hlr[]:SubscriberSignalingRouter[]> add SSRPerSubData[SubscriptionID=sub-1;
SSRTemplateDesc=temp1]
```

SSRPerIMSIRangeData

Name

SSRPerIMSIRangeData

Description

This allows the operator to associate an IMSI Prefix to a SSR Template.

CLI Navigation

```
Hlr[] >SubscriberSignalingRouter[]> SSRPerIMSIRangeData[]
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]:SubscriberSignalingRouter[]> add SSRPerIMSIRangeData[ImsiPrefix=
e.212; SSRTemplateDesc= string]
```

CLI WebCI Navigation:
HLR folder ➤ Subscriber Signaling Router window ➤ SSRPerIMSIRangeData table

Operations Permitted

Add, display, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 102: SSRPerIMSIRangeData Mandatory Attributes

Attribute	Value Range	Default	Description
ImsiPrefix	e.212 0 to 15 digits	N/A	Prefix of an IMSI that represents an IMSI range.

Table 103: SSRPerIMSIRangeData Optional Attributes

Attribute	Value Range	Default	Description
SSRTemplateDesc	string	N/A	Identifier of the SSR Template.

CLI Example

```
:Hlr[]:SubscriberSignalingRouter[]> add
SSRPerIMSIRangeData[ImsiPrefix=3109104; SSRTemplateDesc=temp1]
```

SSR Per MSISDN Range Data

Name

SSRPerMSISDNRangeData

Description

This allows the operator to associate an MSISDN Prefix to a SSR Template.

CLI Navigation

```
Hlr[] >SubscriberSignalingRouter[]> SSRPerMSISDNRangeData[]
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]:SubscriberSignalingRouter[]> add SSRPerMSISDNRangeData[MsisdnPrefix=
e.164; SSRTemplateDesc= string]
```

WebCI Navigation:
HLR folder ➤ Subscriber Signaling Router window ➤ SSRPerMSISDNRangeData table

Operations Permitted

Add, display, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 104: SSRPerMSISDNRangeData Mandatory Attributes

Attribute	Value Range	Default	Description
`MsisdnPrefix`	`e.164` 0 to 15 digits	N/A	Prefix of a MSISDN that represents a MSISDN range.

Table 105: SSRPerMSISDNRangeData Optional Attributes

Attribute	Value Range	Default	Description
`SSRTemplateDesc`	`string`	N/A	Identifier of the SSR Template.

CLI Example

```
:Hlr[]:SubscriberSignalingRouter[]> add
SSRPerMSISDNRangeData[MsisdnPrefix=123; SSRTemplateDesc=temp1]
```

PDN Context Template configuration

PDN Context Template Configuration

PDN Context Templates must be configured first prior to being able to define the PDN Context for a LTE-HSS subscriber. The PDN Context Templates can be defined in the TemplatePDNContext entity and once provisioned, each PDN Context Template can be linked to a subscriber profile.

The following section provides information about the TemplatePDNContext entity and its parameters that need to be provisioned. It also briefly describes the HLR CLI commands used to provision this function.

Name

`TemplatePDNContext`

Description

This allows the operator to define PDN Context Templates. The TemplatePDNContext entity can be modified dynamically, which means that the LTE HSS doesn't need to be restarted when adding/removing/updating entries in this entity.

Note: The PDN template can be modified on the fly without an LTE-HSS restart. However, modifying a PDN Template Id can result in a very high number of IDR sent by the LTE-HSS over the network. One IDR will be sent for each subscriber registered in an MME/SGSN using the modified template in its subscriber profile. If 1Million subscribers are using the PDN Template being modified, and these 1Million subscribers are registered in several MMEs, upon modification of such PDN Template, the LTE HSS will send 1Million IDR messages.

CLI Navigation
`Hlr[] > TemplatePDNContext`

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]> add TemplatePDNContext[AccessPointName= string; VplmnAddressAllowed;
AMBRUL= uint; AMBRDL= uint; PdnTemplateId= uint; EPSQoSClassId= enum;
QosAllocationRetentionPriorityLevel= char;
QosAllocationRetentionPreEmptionCapability= enum;
QosAllocationRetentionPreEmptionVulnerability= enum;PdnGWAllocationType=
enum; PdnChargingCharacteristics= enum;PdnGWIdentity= string]
```

WebCI Navigation
HLR folder ➤ TemplatePDNContext window

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 106: TemplatePDNContext Mandatory Attributes

Attribute	Value Range	Default	Description
`AccessPointName`	`string`	N/A	The Access point name (APN) identifies an IP packet data network (PDN), that a mobile data user wants to communicate with.
`PdnTemplateId`	`Unsigned int 32`	N/A	The Identifier of this PDN Template that has to be used when within a Subscriber Profile, a PDN Context needs to be linked with this PDN Context Template.

Table 107: TemplatePDNContext Optional Attributes

Attribute	Value Range	Default	Description
`AMBRUL`	`Unsigned int 32`	`Null`	Maximum Requested Bandwidth Up Link.
`AMBRDL`	`Unsigned int 32`	`Null`	Maximum Requested Bandwidth Down Link.

Attribute	Value Range	Default	Description
QosAllocationRetention PriorityLevel	char	Null	The priority level defines the relative importance of a resource request. It is used for deciding whether a bearer establishment or modification request can be accepted or needs to be rejected in case of resource limitations (typically used for admission control of GBR traffic). It can also be used to decide which existing bearers to pre-empt during resource limitations. Values 1 to 15 are defined, with value 1 as the highest level of priority. Values 1 to 8 should only be assigned for services that are authorized to receive prioritized treatment within an operator domain. Values 9 to 15 may be assigned to resources that are authorized by the home network and thus applicable when a UE is roaming.
PdnGWIdentity	String	N/A	This parameter is only for future use.
VplmnAddressAllowed	ALLOWED (0) NOTALLOWED (1)	Null	This parameter indicates whether for this APN, the UE is allowed to use the PDN GW in the domain of the HPLMN only, or additionally, the PDN GW in the domain of the VPLMN.
EPSQoSClassId	See the 'Optional Attributes for the EPSQoSClassId parameter' table.		
QosAllocationRetention PreEmptionCapability	PRE-EMPTION_ CAPABILITY_ ENABLED (0)PRE-EMPTION_ CAPABILITY_ DISABLED(1)	Null	This parameter defines whether a service data flow can get resources that were already assigned to another service data flow with a lower priority level.

Attribute	Value Range	Default	Description
			(0): This value indicates that the service data flow is allowed to get resources that were already assigned to another service data flow with a lower priority level. (1): This value indicates that the service data flow is not allowed to get resources that were already assigned to another service data flow with a lower priority level. This is the default value applicable if this AVP is not supplied.
QosAllocationRetention PreEmptionVulnerability	PRE-EMPTION_ VULNERABILITY _ENABLED (0)PRE-EMPTION_ VULNERABILITY _DISABLED(1)	Null	The Pre-emption Vulnerability AVP (AVP code 1048) is of type Enumerated. The AVP defines whether a service data flow can lose the resources assigned to it in order to admit a service data flow with higher priority level. (0): This value indicates that the resources assigned to the service data flow can be pre-empted and allocated to a service data flow with a higher priority level. This is the default value applicable if this AVP is not supplied. (1):This value indicates that the resources assigned to the service data flow shall not be pre-empted and allocated to a service data flow with a higher priority level.
PdnGWAllocationType	STATIC (0) DYNAMIC (1)	0	This parameter indicates whether the PDN GW address is statically allocated or dynamically selected by other nodes.
PdnChargingCharacteristics	One or a combination of these values: HotBilling	Null	This parameter indicates the charging type(s) to be applied to the PDP context.

Attribute	Value Range	Default	Description
	FlateRate Prepaid Normal		

Table 108: Optional Attributes for the EPSQoSClassId parameter

This parameter reflects the Mapping for GPRS QoS Class Identifier to/from UMTS QoS parameters following the table:					
Value Range	**GPRS QoS-Class-Identifier AVP Value**	**Traffic Class**	**THP**	**Signaling Indication**	**Source Statistics Descriptor**
ConversationalSpeech (**1**)	1	Conversational	n/a	n/a	speech (NOTE)
Conversational (**2**)	2	Conversational	n/a	n/a	unknown
StreamingSpeech (**3**)	3	Streaming	n/a	n/a	speech (NOTE)
Streaming (**4**)	4	Streaming	n/a	n/a	unknown
Interactive_THP_1_SI_On (**5**)	5	Interactive	1	Yes	n/a
Interactive_THP_1_SI_Off (**6**)	6	Interactive	1	No	n/a
Interactive_THP_2_SI_Off (**7**)	7	Interactive	2	No	n/a
Interactive_THP_3_SI_Off (**8**)	8	Interactive	3	No	n/a
Background (**9**)	9	Background	n/a	n/a	n/a

CLI Example

```
Hlr[]> add TemplatePDNContext[AccessPointName = apn2; PdnTemplateId = 3;
VplmnAddressAllowed = 0; AMBRUL = 1500; AMBRDL = 2300; EPSQoSClassId = 2;
QosAllocationRetentionPriorityLevel = 1;
QosAllocationRetentionPreEmptionCapability = 1;
QosAllocationRetentionPreEmptionVulnerability = 1; PdnGWAllocationType =
1; PdnChargingCharacteristics = HotBilling]
```

HLR Proxy configuration

LTE-HSS IMSI Range Configuration

The SDM's LTE-HSS application uses the SDM ngHLR's HLR Proxy functionality in order to proxy messages to the external legacy HLR, which hosts the subscriber. This section describes the entity that allows to configure the HLR Proxy functionality. For more details on this functionality and it's interaction with the LTE-HSS, refer to the "HLR-Proxy-Mode for bidirectional mobility between 3G-LTE networks" section in the*SDM Product Description*.

Name

`LteHssImsiRangeConfig`

Description

This allows the operator to configure the SDM ngHLR's HLR-Proxy functionality.

CLI Navigation

```
Hlr[] >HlrProxy[]> LteHssImsiRangeConfig
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Hlr[]:HlrProxy[]> add LteHssImsiRangeConfig[HlrInstance=integer;
ImsiRange=string; SrcNodeNumber=string;SrcNodeType=7,149;DstNodeNumber=string
;DstNodeType=6;RoutingType=0,1]
```

Operations Permitted

`Add, display, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 109: LteHssImsiRangeConfig Mandatory Attributes

Attribute	Value Range	Default	Description
`HlrInstance`	up to 10 digits	`1`	Identifies a specific HLR Instance when multiple HLR blades are used to support the traffic load. In this release version, only one instance is available.

Attribute	Value Range	Default	Description
ImsiRange	String	N/A	The Range of IMSI for which the HLR Proxy configuration applies.
DstNodeNumber	string	Null	HLR Number of the destination node
DstNodeType	6 (HLR)	SS_HLR (6)	Type of the destination node

Table 110: LteHssImsiRangeConfig Optional Attributes

Attribute	Value Range	Default	Description
SrcNodeNumber	string	<ngHLR's Number>	Local HLR number.
SrcNodeType	7 (VLR) 149 (SGSN)	VLR(7)	Must be set to SGSN Type (149) in an HLR Proxy Configuration.
RoutingType	0 (E.212) 1 (E.164)	0 (E.212)	This parameter specifies the type of routing (GT or Imsi). This parameter allows to make the Tekelec ngHLR more flexible with respect to various types of networks. This parameter is used by the Tekelec ngHLR to set the destination address (GT or Imsi) in the SCCP header when building an open request. 0 (E.212): The Tekelec ngHLR sets the destination address in IMSI format in the SCCP header when building an open request. 1 (E.164): The Tekelec ngHLR sets the destination address in GT format in the SCCP header when building an open request.

CLI Example

```
Hlr[]:HlrProxy[]> add LteHssImsiRangeConfig[HlrInstance = 1; ImsiRange =
3109105; SrcNodeNumber = 15634210100; SrcNodeType = 149; DstNodeNumber =
15634210002; DstNodeType = 6; RoutingType = 1]
```

HLR Operations

The following section provides a description of the operations that can be performed on the HLR system.

CancelGprsLoc()

The Cancel GPRS Location operation is used to force the HLR to send a MAP_CANCEL_LOCATION message to the current SGSN (Serving GPRS Support Node) location for the specified subscriber IMSI (e.g., CancelGprsLoc () Imsi = 302370421001).

Command syntax:

```
Hlr[]> CancelGprsLoc()
```

CancelLoc()

The Cancel Location operation is used to force the HLR to send a MAP_CANCEL_LOCATION message to the current VLR location for the specified subscriber IMSI (e.g., CancelLoc () Imsi = 302370421001).

Command syntax:

```
Hlr[]> CancelLoc()
```

Restart()

This operation is used to inform a list of associated VLRs or SGSNs that a failure or restart occurred in the HLR. The VLRs and SGSNs will then send a MAP_UPDATE_LOCATION or MAP_UPDATE_GPRS_LOCATION message back to the HLR for all its registered subscribers. This is done to update the mobile subscriber locations in the HLR.

Command syntax:

```
Hlr[]>Restart()
```

Uos()

The User Out of Service operation is used to request a state change of the SS7 Stack to indicate that the HLR User is Out of Service. This notifies the network that the HLR node is Out Of Service.

Command syntax:

```
Hlr[]>UOS()
```

Uis()

The User In Service operation is used to request a state change of the SS7 Stack to indicate that the HLR User is back In Service. This notifies the network that the HLR node is In Service.

Command syntax:

```
Hlr[]>UIS()
```

SendMapReset()

The SendMapReset operation is used to send a MAP_RESET message to VLRs or SGSNs in order to inform them that a failure occurred. When executing this operation, you can choose to send MAP_RESET messages to all nodes, to only one node by specifying its Node Number and the HLR Number, and finally to a list of nodes imported from the NodeNumberSubset entity.

WARNING: The SendMapReset() operation must only be executed during low traffic periods, otherwise it could affect the performance of the system.

Command syntax:

```
Hlr[]:MapPolicing[]>SendMapReset()
```

When executing the SendMapReset operation, the following parameters can be specified with the following corresponding values:

Mandatory parameter:

Option

- 0 All Nodes
- 1 Node Number
- 2 Node Number Subset

Optional parameters:

These parameters must be specified in the case where you set the Option parameter to 'Node Number'.

NodeNum

{Node # to which you want the Tekelec ngHLR to send a Map Reset}

HlrNum

{# of the Hlr for which the remote Node should refresh all of the subscriber data previously received by that Hlr}

In the case where you choose to set the Option parameter to 'Node Number Subset', the Tekelec ngHLR sends a MAP Reset to all of the Node Numbers defined in the NodeNumberSubset entity. For more information on the NodeNumberSubset, refer to the "*Application Context (AC) Template*" section. For information on how to provision this entity, refer to the "MAP Reset" section of the "HLR Application Configuration" chapter in the*SDM System Configuration - User Guide*.

Example:

```
Hlr[]:MapPolicing[]>SendMapReset() Option= 1; NodeNum=34234235;
HlrNum=15634210100
```

ManageNodeNumberSubset()

The ManageNodeNumberSubset operation is used to clear the NodeNumberSubset entity or to import all elements from the NodeNumber entity. This operation helps to easily and quickly clear the NodeNumberSubset entity or helps you to provision it. For more information on the NodeNumberSubset and NodeNumber entities, refer to the "*Application Context (AC) Template*" section in this document and to know how to provision it, refer to the "MAP Reset" section of the "HLR Application Configuration" chapter in the*SDM System Configuration - User Guide*.

Command syntax:

```
Hlr[]:MapPolicing[]>SendMapReset()
```

When executing the ManageNodeNumberSubset operation, the following parameter is mandatory and must be specified with either one of the following values:

Option:

- 0 Clear table
- 1 Import all elements from Node Number table

Example: `Hlr[]:MapPolicing[]> ManageNodeNumberSubset() Option= 1`

VlrRecoveryModeEnable()

The VlrRecoveryModeEnable() operation can be used to enable the VLR link congestion feature (see "VLR link congestion" section in the*SDM Product Description*). This operation allows the Network Operator to be able to manually reduce the SS7 traffic by controlling the quantity of PRN and ISD messages (in percentage) sent towards the HPLMN VLRs until the VLR recovers from an overload condition.

Note: that this operation doesn't modify the HLR Configuration permanently.

Note: that if the VLR link congestion feature is enabled using this operation and then one of the HLR services is restarted, the feature will remain enabled on all blades except the restarted one.

Command syntax:

```
Hlr[]>VlrRecoveryModeEnable() IsdCompressed_percent = <percent1>;
PrnSuppressed_percent = <percent2>
```

Where:

- <*Percent1*>: integer from 0-100. Specifies the percentage of the UL that will trigger ISD uploading minimal subscriber profile to the HPLMN VLR.
- <*Percent2*>: integer from 0-100. Specifies the percentage of PRNs toward the HPLMN VLR that will be suppressed (not sent).

Note: that if the ISD_compressed% is ➤ 0 or/and the PRN_suppressed% is ➤ 0 the feature is considered enabled. The feature is considered disabled if both ISD compression and PRN suppression parameters are set to 0%.

When the VlrRecoveryMode is enabled with parameter IsdCompressed_percent parameter > 0 and <=100, a certain amount of ULs will trigger ISDs that upload minimal subscriber profile that will be contained in a single ISD.

The definition of a minimal (compressed) Subscriber Profile is the following:

- Imsi
- MSISDN
- TS11 TS21, TS22, if provisioned in the subscriber profile
- BOIC for speech, regardless of whether it is provisioned in the subscriber profile
- CLIR as provisioned in the subscriber profile

When the VlrRecoveryMode is enabled with parameter PRNsupressed_percent parameter > 0 and <=100, a certain amount of the PRNs that are to be sent to the HPLMN VLR are not sent. Instead, the SRI processing continues as if a PRN has been sent and PRN Rasp with error RoaminNotAvailable has been received. This results in SRI Ack with the SIPNumber, CFNumber with/without Camel info, depending on the subscriber's profile and registration.

Note: The PRN suppress mode does not have control over the PSIs triggered. Even if PRNsupressed_percent = 100%, PSIs are still sent to the HPLMN VLR.

The table below presents the number of PRN suppressed/sent or the number of ISD compressed/full for each percentage set for either the PRNsupressed_percent parameter or for the IsdCompressed_percent parameter.

Table 111: Number of PRN Suppressed/Sent or ISD Compressed/Full for the VLR Link Congestion Handling Feature

% PRN suppressed (% ISD compressed)	PRN suppressed/sent (or ISD compressed/full)
100% 96%	All PRN Suppressed (ISDs compressed)
95%	1 of 20 PRN sent
94%	1of 16 PRN sent
93%	1 of 14 PRN sent
92%	1 of 12 PRN sent
91%	1 of 11 PRN sent
90%	1 of 10 PRN sent
89%	1 of 9 PRN sent
88%	1 of 8 PRN sent
87 % 86%	1 of 7 PRN sent
85% 84%	1 of 6 PRN sent
83% 80%	1 of 5 PRN sent

% PRN suppressed (% ISD compressed)	PRN suppressed/sent (or ISD compressed/full)
79% 75%	1 of 4 PRN sent
74% 67 %	1 of 3 PRN sent
66% 51%	1 of 2 PRN sent
50% 34%	1 of 2 PRN suppressed
33% 26%	1 of 3 PRN suppressed
25% 21%	1 of 4 PRN suppressed
20% 17%	1 of 5 PRN suppressed
16% 15%	1 of 6 PRN suppressed
14% 13%	1 of 7 PRN suppressed
12%	1 of 8 PRN suppressed
11%	1 of 9 PRN suppressed
10 %	1 of 10 PRN suppressed
9 %	1 of 11 PRN suppressed
8%	1 of 12 PRN suppressed
7%	1 of 14 PRN suppressed
6%	1 of 16 PRN suppressed
5%	1 of 20 PRN suppressed
4%	0 suppressed

% PRN suppressed (% ISD compressed)	PRN suppressed/sent (or ISD compressed/full)
0%	

VlrRecoveryModeDisable()

The VlrRecoveryModeDisable() operation can be used to disable the VLR link congestion feature (see "VLR link congestion" section in the*SDM Product Description*). This operation will set both the IsdCompressed_percent and PRNsupressed_percent parameters to 0%.

Command syntax:

```
Hlr[]>VlrRecoveryModeDisable()
```

VlrRecoveryModeGet()

The VlrRecoveryModeGet() operation can be used to display the IsdCompressed_percent and PRNsupressed_percent parameters. Refer to the '*VlrRecoveryModeEnable()*' operation described previously and refer to the "VLR link congestion" section in the*SDM Product Description* for a description of the feature.

Command syntax:

```
Hlr[]>VlrRecoveryModeGet()
```

RefreshLocalSSR()

The RefreshLocalSSR() operation can be used by the Network Operator to refresh the peer geo-redundant system's database when new entries are provisioned in the HlrSSRPerMSISDNRangeData and HlrSSRPerIMSIRangeData entities and when existing entries are modified. This will replicate the changes onto the peer site's system.

Command syntax:

```
Hlr[]:SubscriberSignalingRouter[]> RefreshLocalSSR()
```

DisplaySSRVolatileData()

The DisplaySSRVolatileData() operation can be used by the Network Operator to display the SSR volatile data for a specific subscriber.

Command syntax:

```
Hlr[]:SubscriberSignalingRouter[]> DisplaySSRVolData()SubscriptionID=
<sub-ID>
```

UpdateTimeStamp()

The UpdateTimeStamp() operation can be used by the Network Operator to refresh the SSRTemplate entity's TimeStamp to the current time.

Command syntax:

```
Hlr[]:SubscriberSignalingRouter[]> SSRTemplate[SSRTemplateDesc=temp1]>
UpdateTimeStamp()
```

ActivateFeature()

This operation can be used by the Network Operator to activate an HLR feature. Note that if the activation status of the feature is set to '*Unavailable' (can be seen by displaying the HlrConfig[] entity),* this operation cannot be executed. You must first contact Tekelec *Customer Care Center* to make the feature available for activation. The activation of the feature can be done dynamically during running-time of the system.

Command syntax

```
:Hlr[]:HlrConfig[HlrInstance=1]> ActivateFeature()Feature={Feature value}
```

When executing the ActivateFeature operation, the following parameters can be specified with the following corresponding values:

Mandatory parameters

Feature

0 RegionalSubscription

1 MapMessageSegmentation

2 SuperCharger

3 UssdForwardVlrNumber

4 RoutingOnSsn

5 DomainSelection

6 RoamingWelcomeMessage

7 MapPolicing

8 SimKiTransportEncryption

9 FtnTranslation

10 SmsRouting

11 UssdRouting

12 MapResetOptimization

13 VolDataOptimization

14 SaiAckSegmentation

15 ActiveDeviceDetection

16 MobileNumberPortability

17 SubscriberSignalingRouter

18 AccessRestrictionData

19 DirectCallForwardRegistration

20 VlrMessageNotification

21 EnhancedControlOfSccpRouting

22 UpdateOfSccpCgAddrOnlyForUL

23 FtnProvValidation

24 HLRSSMgmtFeature

25 SmsRelay

26 AlertSCBuildCdPA

27 SriRouting

28 IMEIEnforcement

29 EnhancedSccpAllowedPlmn

30 MtRoamingRetry

Optional parameters

This parameter must be specified to activate the *Roaming Welcome Message* feature.

RoamingMsgOpt

0 (Off)

1 (Notify on CC changes or IMSI change)

2 (Notify on CC-NDC changes or IMSI change)

This parameter must be specified to activate is the *SRI Routing* feature.

SriRoutingOpt

0 (Deactivated)

1 (Activated - Relay)

2 (Activated - Redirect)

3 (Activated - Template Only)

255 (Unavailable)

Example: `Hlr[]:HlrConfig[HlrInstance=1]> ActivateFeature()Feature=6; RoamingMsgOpt=1`

This parameter must be specified to activate the *Vlr Notification* feature.

VlrNotificationOpt

0 (Off)

1 (Logging On)

2 (Notification On)

3 (Logging and Notification)

Example: `Hlr[]:HlrConfig[HlrInstance=1]> ActivateFeature()Feature=20; VlrNotificationOpt=1`

HLR Feature/Functionality Modification

Most HLR features or functionalities can be modified dynamically, that is, while the system is running. Other HLR features or functionalities require a restart of the HLR service to commit the modifications. The following table identifies these modification types.

Table 112: HLR feature or functionality modification types

Dynamic modification	HLR service restart
RegionalSubscription	MapMessageSegmentation
UssdForwardVlrNumber	SuperCharger
RoutingOnSsn	FtnTranslation
DomainSelection	UssdRouting
RoamingWelcomeMessage	MapResetOptimization
MapPolicing	VolDataOptimization
SimKiTransportEncryption	SaiAckSegmentation
SmsRouting	DirectCallForwardRegistration
ActiveDeviceDetection	
MobileNumberPortability	
SubscriberSignalingRouter	
AccessRestrictionData	
EnhancedControlOfSccpRouting	
UpdateOfSccpCgAddrOnlyForUL	
FtnProvValidation (FTN Provisioning validation through the OAM interface)	
SMSRelay	
AlertSCBuildCdPA	
SriRouting	
VlrMessageNotification (see notes)	
EnhancedSccpAllowedPlmn	
MtRoamingRetry	

Note: The Network Operator can activate/deactivate the VLR Message Notification feature dynamically:

- for the entire system, by activating/deactivating from the WebCI's HLR Configuration - VlrMsgNotification tab.

  AND

- on a per subscriber basis, by provisioning from the WebCI the SubsVlrMsgNotificationOn parameter in the subscriber's Service Profile (SubscriberProfile)

Note: The VLR Message Notification feature is based on the same notification mechanism used for the Roaming Welcome Notification feature and may generate a large number of XML notifications. This number will impact the performance and/or decrease the maximum number of subscriber that can be provisioned on the system. This feature must only be enabled on a system that is dimensioned accordingly (for a given capacity AND traffic model). The Network Operator must contact the Tekelec *Customer Care Center* prior to enabling this feature to prevent any performance issues.

DeactivateFeature()

This operation can be used by the Network Operator to deactivate an HLR feature. Note that this operation can only be executed if the activation status of the feature is already activated (see activation status of feature by displaying the HlrConfig[] entity). The deactivation of the feature can be done dynamically during running-time of the system.

Command syntax

```
Hlr[]:HlrConfig[HlrInstance=1]> DeactivateFeature()Feature={Feature value}
```

When executing the DeactivateFeature operation, the following parameters can be specified with the following corresponding values:

Mandatory parameters

Feature

0 RegionalSubscription

1 MapMessageSegmentation

2 SuperCharger

3 UssdForwardVlrNumber

4 RoutingOnSsn

5 DomainSelection

6 RoamingWelcomeMessage

7 MapPolicing

8 SimKiTransportEncryption

9 FtnTranslation

10 SmsRouting

11 UssdRouting

12 MapResetOptimization

13 VolDataOptimization

14 SaiAckSegmentation

15 ActiveDeviceDetection

16 MobileNumberPortability

17 SubscriberSignalingRouter

18 AccessRestrictionData

19 DirectCallForwardRegistration

20 VlrMessageNotification

21 EnhancedControlOfSccpRouting

22 UpdateOfSccpCgAddrOnlyForUL

23 FtnProvValidation

24 HLRSSMgmtFeature

25 SmsRelay

26 AlertSCBuildCdPA

27 SriRouting

28 IMEIEnforcement

29 EnhancedSccpAllowedPlmn

30 MtRoamingRetry

Example: `Hlr[]:HlrConfig[HlrInstance=1]> DeactivateFeature()Feature=6`

Chapter 4

Signaling System 7 (SS7)

Topics:

- *SS7 configuration.....218*
- *Mobile Application Part (MAP) configuration.....220*
- *Message Transfer Part 2 configuration.....230*
- *Signaling ATM Adaption Layer (SAAL) configuration.....237*
- *Message Transfer Part 3 configuration.....241*
- *TCP/UDP Convergence Layer (TUCL) configuration.....276*
- *MTP3 User Adaption Layer (M3UA) configuration.....279*
- *Signaling Connection Control Part (SCCP) configuration.....306*
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SS7 configuration

SS7 Configuration

Name

CONFIG

Description

Table that allows to view the activation status of the SS7 and SIGTRAN links.

CLI Navigation
SS7[]>CONFIG

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]>display CONFIG[]
```

Operations Permitted

Display

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 113: CONFIG Mandatory Attributes

Attribute	Value Range	Default	Description
ProcId	integer	0	Unique identification for each instance of the SS7 Stack.
MTP2Active	0,1	0	Activation status of the MTP2 layer. 0= Not active 1=Active
MTP3Master	0,1	0	Identifies whether MTP3 is Master* or not on the instance. 0: MTP3 is not Master. 1: MTP3 is Master.

Attribute	Value Range	Default	Description
MTP3Shadow	0,1	0	Identifies whether MTP3 is Shadow* or not on the instance. 0: MTP3 is not Shadow. 1: MTP3 is Shadow.
SCCPMaster	0,1	0	Identifies whether SCCP is Master* or Shadow on the instance. 0: SCCP is not Master 1: SCCP is Master
SCCPShadow	0,1	0	Identifies whether SCCP is Shadow* or not on the instance. 0: SCCP is not Shadow. 1: SCCP is Shadow.
TCAPMaster	0,1	0	Identifies whether TCAP is Master* or Shadow on the instance. 0: TCAP is not Master 1: TCAP is Master
TCAPShadow	0,1	0	Identifies whether TCAP is Shadow* or not on the instance. 0: TCAP is not Shadow. 1: TCAP is Shadow.
GMAPActive	0,1	0	Activation status of the GSM-MAP layer. 0= Not active 1=Active
SS7DynamicConfigSlotId	1-14	N/A	Slot ID of the shelf on which the SS7 configuration is made.
SS7DynamicConfigHlrInstance	1-14	N/A	Instance on which runs the HLR service for which the SS7 configuration is made.
TUCLActive	0,1	0	Activation status of the TUCL layer. 0= Not active 1=Active

Attribute	Value Range	Default	Description
			Note: This attribute should be set to active if you are provisioning the SDM with SS7 using SIGTRAN.
M3UAActive	0,1	0	Activation status of the M3UA layer. 0= Not active 1=Active **Note:** This attribute should be set to active if you are provisioning the SDM with SS7 using SIGTRAN.
SAALActive	0,1	0	Activation status of the SAAL protocol. 0= Not active 1=Active **Note:** This attribute should be set to active if you are provisioning the SDM with SS7 using the ATM broadband.

*

Note: Distributed stacks, such as the MTP3, SCCP and TCAP stacks, must each have one instance defined as Master. Every instance of these stacks run on each blade as Master or Shadow and are configured identically. The instance defined as the Master is the one from where all control operations are executed and it is responsible to distribute the resulting effect and information to all of its Shadow instances. In a twelve blade system, ten Hlr services can run traffic and so ten instances of the MTP3, SCCP and TCAP stack run traffic with one of each defined as Master and the nine other instances defined as Shadow.

CLI Example

```
1 :SS7[]>display CONFIG[]
```

Mobile Application Part (MAP) configuration

Mobile Application Part (MAP)

Name

Map

Description

Mobile Application Part (MAP) layer. The alarm attribute for the MAP layer can be accessed.

CLI Navigation
`SS7[]>Map`

CLI Inherited Attributes

None.

CLI Command Syntax

`SS7[]>display MAP[]`

Operations Permitted

`Modify, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 114: Map Mandatory Attributes

Attribute	Value Range	Default	Description
`AlarmOn`	0 or 1	1	Enable alarm generation. This attribute cannot be reconfigured. Read only. 0 = disabled 1 = enabled

Example:

```
1 :SS7[]>display MAP[]
```

GSM MAP Application Context

Name

`GsmMapApplicationContext`

Description

This entity defines the MAP services supported by the HLR, such as mobility management, location management, or call handling.

CLI Navigation
`SS7[]>Map[]>GsmMapApplicationContext`

CLI Inherited Attributes

None.

CLI Command Syntax

```
:SS7[]:MAP[]> modify GsmMapApplicationContext[ApplCtxId = 1-100;
OperationCode = 0-255; OperationClass = 1-4; VersionId = 1-4,16,64-67,128;
ApplicationContextName = octets;AlternateApplicationContextName = octets;
GsmMapTimerProfileId = 1-15; GsmMapSapId = 1-15]
```

Operations Permitted Modify and Display

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 115: GsmMapApplicationContext Mandatory Attributes

Attribute	Value Range	Default	Description
ApplCtxId	1 to 100	N/A	Application Context ID. Identifier of the instance of this entity. Read only. Generated by the Tekelec Subscriber Data Management system.
Operation-Code	0 to 255	N/A	Indicates the TCAP Operation Code of the service supported.
Operation-Class	1 (CLASS1), 2 (CLASS2), 3 (CLASS3), 4 (CLASS4)	N/A	Indicates the TCAP invoke class associated with an operation code.
VersionId	1 (V1), 2 (V2), 3 (V2P), 4 (V4), 16 (V1_AND_V2), 64 (V2_AND_V2P), 65 (V1_AND_V2_AND_V2P), 66 (V2P_AND_V4),	N/A	Indicates the GSM MAP version supported for this service.

Attribute	Value Range	Default	Description
	67 (V2_AND_V2P_AND_V4), 128 (ALL)		
Application-ContextName	Up to 8 octets.	N/A	This field is compared with the ACN present in the dialogue open request message (TCAP-BEGIN) from the peer. If the ACNs match, the dialogue open request is accepted. Otherwise, abort message is sent to the peer.
Alternate-Application-ContextName	Up to 8 octets.	N/A	This field is used to carry the alternate application context name. If the ACN compatibility verification fails and valid alternate ACN is configured, this field is sent to the peer in the abort message.
GsmMapTimer-ProfileId	1 to 15	N/A	The Identifier of the GsmMapTimers instance from which the timers of this entity will be set.

Table 116: GsmMapApplicationContext Optional Attributes

Attribute	Value Range	Default	Description
GsmMapSapId	1 to 15	N/A	The identifier of the GsmMapSap to which this service will be provided

Example:

```
1 :SS7[]:MAP[]>display GsmMapApplicationContext [GsmMapSapId = 1]
```

GSM MAP General Configuration

Name

GsmMapGenCfg

Description

Used to initialize the general configuration parameters that apply to the entire GsmMap Layer.

CLI Navigation

SS7[]>Map[]>GsmMapGenCfg

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:MAP[]> modify GsmMapGenCfg[MaxNbDialogues = integer; MaxNbOperation
= integer; SignallingFrameSize =  0-4000] 0-4000]]
```

Operations Permitted

`Modify, display`

Attributes and Values

Table 117: GsmMapGenCfg Mandatory Attributes

Attribute	Value Range	Default	Description
`MaxNbDialogues`	1 to 4294976295	N/A	Maximum number of concurrent dialogues at GSM MAP layer. Read only.
`MaxNbOperation`	1 to 4294976295	N/A	Maximum number of concurrent operations at GSM MAP layer. Read only
`SignallingFrameSize`	0 to 4000	1000	Signalling frame size in bytes. When the parameters of the response primitives exceed this size, MAP issues a TC-RESULT-NL (Return Result Not Last) components instead of TC-RESULT-L (Return Result Last). This attribute is to enable the segmentation feature. When this frame size is set to zero, no segmentation is performed.

CLI Example

```
1 :SS7[]:MAP[]>display GsmMapGenCfg[]
```

GSM MAP Service Access Point (SAP)

Name

`GsmMapSap`

Description

This is the Service Access Point (SAP) of the GSM-MAP services to its users (e.g., HLR) and contains the SAP address (e.g., Sub-System number).

Navigation:

```
SS7[]> Map[]> GsmMapSap
```

Inherited Attributes:

None.

Command Syntax:

```
SS7[]:MAP[]> modify GsmMapSap[GsmMapSapId = 1-15; TcapSapId = 1-15;
MaxDialogues = integer; SubSystemNumber = 1-255; GsmMapTimerProfileId =
1-15; ShelfId=int; SlotId= int; Priority = 0-3; RetOpt = 0,8; ProtocolClass
= 0,1]
```

Operations Permitted

`Modify, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 118: GsmMapSap Mandatory Attributes

Attribute	Value Range	Default	Description
`GsmMapSapId`	1 to 15	N/A	The identifier of the entity. Read only. Generated by the Tekelec ngHLR.
`TcapSapId`	1 to 15	N/A	The TcapSap ID of the TcapSap to which this GsmMapSap is connecting to. Read only.
`MaxDialogues`	1 to 4294976295	N/A	Maximum dialogues per SAP. Read only.
`SubSystem-Number`	1 to 255	6 (HLR)	The subsystem number of this SAP. Read only.
`GsmMapTimer-ProfileId`	1 to 15	N/A	The Identifier of the GsmMapTimers instance from which the timers of this SAP will be set.
`ShelfId`	1 to 4294976295	N/A	This parameter identifies the Shelf Id number on which the GSM MAP Sap is being configured.
`SlotId`	1 to 14	N/A	Numerical identification of slot on the shelf, on which this GsmMapSap is configured. Note that this is a display only, the slot assignment will

Attribute	Value Range	Default	Description
			be done automatically when a new Hlr service will be added to a new slot in the system.

Table 119: GsmMapSap Optional Attributes

Attribute	Value Range	Default	Description
`Priority`	0 to 3	0	MAP message priority used by the MTP3 to route the message. 0 = lowest priority 3 = highest priority
`RetOpt`	0 (DROP), 8 (RETURN)	8 (RETURN)	Enable (return on error option) or disable (drop on error option) notice indication when the MAP-GSM message is not delivered to the network by SCCP layer.
`ProtocolClass`	0 (CLASS0), 1 (CLASS1)	0 (CLASS0)	SCCP Protocol class for the MAP message. Read only. 0 = no sequencing 1 = sequencing

Example:

```
1 :SS7[]:MAP[]>display GsmMapSap[GsmMapSapId = 1]
```

GSM MAP Service Access Point Operations

The following section provides a description of the operations that can be performed on GSM MAP SAPs.

Activate()

Activate the GsmMap Service Access Point. This will bind the MAP Layer with the TCAP Layer and then processing the MAP messages.

Command Syntax:

```
SS7[]:MAP[]:GsmMapSap[GsmMapSapId = 1]> Activate()
```

Deactivate()

Deactive the GsmMap Service Access Point. This will unbind the MAP Layer with the TCAP Layer and then not process any MAP messages.

Command syntax:

```
SS7[]:MAP[]:GsmMapSap[GsmMapSapId = 1]> Deactivate()
```

GSM MAP Timers

Name

`GsmMapTimers`

Description

Used to define the specified timers for the MAP Protocol Layer. When creating a new GsmMapTimerProfile, the OamTimerVal entities (TimerGuard, TimerBindConfirm and TimerInvocation) will be automatically created and the minimum, maximum, and current values will be set to the predefined values according to the Protocol Variant chosen. Current values are set to default values.

CLI Navigation
`SS7[]>Map[]>GsmMapTimers`

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:MAP[]>display GsmMapTimers[GsmMapTimerProfileId = 1]
```

Operations Permitted

`Add, delete, display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 120: GsmMapTimers Mandatory Attributes

Attribute	Value Range	Default	Description
`GsmMapTimer-ProfileId`	1 to 15	N/A	The identifier of the instance of this GsmMapTimer. Generated by the Tekelec Tekelec ngHLR.

Table 121: GsmMapTimers Optional Attributes

Attribute	Value Range	Default	Description
TimerGuard	ITU: 0-720,000 ms	600,000 ms	The GSM MAP starts this timer after delivering the operation indication to the service user.
	ANSI: 0-720,000 ms	600,000 ms	
TimerBind-Confirm	ITU: 360,000-720,000 ms	10,000 ms	The GSM MAP starts this timer after sending the bind request to the lower layer.
	ANSI: 360,000-720,000 ms	10,000 ms	
Timer-Invocation	ITU: 0-720,000 ms	30,000 ms	Invocation timer.
	ANSI: 0-720,000 ms	30,000 ms	

CLI Example

```
1 :SS7[]:MAP[]>display GsmMapTimers[GsmMapTimerProfileId = 1]
```

GSM MAP Timer Attributes

The attributes for each GSM MAP Timer can be retrieved and displayed. The attributes are listed in the table below. The Minimum and Maximum values are defined according to the Protocol Variant (ITU or ANSI) that was selected. The Current value is set to the default value and can be modified as long as it is between the Minimum and Maximum values.

Table 122: GsmMapTimer Attributes

Attribute	Description
OAMTimerValId	Identifier of OAM Timer Value. Read only. Generated by the ngHLR.
TimerId	Timer ID number from 501 to 503. Read only.
MinVal	Minimum Value, in milliseconds, that timer can be set. Read only.
MaxVal	Maximum Value, in milliseconds, that timer can be set. Read only.
CurrentVal	Current Value of timer in milliseconds.

CLI Navigation

```
SS7[]>Map[]>GsmMapTimers>specific Gsm Map timer
```

CLI Inherited Attributes

GsmMapTimerProfileId.

CLI Command Syntax

```
:SS7[]:MAP[]:GsmMapTimers[GsmMapTimerProfileId = #]> modify SpecificTimer
[CurrentVal = milliseconds]
```

Operations Permitted

`Modify, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 123: GSM Map Timers

Specific Timer	OAMTimerValId	TimerId	Standard	MinVal (ms)	MaxVal (ms)	CurrentVal (ms)
TimerGuard	1 to 2,000	501	ITU	0	720,000	600,000
			ANSI	0	720,000	600,000
TimerBind-Confirm	1 to 2,000	502	ITU	360,000	720,000	10,000
			ANSI	360,000	720,000	10,000
Timer-Invocation	1 to 2,000	503	ITU	0	720,000	30,000
			ANSI	0	720,000	30,000

CLI Example

```
1 :SS7[]:MAP[]:GsmMapTimers[GsmMapTimerProfileId = #]> modify TimerGuard[]
CurrentVal = 500000
```

GSM MAP Timers Operation

The following provides a description of the operation that can be performed with GSM MAP Timers.

Get All Timers

This operation will retrieve and display all the information for the GSM MAP timers. It will display the minimum, maximum, and current values of all the timers.

Command syntax:

```
:SS7[]:MAP[]:GsmMapTimers[GsmMapTimerProfileId = 1]> GetAllTimers()
```

Message Transfer Part 2 configuration

MTP2

Name

MTP2

Description

Message Transfer Part 2. MTP2 corresponds to OSI Layer 2 (the data link layer) and as such is the lowest protocol in the stack. Sitting on the physical layer, it provides a reliable means of transfer for signalling information between two directly connected signalling points (SPs), ensuring that the signalling information is delivered in sequence and error-free. The alarm attribute for the MTP2 layer can be accessed and modified.

CLI Navigation

SS7[]>MTP2

CLI Inherited Attributes

None.

CLI Command Syntax

:SS7[]>display MTP2[]

Operations Permitted Modify and Display

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 124: MTP2 Mandatory Attributes

Attribute	Value Range	Default	Description
AlarmOn	1	1	Enable or disable alarm generation. Read only. 1 = enabled

CLI Example

```
1 :SS7[]>display MTP2[]
```

MTP2 Operation

This section provides a description of the operation that can be performed on the Message Transfer Part Layer 2.

Get Active MTP2 Saps

This operation will retrieve and display all active MTP2 Service Access Points.

Command syntax:

```
SS7[]:MTP2[]> GetActiveMTP2Saps()
```

MPT2 Service Access Point (SAP)

Name

`MTP2Sap`

Description

The MTP2 Sap (Service Access Point) contains the attributes of the physical port and link that is connected to the logical signaling link. The timer values to be used with this link can be configured on a per-link basis. This entity is configured in load-shared mode between the two SS7 cards (meaning this entity can be configured differently on the two cards and both cards are actively processing MTP2 traffic).

CLI Navigation

`SS7[]>MTP2[]>MTP2Sap`

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:MTP2[]> add MTP2Sap [PhyNumber = 0-3; ChannelNumber = integer;
MTP2TimerProfileId = 1-16; ProtocolVariant = 1-4; MsgSize = 0-272;
Mtp2LinkType=0,1; SlotId = 5,10 ]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 125: MTP2Sap Mandatory Attributes

Attribute	Value Range	Default	Description
PhyNumber	0 (PHY0), 1 (PHY1), 2 (PHY2), 3 (PHY3)	N/A	Specify which physical interface to create the link on. Read only.
ChannelNumber	See description.	N/A	Indicates which channel of the virtual port to use. -in T1 the channel number can range from 0-23, corresponding to timeslots 0 to 23. -in E1 the channel number can range from 0-30, corresponding to timeslots 1 to 31. Channel 0 of E1 is the only channel allowed for HSL and is not available for LSL. Note that virtual channel number 0 maps to T1 timeslot 0 but E1 timeslot 1. Read only.
MTP2Timer-ProfileId	1 to 16	N/A	Timer definitions associated with this link.
Protocol- Variant	1 (ITU88), 2 (ANS88), 3 (ANS92), 4 (ITU92)	N/A	Protocol type of the link. Read only.
Mtp2LinkType	0 (LSL) 1 (HSL)		Type of link used by the MTP2 protocol. The ngHLR can support the MTP2 narrow band Low Speed Link (LSL) or the MTP2 narrow band High Speed Link (HSL).
SlotId	3 or 10	N/A	The shelf Slot ID for the link being configured. The Mtp2Sap can be configured

Attribute	Value Range	Default	Description
			differently on the two SS7 cards. This allows using a different timeslot. The MTP2 Layer is configured in load-shared mode. The other layers are configured in active-standby mode. Read only.
Provisioned	PROVISIONED UNPROVISIONED	UNPROVISIONED	Read only. This is automatically generated by the system to indicate the provisioning state of the SAP.

Table 126: MTP2Sap Optional Attributes

Attribute	Value Range	Default	Description
MsgSize	0 to 272	272	Maximum message length (in bytes) acceptable for layer 2.

CLI Example

```
1 :SS7[]:MTP2[]> add MTP2Sap [PhyNumber = 0; ChannelNumber = 1;
MTP2TimerProfileId = 1; Speed = 0; ProtocolVariant = 3; Mtp2LinkType=0;
SlotId = 5; MsgSize = MsgSize]
```

MTP2 SAP Operations

The following section provides a description of the operations that can be performed on MTP2 SAPs.

Activate

Activate the MTP2 Service Access Point. This binds the MTP2 Layer with the MTP3 Layer and then processing the MTP2 messages.

Command syntax:

```
:SS7[]:MTP2[]:MTP2Sap[MTP2SapId = 1]> Activate()
```

Deactivate

Deactivate the MTP2 Service Access Point. This unbinds the MTP2 Layer from the MTP3 Layer and then stops processing the MTP2 messages.

Command syntax:

```
:SS7[]:MTP2[]:MTP2Sap[MTP2SapId = 1]> Deactivate()
```

MTP2 Timers

Name

MTP2Timers

Description

The MTP2Timers is used to define the specified timers for the MTP2 Protocol Layer. When creating a new MTP2TimerProfile, the OamTimerVal entities (T1, T2, T3, T4E, T4N, T5, T6, T7) will be automatically created and the minimum, maximum, and current values will be set to the predefined values according to the Protocol Variant chosen (ITU or ANSI). Current values are set to default values. For detailed information on MTP2 Timers, please refer to the following specifications:*ITU Q.703, Section 12.3 and ANSI T1.111.3, Section 12.3*.

CLI Navigation

SS7[]>MTP2[]>MTP2Timers

CLI Inherited Attributes

None.

CLI Command Syntax

SS7[]:MTP2[]> add MTP2Timers[ProtocolVariant = 1-4]

Operations Permitted

Add, delete, display.

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 127: MTP2Timers Mandatory Attributes

Attribute	Value Range	Default	Description
Protocol-Variant	1 (ITU88), 2 (ANS88), 3 (ANS92), 4 (ITU92)	N/A	Protocol variant supported by MTP2 layer. Read only.
MTP2Timer-ProfileId	1 to 16	N/A	The identifier Mtp2TimerProfile instance from which the timers of this entity will be set. Read only. Generated by the Tekelec ngHLR.

Table 128: MTP2Timers Optional Attributes

Attribute	Value Range	Default	Description
T1	ITU: 40,000-50,000 ms	45,000 ms	Alignment ready timer. Read only.
	ANSI: 12,900-16,000 ms	13,000 ms	
T2	ITU: 5,000-150,000 ms	30,000 ms	Not aligned timer. Read only.
	ANSI: 5,000-30,000 ms	11,500 ms	
T3	ITU: 1,000-2,000 ms	1,500 ms	Aligned timer. Read only.
	ANSI: 5,000-14,000 ms	11,500 ms	
T4E	ITU: 400-600 ms	500 ms	Emergency Proving Period timer. Read only.
	ANSI: 540-660 ms	600 ms	
T4N	ITU: 7,500-9,500 ms	8,200 ms	Normal Proving Period timer. Read only.
	ANSI: 2,070-2,530 ms	2,300 ms	
T5	ITU: 80-120 ms	100 ms	Sending SIB (Status Indication Busy) timer. Read only.
	ANSI: 80-120 ms	100 ms	
T6	ITU: 3,000-6,000 ms	4,500 ms	Remote Congestion timer. Read only.
	ANSI: 1,000-6,000 ms	3,500 ms	
T7	ITU: 500-2,000 ms	1,500 ms	Excessive delay of acknowledgement timer. Read only.
	ANSI: 500-2,000 ms	1,500 ms	

CLI Example

```
SS7[]:MTP2[]> add MTP2Timers [ProtocolVariant = 1]
```

MTP2 Timer Attributes

Name

MTP2Timers

Definition

The attributes for each MTP2 timer can be retrieved and displayed. The attributes are listed in the table below. The Minimum and Maximum values are defined according to the Protocol Variant (ITU or ANSI) that was selected. The Current value can be modified as long as it is between the Minimum and Maximum values.

Table 129: MTP2Timers Attributes

Attribute	Description
OAMTimerValId	Identifier of OAM Timer Value. Read only. Generated by the Tekelec ngHLR.
TimerId	Timer ID number from 101 to 108. Read only.
MinVal	Minimum Value of timer in milliseconds. Read only.
MaxVal	Maximum Value of timer in milliseconds. Read only.
CurrentVal	Current Value of timer in milliseconds. Read-write

CLI Navigation

```
SS7[]>MTP2[]>MTP2Timers[]>specific MTP2 timer
```

CLI Inherited Attributes

```
MTP2TimerProfileId.
```

CLI Command Syntax

```
SS7[]:MTP2[]:MTP2Timers[MTP2TimerProfileId = #]> modify TimerName[]
CurrentVal = milliseconds
```

Operations Permitted

```
Modify, display
```

Note: Not all users (User Groups) are allowed to perform these operations. Please see Table 2-2 to know which ones have access to this entity and which operations they have permission to do.

Attributes and Values

Table 130: MTP2 Timers

Specific Timer	OAMTimerValId	TimerId	Standard	MinVal (ms)	MaxVal (ms)	CurrentVal (ms)
T1 (Alignment ready)	1 to 2,000	101	ITU	40,000	50,000	45,000
			ANSI	12,900	16,000	13,000
T2 (Not aligned)	1 to 2,000	102	ITU	5,000	150,000	30,000
			ANSI	5,000	30,000	11,500
T3	1 to 2,000	103	ITU	1,000	2,000	1,500

Specific Timer	OAMTimerValId	TimerId	Standard	MinVal (ms)	MaxVal (ms)	CurrentVal (ms)
(Aligned)			ANSI	5,000	14,000	11,500
T4E (Emergency Proving)	1 to 2,000	104	ITU	400	600	500
			ANSI	540	660	600
T4N (Normal Proving)	1 to 2,000	105	ITU	7,500	9,500	8,200
			ANSI	2,070	2,530	2,300
T5 (Sending SIB)	1 to 2,000	106	ITU	80	120	100
			ANSI	80	120	100
T6 (Remote Congestion)	1 to 2,000	107	ITU	3,000	6,000	4,500
			ANSI	1,000	6,000	3,500
T7 (Excessive Delay of Acknowledgement)	1 to 2,000	108	ITU	500	2,000	1,500
			ANSI	500	2,000	1,500

Example:

```
SS7[]:MTP2[]:MTP2Timers[MTP2TimerProfileId = #]> modify T1[] CurrentVal =
48000
```

MTP2 Timer Profile Operation

The following describes the operation that can be performed with MTP2 timers.

GetAllTimers()

The GetAllTimers() operation will retrieve and display all the information for the MTP2 timers. It will display the minimum, maximum, and current values of all the timers.

CLI Example:

```
SS7[]:MTP2[]:MTP2Timers[MTP2TimerProfileId = 1]> GetAllTimers()
```

Signaling ATM Adaption Layer (SAAL) configuration

SAAL

Name

SAAL

Description

Signalling ATM Adaption Layer. SAAL corresponds to OSI Layer 2 (the data link layer) and as such is the lowest protocol in the stack. Sitting on the physical layer, it provides a reliable means of transfer for signalling information between two directly connected signalling points (SPs), ensuring that the signalling information is delivered in sequence and error-free. It utilizes the entire bandwidth of a T1/E1 for the transport of SS7 signaling messages, which amplifies the HLR SS7 capacity. The alarm attribute for the SAAL layer can be accessed and modified.

CLI Navigation
`SS7[]>SAAL`

CLI Inherited Attributes

None.

CLI Command Syntax

```
:SS7[]>display SAAL[]
```

Operations Permitted

`Modify, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 131: SAAL Mandatory Attributes

Attribute	Value Range	Default	Description
`AlarmOn`	1	1	Enable or disable alarm generation. Read only. 1 = enabled

CLI Example

```
:SS7[]>display SAAL[]
```

SAAL Operations

This section provides a description of the operation that can be performed on the Signaling ATM Adaptation Layer.

Get Active SAAL Saps

This operation will retrieve and display all active SAAL Service Access Points.

Command syntax:

```
SS7[]:SAAL[]> GetActiveSaalSaps()
```

SAAL Service Access Point (SAP)

Name

SAALSap

Description

The SAAL SAP (Service Access Point) contains the attributes of the physical port and link that is connected to the logical signalling link. The timer values to be used with this link can be configured on a per-link basis. This entity is configured in load-shared mode between the two SS7 cards (meaning this entity can be configured differently on the two cards and both cards are actively processing SAAL traffic). The other entities are configured in active-standby mode (same configuration on the two cards).

CLI Navigation
SS7[]>SAAL[]>SAALSap

CLI Inherited Attributes

None.

CLI Command Syntax

```
:SS7[]>SAAL[]> add SAALSap [VirtualPort = 0,1,2,3; VPI = 0-255; VCI =
1,2,5-65535; SaalLinkType =0,1; MsgSize = 0-4096; SlotId = integer ]
```

Attributes and Values

Table 132: SAALSap Mandatory Attributes

Attribute	Value Range	Default	Description
VirtualPort	0 (PHY0), 1 (PHY1), 2 (PHY2), 3 (PHY3)	N/A	Specifies on which port of the SS7 Card to create the link on. The port on which the link can be created for a SAALSap has to have been configured with the SAAL protocol. Read only.
VCI	Integer 0-65 535 Except the following values:**0** (reserved for idle cell) **3** and**4** (reserved for OAM).	N/A	Virtual Channel Identifier. Identifies the Channel used by the Sap.

Attribute	Value Range	Default	Description
VPI	Integer 0-255	N/A	Virtual Path Identifier. It Regroups one or more VCI. It identifies the path between two nodes of the network.
SaalLinkType	See description.	N/A	Indicates which channel of the virtual port to use. -in T1 the channel number can range from 0-23, corresponding to timeslots 0 to 23. -in E1 the channel number can range from 0-30, corresponding to timeslots 1 to 31. Timeslot 0 of E1 is not available. Note that virtual channel number 0 maps to T1 timeslot 0 but E1 timeslot 1. Read only.
SlotId	1-14	N/A	The shelf Slot ID for the link being configured. The SaalSap can be configured differently on the two SS7 cards. This allows using a different timeslot. The SAAL Layer is configured in load-shared mode. Read only.

Table 133: SAALSap Optional Attributes

Attribute	Value Range	Default	Description
MsgSize	0 to 4096	4096	Maximum message length (in bytes) acceptable for layer 2.

CLI Example

```
:SS7[]:SAAL[]> add SAALSap [VirtualPort = 0; VPI =0; VCI =5;SallLinkType
=0; SlotId = 5]
```

SAAL SAP Operations

Activate()

Activate the SAAL Service Access Point. This binds the SAAL Layer with the MTP3 Layer and then processing the SAAL messages.

Note: The SAALSapId is generated by the system for every SAALSap added. To Take note of the SAALSapId generated by the system, type the following:`SS7[]:SAAL[]> display SAALSap[]`

Command syntax:

```
:SS7[]:SAAL[]:SAALSap[SAALSapId = 1]> Activate()
```

Deactivate()

Deactivate the SAAL Service Access Point. This unbinds the SAAL Layer from the MTP3 Layer and then stops processing the SAAL messages.

Command syntax:

```
:SS7[]:SAAL[]:SAALSap[SAALSapId = 1]> Deactivate()
```

Message Transfer Part 3 configuration

MTP3

Name

`MTP3`

Description

Message Transfer Part 3. MTP3 corresponds to OSI Layer 3 and performs the SS7 protocol's network functions. The primary purpose of this protocol level is to route messages between SS7 network nodes in a reliable manner. The alarm attributes for the MTP3 layer can be accessed.

CLI Navigation
`SS7[]>MTP3`

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]>display MTP3[]
```

Operations Permitted

`Modify, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 134: MTP3 Mandatory Attributes

Attribute	Value Range	Default	Description
AlarmOn	0 or 1	1	Enable or disable alarm generation. Read only. 0 = disabled 1 = enabled

CLI Example

```
:SS7[]>display MTP3[]
```

MTP3 Operations

This section describes the operations that can be performed on the Message Transfer Part Layer 3.

GetActiveMTP3NSaps()

This operation will retrieve and display all active MTP3 Network Service Access Points.

Command syntax:

```
:SS7[]:MTP3[]> GetActiveMTP3NSaps()
```

GetActiveLinkSets()

This operation will retrieve and display all active Link Sets.

Command syntax:

```
:SS7[]:MTP3[]> GetActiveLinkSets()
```

GetActiveLinks()

This operation will retrieve and display all active Links.

Command syntax:

```
:SS7[]:MTP3[]> GetActiveLinks()
```

DisplayLinksStatistics()

This operation will display the Statistics of the SS7 Links in the latest SS7Manager log file based on the time period from the last DisplayLinksStatistics() command execution.

Command syntax:

```
:SS7[]:MTP3[]> DisplayLinksStatistics()
```

Displaying Links Statistics

To do so, it is recommended you open multiple Shell sessions. Log in the active core system controller to access the system and in one of them, start a CLI session. It is important to note that only the administrator can execute this operation. In the other Shell sessions (on each of the blades hosting the Hlr services), log in the system and find the latest SS7 Manager file as follows:

1. Go to the trace directory by typing:
   ```
   cd /blue/var/trace
   ```
2. Display the SS7 Manager files in order, by typing:
   ```
   ls -lrt
   ```
3. Take note of the name of the latest file and open it with the following option:
   ```
   tail -f HlrServer.xml
   ```
4. Then, in the other Shell, once a CLI session has been started, follow the steps below:
5. Go to the SS7 subsystem, by typing:
   ```
   :SS7[] :
   ```
6. Go to the MTP3, by typing:
   ```
   :SS7[] :MTP3[]
   ```
7. Execute the Display Links Statistics operation, by typing:
   ```
   :SS7[] :MTP3[] DisplayLinksStatistics()
   ```

   In the latest SS7 Manager file, you will find the Statistic Information for each link on the local slot, displayed as per the format shown below:

   Time: Wed Nov 7 15:48:41 2007

   File: mtp3/mtp3ProvisioningManager.cpp

   Line: 471

   SlotId: 3

   Seq#: 2449

Table 135: SS7 Manager Statistics Detailed Descriptions

Field	Description
Change Over Tx	Changeover order transmitted for this link.
Change Over Rx	Changeover order received for this link.
Change Back Tx	Changeback declaration transmitted on this link.
Change Back Rx	Changeback declaration received on this link.
Emergency Change Over Tx	Emergency changeover transmitted for this link.
Emergency Change Over Rx	Emergency changeover received for this link.
Link Connection Tx	Link connection order transmitted for this link.

Field	Description
Link Connection Rx	Link connection order received for this link.
Link Connection Ack Tx	Link connection acknowledgment transmitted for this link.
Link Connection Ack Rx	Link connection acknowledgment received for this link.
Link Test Rx	Signalling link test message received on this link.
Link Test Tx	Signalling link test message transmitted on this link.
Link Test Ack Rx	Signalling link test acknowledgment received on this link.
Link Test Ack Tx	Signalling link test acknowledgment transmitted on this link.
Tx Message Drop	A message to be transmitted cannot be sent and consequently is dropped. This may occur for the following reasons: • There is an error in encoding the message • The size of the message is illegal • The link is congested and a message is a COO (Changeover, Order) or ECO (Emergency Changeover, Order). Changeover messages are not queued, as congestion abatement at a later time may bring down the link for which the changeover was previously sent. • A message retrieved from layer2 during changeover cannot be decoded or contains an illegal field
Tx MSUs Drop due to congestion	MSUs (Message Signal Unit) dropped because of congestion on this link.
SIF Octets Tx	Number of SIF (Service Information Field) octets transmitted.
SIF Octets Rx	Number of SIF (Service Information Field) octets received.
MSU Tx	Number of MSUs (Message Signal Unit) transmitted.
MSU Rx	Number of MSUs (Message Signal Unit) received.
Congestion at Threshold 1	Link congestion set at threshold 1.
Congestion at Threshold 2	Link congestion set at threshold 2.
Congestion at Threshold 3	Link congestion set at threshold 3.

Field	Description
Duration of Link Unavailability (ticks)	Duration of link unavailability (in terms of number of system ticks).
Duration of Link Congestion (ticks)	Duration of link congestion (in terms of number of system ticks).
Nb errored msg Rx	Invalid PDU (Protocol Data Unit) received on this link. This may reflect one of the following conditions: • PDU has a wrong size. That is, less than the minimum allowed or more than the maximum allowed. • Length of PDU cannot be found. • PDU cannot be decoded. • PDU contains illegal SLS (Signalling Link Selection) value. • PDU is received in an invalid link state.

```
-------------------------------------------
Statistics Information for Link #1:
Gathering Interval = 21839 secs
Link Utilization = 0.016%
===========================================
Change Over Tx                          = 1
Change Over Rx                          = 0
Change Back Tx                          = 0
Change Back Rx                          = 0
Emergency Change Over Tx                = 0
Emergency Change Over Rx                = 0
Link Connection Tx                      = 0
Link Connection Rx                      = 0
Link Connection Ack Tx                  = 0
Link Connection Ack Rx                  = 0
Link Test Rx                            = 2
Link Test Tx                            = 365
Link Test Ack Rx                        = 365
Link Test Ack Tx                        = 2
Tx Message Drop                         = 0
Tx MSUs Drop due to congestion          = 0
SIF Octets Tx                           = 16698
SIF Octets Rx                           = 12624
MSU Tx                                  = 470
MSU Rx                                  = 462
Congestion at Threshold 1               = 0
Congestion at Threshold 2               = 0
Congestion at Threshold 3               = 0
Duration of Link Unavailability (ticks) = 47
Duration of Link Congestion (ticks)     = 0
Nb errored msg Rx                       = 0
-------------------------------------------
Time: Wed Nov  7 15:48:41 2007
File: mtp3/mtp3ProvisioningManager.cpp
Line: 471
SlotId: 3
Seq#: 2450
-------------------------------------------
Statistics Information for Link #2:
```

```
Gathering Interval = 21837 secs
Link Utilization = 0.000%
=============================================
Change Over Tx                          = 0
Change Over Rx                          = 0
Change Back Tx                          = 0
Change Back Rx                          = 0
Emergency Change Over Tx                = 0
Emergency Change Over Rx                = 0
Link Connection Tx                      = 0
Link Connection Rx                      = 0
Link Connection Ack Tx                  = 0
Link Connection Ack Rx                  = 0
Link Test Rx                            = 0
Link Test Tx                            = 0
Link Test Ack Rx                        = 0
Link Test Ack Tx                        = 0
Tx Message Drop                         = 0
Tx MSUs Drop due to congestion          = 0
SIF Octets Tx                           = 0
SIF Octets Rx                           = 0
MSU Tx                                  = 0
MSU Rx                                  = 0
Congestion at Threshold 1               = 0
Congestion at Threshold 2               = 0
Congestion at Threshold 3               = 0
Duration of Link Unavailability (ticks) = 0
Duration of Link Congestion (ticks)     = 0
Nb errored msg Rx                       = 0
---------------------------------------------
```

To have the complete link utilization and tTx/Rx bytes for the Link, you should add up all the values from all the slots.

Combined Link Set

Name

`CombinedLinkSet`

Description

It defines a group of all linksets that can be used to reach a particular destination or group of destinations (routes). Each linkset may be associated with up to 16 combined linksets. For each combined linkset that a linkset is a member of, it may be assigned a priority relative to other linksets belonging to that combined linkset.

CLI Navigation

`SS7[]>MTP3[]>CombinedLinkSet`

CLI Inherited Attributes

None.

CLI Command Syntax

`SS7[]:MTP3[]>display CombinedLinkSet[]`

Operations Permitted

`Add, delete, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 136: CombinedLinkSet Mandatory Attributes

Attribute	Value Range	Default	Description
`Combined-LinkSetId`	`1 to 255`	N/A	The instance identifier of this entity. Generated by the Tekelec ngHLR. Read only

Table 137: CombinedLinkSet Optional Attributes

Attribute	Value Range	Default	Description
`Name`	up to 255 digits and/or letters	N/A	User defined name for Combined linkset.

CLI Example

```
SS7[]:MTP3[]>display CombinedLinkSet [CombinedLinkSetId = 1]
```

Combined Link Set Operations

The following provides a description of the operation that can be performed with a Combined Link Set.

AddLinkSets()

This operation will add a new LinkSet to a specific CombinedLinkSet. A priority for this linkset must be specified within the CombinedLinkSet. Only linksets with priority 0 will be used to carry traffic (0=highest priority, 3 = lowest priority).

Command syntax:

```
:SS7[]:MTP3[]:CombinedLinkSet[CombinedLinkSetId = 1]> addLinkSets() LinkSetId
= 1; Priority = 0
```

RemoveLinkSets()

This operation will remove a LinkSet from a specific CombinedLinkSet.

Command syntax:

```
:SS7[]:MTP3[]:CombinedLinkSet[CombinedLinkSetId = 1]> RemoveLinkSets()
LinkSetId = 1
```

GetLinkSets()

This operation will retrieve and display all the LinkSets belonging to a specific CombinedLinkSet.

Command syntax:

```
:SS7[]:MTP3[]:CombinedLinkSet[CombinedLinkSetId = 1]> GetLinkSets()
```

Link

Name

Link

Description

Link defines physical signaling links between the SS7 board and the adjacent signaling points. One link configuration must be performed for each physical signaling link. The attributes of a link include the point code of the adjacent signalling point, protocol variant employed on the link (ITU-T or ANSI), point code length, maximum packet length, various timer values, membership in a linkset, and others.

There must be at least one Link in a LinkSet with priority 0. If there are links with different priorities in a LinkSet, the priorities of the links must be continuous.

For example, there can be no existing links with priority 0, 1, and 3 in a LinkSet (priority 2 is missing). At any given time, only the in-service links with the highest priority are used to carry traffic on that link. If one priority 0 link goes out-of-service, then one of the in-service priority 1 links will be used to carry traffic.

CLI Navigation

```
SS7[]> MTP3[]> LinkSet[]> Link.
```

CLI Inherited Attributes

```
LinkSetId.
```

CLI Command Syntax

```
SS7[]:MTP3[]:Linkset[LinksetId =#]> add Link [Priority = 0-3; MTP2SapId =
1-192; SapType= 0,1;LinkTstSLC = 0-15; MTP3TimerProfileId = 1-32; AdjDPC =
1-255; SignallingLinkTestOn = 0,1; MsgPriority = 0-3; IsCLink = 0,1;
MaxSLTtry = integer; P1QLen = integer; P2QLen = integer; P3QLen = integer;
DiscardPrior = 0-3; TestPattern = characters]
```

Operations Permitted

```
Add, display, modify, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 138: Link Mandatory Attributes

Attribute	Value Range	Default	Description
`Priority`	0 to 3	0	Link priority within the linkset. At least one link must have priority zero. Read only. 0=highest priority 3=lowest priority
`MTP2SapId`	1 to 192 (ANSI) 1 to 248 (ITU)	N/A	MTP2Sap this Link is connected to. Read only.
`SapType`	0 MTP2_SAP 1 SAAL_SAP	N/A	Type of protocol used in layer 1&2 for signaling. The Tekelec ngHLR supports either the MTP2 or SAAL protocols.
`LinkTstSLC`	0 to 15	0	Signalling Link Code for link test. This must match the configured value at the adjacent SP.
`MTP3Timer-ProfileId`	1 to 32	N/A	Timer definitions associated with this link.

Table 139: Link Optional Attributes

Attribute	Value Range	Default	Description

`State`	0 (DOWN),
	1 (UP)
		0	Indicates the state of the link. Read only.
			0 = deactivated
			1 = activated
			This state is changed on reception of the alarms:
			`LSN_EVENT_PROT_ST_UP`
			`LSN_EVENT_PROT_ST_DN`
			Refreshed automatically by the Tekelec ngHLR.

`Congestion-State`	0 (UNCONGESTED),
	1 (CONGESTED)
		0	Read only. Link is congested. This state is changed on reception of the alarms:
			`LSN_EVENT_CONG`
			`LSN_EVENT_STPCONG`
			Refreshed automatically by the Tekelec ngHLR.

Attribute	Value Range	Default	Description
AdjDPC	1 to 255	N/A	Adjacent Destination Point Code. (Signalling Point Id).
	1 to 32	N/A	Instance identification of this entity. Read only. Generated by the Tekelec ngHLR.
Signalling-LinkTestOn	0 or 1	0	Read only. Signalling test is on for this link. 0 = false 1 = true
MsgPriority	0 to 3	3	Management message priority on this link. 0 = lowest 3 = highest Set priority to 0 for international networks or networks without congestion states.
IsCLink	0 or 1	0	Is the link a Cross-Link (i.e., a link between mated STPs) 0 = false 1 = true
MaxSLTtry	0 to 255	2	Maximum times to retry SLTM (Signalling Link Test Message). When a link is aligned at MTP3, an SLTM message is periodically sent to the peer MTP3 to determine the state of the link and waits for SLTA (Signalling Link Test Acknowledgement - MTP3 receives SLTA for the SLTM message it sent after level 2 is aligned for an Out-Of-Service (OOS) link). If SLTA is not received, then it repeats the SLTM message**MaxSLTtry** before declaring the link OOS.
P1QLen	2 to 1024 P1QLen is used to implement multiple levels of congestion on this Link with P1QLen <= P2QLen <= P3QLen. This specifies four different levels of thresholds and does not represent four different queues for the Link. When MTP3	16	Transmit Queue Length threshold at which the congestion priority is raised to 1. P*QLen is used to implement multiple levels of congestion on this Link with P1QLen <= P2QLen <= P3QLen. This specifies four different levels of thresholds and does not represent four different queues for the Link. When MTP3 starts queuing up messages (for example, due to congestion on a link), the messages are queued up. As the queue length grows, different levels of congestion are reached depending upon the values configured for p*QLen. The same value of P1QLen to P3QLen is acceptable, but will result in only one level of

Attribute	Value Range	Default	Description
	starts queuing up messages (for example, due to congestion on a link), the messages are queued up. As the queue length grows, different levels of congestion are reached depending upon the values configured for p*QLen. The same value of P1QLen to P3QLen is acceptable, but will result in only one level of congestion. These values are configured based upon the memory available to queue the messages. For international networks or for national networks without multiple congestion priorities, the same value for P1QLen to P3QLen should be configured.		congestion. These values are configured based upon the memory available to queue the messages. For international networks or for national networks without multiple congestion priorities, the same value for P1QLen to P3QLen should be configured.
`P2QLen`	(P1QLen +2) to 1024	32	Transmit Queue Length threshold at which the congestion priority is raised to 2.
`P3QLen`	(P2QLen +2) to 1024	64	Transmit Queue Length threshold at which the congestion priority is raised to 3.
`DiscardPrior`	0 to 3	0	Discard Priority. 0 = lowest 3 = highest In national networks supporting multiple levels of congestion, if a message is received by MTP3 with a priority less than the current congestion priority of the link (in case the link is congested), then the message is dropped. If it is required to override this feature, this parameter can be configured so that before MTP3 drops a message because of congestion, it checks the message

Attribute	Value Range	Default	Description
			priority with DiscardPrior. If the message priority is less than the discard priority, the message is dropped. If it is necessary to completely avoid the message dropping functionality, DiscardPrior is configured as 0 (lowest message priority). If message dropping functionality is required as specified in ANSI, DiscardPrior is configured as 3 (highest message priority).
`TestPattern`	Maximum of 15 characters	N/A	Link Test Pattern. Specify the character pattern for the SLTM message.

`Inhibition-State`	0 (UNINHIBITED),
	1 (INHIBITED)
		N/A	Read only. Link is inhibited or uninhibited. This state is changed on reception of the alarms:
			`LSN_EVENT_LOC_INH_ACK`
			`LSN_EVENT_REM_INH_ACK,`
			`LSN_EVENT_LOC_UNINHED`
			`LSN_EVENT_REM_UNINHED`
			Refreshed automatically by the Tekelec ngHLR.

`BlockedState`	0 (UNBLOCKED),
	1 (BLOCKED)
		0	Read only. Link is blocked (Processor Outage) See note below. This state is changed on reception of the alarms:
			`LSN_EVENT_LOC_BLKD LSN_EVENT_RMT_BLKD,`
			`LSN_EVENT_LOC_UNBLKD LSN_EVENT_RMT_UNBLKD`
			Refreshed automatically by the Tekelec ngHLR.

`StartupState`	1 (UP) 0 (DOWN)	UP	Read only. This parameter indicates whether the links are UP or DOWN at Startup system. If the links were deactivated manually by the operator (from the CLI or WebCI), the StartupState will be down. If the links were activated manually by the operator, the StartupState will be up.

CLI Example

```
:SS7[]:MTP3[]:Linkset[LinksetId = #]> add Link [Priority = 0; MTP2SapId =
1; LinkTstSLC = 0; MTP3TimerProfileId = 1; CongestionState = 0; AdjDPC =
0; SignallingLinkTestOn = 0; MsgPriority = 3; IsCLink = 0; MaxSLTtry = 2;
P1QLen = 16; P2QLen = 32; P3QLen = 64; DiscardPrior = 0; TestPattern =
abcdefghijkl]
```

Note: A signaling link (in service, failed or inactive) is recognized as blocked when an indication is obtained from the signalling terminal that a processor outage condition exists at the remote terminal (i.e. link status signal units with processor outage indication are received), or when a local processor outage situation is detected.

Note: – A link becomes unavailable when it is failed or deactivated or [(failed or deactivated) and blocked] or inhibited.

Link Operations

The following section provides a description of the operations that can be performed with a Link.

Activate

Make this link available to carry MTP3 user traffic. This operation will trigger the alarm: `LSN_EVENT_PROT_ST_UP` so then the link 'State' will change.

Command syntax:

```
SS7[]:MTP3[]:LinkSet[LinkSetId = 1]:Link[LinkId = 1]> Activate()
```

Deactivate

Remove the link from service and make it unavailable to carry traffic. This operation will trigger the alarm: `LSN_EVENT_PROT_ST_DN` so then the link 'State' will change.

Note: In the situation where the Tekelec ngHLR has unused SS7 links defined and activated, the system will continue to generate alarms and logs, causing an increase of the database disk space allocation, which could result in a performance impact of the backup and restore procedure. Tekelec recommends operators to either delete or deactivate any SS7 links defined in the system which are not in use. This will stop the alarm generation and prevent the issue to occur. If the operator decides to deactivate but not delete the unused SS7 links, then the deactivation of the unused SS7 links must be performed every time a Blade switch over or Blade restart occurs.

Command syntax:

```
SS7[]:MTP3[]:LinkSet[LinkSetId = 1]:Link[LinkId = 1]> Deactivate()
```

Inhibit

Signalling link management inhibiting is used to prevent user traffic on the links while leaving the links themselves in service. This process is useful for isolating links for testing purposes. This operation will trigger the alarms: `LSN_EVENT_LOC_INH_ACK` with the cause set to `LCM_CAUSE_MGMT_INITIATED`, so then the link 'InhibitionState' will change. When a link is in the inhibited state, an inhibit test message is periodically sent to verify that the link is still in the inhibited state. Since an inhibited link is not available for user traffic, the inhibit test is a safeguard to ensure that the link state is correctly marked as inhibited at the far end of the link. Both the locally inhibited node and remote node perform the inhibit test. The periodic test continues between the nodes at each end of the link until the link is unhibited.

It is possible that this operation trigger the alarms `LSN_EVENT_INH_DEN` with the cause set to `LSN_CAUSE_DPC_UNAVAIL`. It is because a Link can only be inhibited if they do not cause any destinations (route) defined at the node to become isolated.

A signalling link is recognized as inhibited when:

a) An acknowledgement is received from a remote signalling point in response to an inhibit request sent to the remote end by the local signalling link management.

b) Upon receipt of a request from a remote signalling point to inhibit a link and the successful determination that no destination will become inaccessible by inhibiting the link.

Command syntax:

```
SS7[]:MTP3[]:LinkSet[LinkSetId = 1]:Link[LinkId = 1]> Inhibit()
```

Unhibit

The link uninhibit procedure does the reverse of the inhibit procedure: it puts the link back into service for user traffic. This operation will trigger the alarm: `LSN_EVENT_LOC_UNINHED`, so then the link 'InhibitionState' will change.

Command syntax:

```
SS7[]:MTP3[]:LinkSet[LinkSetId = 1]:Link[LinkId = 1]> Unhibit()
```

Set Local Processor Outage

This operation sets the local-processor outage condition on the link. This operation will trigger the alarm: `LSN_EVENT_LOC_BLKD`, so then the link 'BlockedState' will change.

Command syntax:

```
SS7[]:MTP3[]:LinkSet[LinkSetId = 1]:Link[LinkId = 1]>
SetLocalProcessorOutage()
```

Set Local Processor Recovered

This operation removes the local-processor outage condition on the link. This operation will trigger the alarm: `LSN_EVENT_LOC_UNBLKD`, so then the link 'BlockedState' will change.

Command syntax:

```
SS7[]:MTP3[]:LinkSet[LinkSetId = 1]:Link[LinkId = 1]>
SetLocalProcessorRecovered()
```

Link Set

Name

`LinkSet`

Description

It defines groups of 1 to 16 links that directly connect two signaling points (SPs). Although a linkset usually contains all parallel signalling links between two SPs, it is possible to define parallel linksets. Each signaling link defined is assigned membership in exactly one linkset.

CLI Navigation

```
SS7[]> MTP3[]> CombinedLinkSet[]> LinkSet
```

CLI Inherited Attributes

CombinedLinkSetId.

CLI Command Syntax

```
SS7[]:MTP3[]:CombinedLinkSet[CombinedLinkSetId=#]>display LinkSet [AdjDPC
= 1-255; State = 0,1; Name = text; LinkSetId = 1-16; AllLinksActive = 0,1]
```

Operations Permitted

`Add, delete, modify, and Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 140: LinkSet Mandatory Attributes

Attribute	Value Range	Default	Description
`AdjDPC`	1 to 255	N/A	Adjacent Destination Point Code (Signalling Point Id). Read only.

Table 141: LinkSet Optional Attributes

Attribute	Value Range	Default	Description
`State`	0 (DEACTIVATED), 1 (ACTIVATED)	0	Indicates the state of the SAP. This state is changed on reception of the alarms: `LSN_EVENT_LSET_ACTIVE` `LSN_EVENT_LSET_INACTIVE`. Read only. 0 = deactivated 1 = activated Refreshed automatically by the Tekelec ngHLR.
`Name`	Up to 65535 digits and/or letters	N/A	User defined name for linkset.
`LinkSetId`	1 to 16	N/A	Linkset identification value. Read only. Generated by the Tekelec ngHLR.
`AllLinks-` `Active`	0 or 1	0	All Links belonging to this linkset are active. Read only. 0 = false 1 = true

Attribute	Value Range	Default	Description
			Refreshed automatically by the Tekelec ngHLR.

CLI Example:

```
:SS7[]:MTP3[]:CombinedLinkSet[CombinedLinkSetId=1]> add LinkSet[AdjDPC =
2; Name = LS01; AllLinksActive = 0]
```

Link Set Operation

The following section describes the operations that can be performed with a Link Set.

Activate()

Activate all the Links of a LinkSet. This operation will trigger the alarm: `LSN_EVENT_LSET_ACTIVE,` so then the LinkSet 'State' will change.

Command syntax:

```
SS7[]:MTP3[]:LinkSet[LinkSetId = 1]> Activate()
```

Deactivate()

Deactivate all the Links of a LinkSet. This operation will trigger the alarm: `LSN_EVENT_LSET_INACTIVE,` so then the LinkSet 'State' will change

Command syntax:

```
SS7[]:MTP3[]:LinkSet[LinkSetId = 1]> Deactivate()
```

GetLinks()

Retrieve and display all the Links belonging to that LinkSet. A list of LinkIds will be displayed.

Command syntax:

```
SS7[]:MTP3[]:LinkSet[LinkSetId = 1]> GetLinks()
```

MTP3 General Configuration

Name

`MTP3GenCfg`

Description

The MTP3GenCfg is used to define and control the general operation of the signaling point (SP). It is used to initialize general configuration parameters for the MTP3 layer such as values for various SP-level timers.

CLI Navigation

```
SS7[]> MTP3[]> MTP3GenCfg
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:MTP3[]>display MTP3GenCfg[] SsfValid = 0,1; MTP3TimerProfileId = 1-32
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 142: MTP3GenCfg

Attribute	Value Range	Default	Description
`SsfValid`	0 or 1	0	Service Switching Function validation required. 0 = yes 1 = no
`MTP3Timer-ProfileId`	1 to 32	N/A	Timer definitions for the general configuration.

CLI Example

```
1 :SS7[]:MTP3[]>display MTP3GenCfg[]
```

MTP3 Network Service Access Point (NSAP)

Name

`MTP3NSap`

Description

Nsap (Network Service Access Point) defines the interface between the SCCP layer and the MTP Layer 3. One Network SAP is defined for each MTP 3 layer interface that the SCCP layer uses. Typically the SCCP layer has only a single Network SAP, although if the same system supports multiple protocol variants (ANSI and ITU-T), the SCCP layer would have a separate Network SAP for each variant. You cannot deactivate or activate MTP3 Network SAP.

CLI Navigation

```
SS7[]> MTP3[]> MTP3NSap
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:MTP3[]> add MTP3NSap [ProtocolVariant = 1,2,6; SCCPNSapId = 0,1;
OwnSignallingPointId = 1-255; ServiceIndicator = 0-8]
```

Operations Permitted

`Add, modify, and Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 143: MTP3NSap

Attribute	Value Range	Default	Description
`Protocol-Variant`	1 (ANS), 2 (ITU), 6 (ANS96)	N/A	Protocol variant used to provide service to the user part connected through this upper SAP. Read only.

Table 144: MTP3NSap

Attribute	Value Range	Default	Description
`State`	0 (DEACTIVATED), 1 (ACTIVATED)	0	State of the Network SAP. Read only. 0 = deactivated 1 = activated Refreshed automatically by the Tekelec ngHLR.
`SCCPNSapId`	0 or 1	N/A	The SccpNSap instance that is connected to this SAP. Read only.
`MTP3NSapId`	1	N/A	Instance Identification Value. Read only. Generated by the Tekelec ngHLR.
`Own-Signaling-PointId`	1 to 255	N/A	The Own Signaling point associated with this NSAP. Read only.

Attribute	Value Range	Default	Description
Service-Indicator	0 (BROADBAND_ISUP), 1 (DUP_CALL_CIRCUIT), 2 (DUP_FACILITY_CANCELLATION), 3 (ISUP), 4 (MTP_TESTING), 5 (SATELLITE_ISUP), 6 (SCCP), 7 (SIG_NET_MAIN_MESSAGES), 8 (TUP)	6 (SCCP)	Specifies the MTP user, thereby allowing the decoding of the information contained in the SIF (Signaling Information Field). Read only. 0=Broadband ISDN User Part 1=Data User Part-call and circuit-related messages 2= Data User Part-facility registration and cancellation messages 3=ISDN User Part 4=Reserved for MTP Testing User Part 5=Satellite ISDN User Part 6=SCCP 7=Signaling Network Management Messages 8=Telephone User Part

CLI Example

```
1 :SS7[]:MTP3[]> add MTP3NSap [ProtocolVariant = 1; OwnSignallingPointId =
1; ServiceIndicator = 5]
```

MTP3 Timers

Name

MTP3Timers

Description

The MTP3Timers is used to define the specified timers for the MTP3 Protocol Layer.

When creating a new MTP3Timer, the OamTimerVal entities (T1 to T8 and T10 to T39) will be automatically created and the minimum, maximum, and current values will be set to the predefined values according to the Protocol Variant chosen (ITU or ANSI or ANS96). For detailed information on MTP3 Timers, please refer to the following specifications: ITU Q.704, Section 16.8 and ANSI T1.111.4, Section 16.7.

CLI Navigation

SS7[]> MTP3[]> MTP3Timers

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:MTP3[]> add MTP3Timers [ProtocolVariant = 1,2,6]
```

Operations Permitted

`Add, delete, display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 145: MTP3Timers Mandatory Attributes

Attribute	Value Range	Default	Description
`MTP3Timer-ProfileId`	1 to 32	N/A	The instance identification value of Mtp3TimerProfile entity. Read only. Generated by the Tekelec ngHLR.
`Protocol-Variant`	1 (ANS), 2 (ITU), 6 (ANS96)	N/A	Uses the timer ranges as specified in the selected standard or recommendation. Currently ANSI and ITU are supported. Read only.

Table 146: MTP3Timers Optional Attributes

Attribute	Value Range (ms)	Default (ms)	Description
`T1`	ITU: 500-1200	850	Delay to avoid message mis-sequencing on changeover.
	ANSI: 500-1200	850	
`T2`	ITU: 700-2,000	1,350	Waiting for changeover acknowledgment.
	ANSI: 700-2,000	1,350	
`T3`	ITU: 500-1,200	850	Time controlled diversion-delay to avoid mis-sequencing on changeback.
	ANSI: 500-1,200	850	
`T4`	ITU: 500-1,200	850	Waiting for changeback acknowledgment (first attempt).
	ANSI: 500-1,200	850	

Attribute	Value Range (ms)	Default (ms)	Description
T5	ITU: 500-1,200	850	Waiting for changeback acknowledgement (second attempt).
	ANSI: 500-1,200	850	
T6	ITU: 500-1,200	850	Delay to avoid message mis-sequencing on controlled rerouting.
	ANSI: 500-1,200	850	
T7	ITU: 1,000-2,000	1,500	Waiting for signalling data link connection acknowledgment.
	ANSI: 1,000-2,000	1,500	
T8	ITU: 800-1,200	1,000	Transfer prohibited inhibition timer (transient solution).
	ANSI: 800-1,200	1,000	
T10	ITU: 30,000-60,000	45,000	Waiting to repeat signaling routeset test message.
	ANSI: 30,000-60,000	45,00	
T11	ITU: 30,000-90,000	60,00	Transfer restricted timer.
	ANSI: 30,000-90,000	60,00	
T12	ITU: 800-1,500	1,150	Waiting for uninhibit acknowledgment.
	ANSI: 800-1,500	1,150	
T13	ITU: 800-1,500	1,150	Waiting for force uninhibit.
	ANSI: 800-1,500	1,150	
T14	ITU: 2,000-3,000	2,500	Waiting for inhibition acknowledgment.
	ANSI: 2,000-3,000	2,500	
T15	ITU: 2,000-3,000	2,500	Waiting to start signalling routeset congestion test.
	ANSI: 2,000-3,000	2,500	
T16	ITU: 1,400-2,000	1,700	Waiting for routeset congestion status update.
	ANSI: 1,400-2,000	1,700	
T17	ITU: 800-1,500	1,150	Delay to avoid oscillation of initial alignment failure and link restart.
	ANSI: 800-1,500	1,150	
T18	ITU: 0	0	Timer within a signaling point whose MTP restarts for supervising link and link set activation as well as the receipt of routing information. Timer values are implementation and network

Attribute	Value Range (ms)	Default (ms)	Description
			dependent. Criteria to choose T18 are given in ITU-T Rec. Q.704 9.2.
	ANSI: 2,000-20,000	10,000	Transfer Restricted inhibition timer.
T19	ITU: N/A	N/A	N/A
	ANSI: 480,000-600,000	540,000	Failed link craft referral timer.
T20	ITU: 59,000-61,000	60,000	Overall MTP restart timer at the signalling point whose MTP restarts.
	ANSI: 90,000 -120,000	105,000	Waiting to repeat local inhibit test.
T21	ITU: 63,000-65,000	64,000	Overall MTP restart timer at a signalling point adjacent to one whose MTP restarts.
	ANSI: 90,000 -120,000	105,000	Waiting to repeat remote inhibit test.
T22	ITU: 180,000-360,000	240,000	Local inhibit test timer.
	ANSI: 0-1,000,000	0	Timer at starting SP, waiting for signalling links to become available. Network dependent.
T23	ITU: 180,000-360,000	240,000	Remote inhibit test timer.
	ANSI: 0-1,000,000	0	Timer at restating SP, started after MTP3_TIMER_22, waiting to receive all traffic restart allowed messages. Network dependent.
T24	ITU: 500-500	500	Stabilising timer after removal of local processor outage (LPO), used in LPO latching to RPO (Remote Processor Outage) (national option).
	ANSI: 0-1,000,000	0	Timer at restarting SP, started after MTP3_TIMER_22, waiting to broadcast all traffic restart allowed messages.
T25	ITU: N/A	N/A	N/A

Attribute	Value Range (ms)	Default (ms)	Description
	ANSI: 30,000 -35,000	32,500	Timer at SP adjacent to restarting SP, waiting for traffic restart allowed message.
T26	ITU: N/A	N/A	N/A
	ANSI: 12,000 -15,000	13,500	Timer at restarting SP, waiting to repeat traffic restart waiting message.
T27	ITU: N/A	N/A	N/A
	ANSI: 2,000 -5,000	3,500	Minimum duration of unavailability for full restart
T28	ITU: N/A	N/A	N/A
	ANSI: 3,000 -35,000	19,000	Timer at SP adjacent to restarting SP, waiting for traffic restart waiting message.
T29	ITU: N/A	N/A	N/A
	ANSI: 60,000 -65,000	62,500	Timer started when TRA (Traffic restart allowed) sent in response to unexpected TRA or TRW (Traffic restart waiting).
T30	ITU: N/A	N/A	N/A
	ANSI: 30,000 -35,000	32,500	Timer to limit sending of Transfer-Prohibits and Transfer-Restricteds in response to unexpected Traffic Restarts or TRW (Traffic restart waiting).
T31	ITU: 100 -65,000	5,000	BSN requested timer. This is an Internal-specific timer. As part of changeover procedure on a link, MTP3 sends a status request to MTP2 Layer to return the BSN for that link.
	ANSI: 100 -65,000	5,000	
T32	ITU: 4,000 -12,000	8,000	SLT timer. Same as T1 in Q.707.
	ANSI: N/A	N/A	N/A

Attribute	Value Range (ms)	Default (ms)	Description
T33	ITU: 120,000 -600,000	360,000	Connecting timer. This is an Internal-specific timer to take care of loss of connect request or connect confirm.
	ANSI: 120,000 -600,000	360,000	
T34	ITU: 30,000 -90,000	60,000	Periodic signalling link test timer This is the same as T2 in Q.707.
	ANSI: N/A	N/A	N/A
T35	ITU: N/A	N/A	N/A
	ANSI: 100 -65,000	65,000	Same as Timer T31 in ANSI 96.
T36	ITU: N/A	N/A	N/A
	ANSI: 100 -650,000	330,000	Same as Timer T33 in ANSI 96.
T37	ITU: N/A	N/A	N/A
	ANSI: 100 -65,000	63,000	Same as Timer T34 in ANSI 96.
T38	ITU: 100 -65,000	30,000	Flow Control Request Timer. This is an Internal-specific timer. When layer 2 sends a flow control indication to MTP3 indicating onset of flow control, MTP3 sends a status request to layer 2 periodically at the time out of the this timer.
	ANSI: 100 -65,000	30,000	
T39	ITU: 2,000 -5,000	5,000	Bind Confirm Wait Timer. This is an Internal-specific timer. When MTP3 sends a bind request to layer 2, it starts this timer to wait for the bind confirm.
	ANSI: 2,000 -5,000	5,000	

CLI Example

```
:SS7[]:MTP3[]> add MTP3Timers[ProtocolVariant = 2]
```

MTP3 Timer Attributes

The attributes for each MTP3 timer can be retrieved and displayed. The attributes are listed in the table below. The Minimum and Maximum values are defined according to the Protocol Variant (ITU

or ANSI) that was selected. The Current value can be modified as long as it is between the Minimum and Maximum values.

Table 147: MTP3Timer Attributes

Attribute	Description
OAMTimerValId	Identifier of OAM Timer Value. Read only. Generated by the Tekelec ngHLR system.
TimerId	Timer ID number from 201 to 238. Read only.
MinVal	Minimum Value of timer in milliseconds. Read only.
MaxVal	Maximum Value of timer in milliseconds. Read only.
CurrentVal	Current Value of timer in milliseconds.

CLI Navigation

```
SS7[]> MTP3[]> MTP3Timers> specific MTP3 timer
```

CLI Inherited Attributes

MTP3TimerProfileId.

CLI Command Syntax

```
SS7[]:MTP3:MTP3Timers[MTP3TimerProfileId = #]> modify TimerName[] CurrentVal
= milliseconds
```

Operations Permitted

```
Modify, display
```

Note: Not all users (User Groups) are allowed to perform these operations. Please see Table 2-2 to know which ones have access to this entity and which operations they have permission to do.

MTP3 Timer Definitions

Table 148: MTP3 Timers

MTP3 Timer	Definition (definitions apply to both ITU and ANSI unless noted otherwise)
T1	Delay to avoid message mis-sequencing on changeover.
T2	Waiting for changeover acknowledgment.
T3	Time controlled diversion-delay to avoid mis-sequencing on changeback.
T4	Waiting for changeback acknowledgment (first attempt).
T5	Waiting for changeback acknowledgment (second attempt).
T6	Delay to avoid message mis-sequencing on controlled rerouting.

MTP3 Timer	Definition (definitions apply to both ITU and ANSI unless noted otherwise)
T7	Waiting for signaling data link connection acknowledgment.
T8	Transfer prohibited inhibition timer (transient solution).
T10	Waiting to repeat signaling routeset test message.
T11	Transfer restricted timer.
T12	Waiting for uninhibit acknowledgment.
T13	Waiting for force uninhibit.
T14	Waiting for inhibition acknowledgment.
T15	Waiting to start signaling routeset congestion test.
T16	Waiting for routeset congestion status update.
T17	Delay to avoid oscillation of initial alignment failure and link restart.
T18	ITU: Timer within a signaling point whose MTP restarts for supervising link and link set activation as well as the receipt of routing information. ANSI: Transfer Restricted inhibition timer.
T19	ANSI: Failed link craft referral timer.
T20	ITU: Overall MTP restart timer at the signaling point whose MTP restarts. ANSI: Waiting to repeat local inhibit test.
T21	ITU: Overall MTP restart timer at a signaling point adjacent to one whose MTP restarts. ANSI: Waiting to repeat remote inhibit test.
T22	ITU: Local inhibit test timer. ANSI: Timer at starting SP, waiting for signaling links to become available.
T23	ITU: Remote inhibit test timer. ANSI: Timer at restating SP, started after MTP3_TIMER_22, waiting to receive all traffic restart allowed messages.
T24	ITU: Stabilizing timer after removal of local processor outage (LPO), used in LPO latching to RPO (Remote Processor Outage) (national option). ANSI: Timer at restarting SP, started after MTP3_TIMER_22, waiting to broadcast all traffic restart allowed messages.
T25	ITU: N/A

MTP3 Timer	Definition (definitions apply to both ITU and ANSI unless noted otherwise)
	ANSI: Timer at SP adjacent to restarting SP, waiting for traffic restart allowed message.
T26	ITU: N/A ANSI: Timer at restarting SP, waiting to repeat traffic restart waiting message.
T27	ITU: N/A ANSI: Minimum duration of unavailability for full restart
T28	ITU: N/A ANSI: Timer at SP adjacent to restarting SP, waiting for traffic restart waiting message.
T29	ITU: N/A ANSI: Timer started when TRA (Traffic restart allowed) sent in response to unexpected TRA or TRW (Traffic restart waiting).
T30	ITU: N/A ANSI: Timer to limit sending of Transfer-Prohibits and Transfer-Restricteds in response to unexpected Traffic Restarts or TRW (Traffic restart waiting).
T31	BSN requested timer
T32	ITU: SLT Timer. ANSI: N/A
T33	Connecting timer
T34	ITU: Periodic signalling link test timer ANSI: N/A
T35	ITU: N/A ANSI: Same as Timer T31 in ANSI 96.
T36	ITU: N/A ANSI: Same as Timer T33 in ANSI 96
T37	ITU: N/A ANSI: Same as Timer T34 in ANSI 96

MTP3 Timer	Definition (definitions apply to both ITU and ANSI unless noted otherwise)
T38	Flow Control Request Timer
T39	Bind Confirm Wait Timer

The OAMTimerValId, TimerId, MinVal, MaxVal and CurrentVal for each timer are shown below.

Table 149: MTP3 Specific Timers

Specific Timer	OAMTimerValId	TimerId	Standard	MinVal (ms)	MaxVal (ms)	CurrentVal (ms)
T1	1 to 2,000	201	ITU	500	1,200	850
			ANSI	500	1,200	850
T2	1 to 2,000	202	ITU	700	2,000	1,350
			ANSI	700	2,000	1,350
T3	1 to 2,000	203	ITU	500	1,200	850
			ANSI	500	1,200	850
T4	1 to 2,000	204	ITU	500	1,200	850
			ANSI	500	1,200	850
T5	1 to 2,000	205	ITU	500	1,200	850
			ANSI	500	1,200	850
T6	1 to 2,000	206	ITU	500	1,200	850
			ANSI	500	1,200	850
T7	1 to 2,000	207	ITU	1,000	2,000	1,500
			ANSI	1,000	2,000	1,500
T8	1 to 2,000	208	ITU	800	1,200	1,000
			ANSI	800	1,200	1,000
T10	1 to 2,000	210	ITU	30,000	60,000	45,000
			ANSI	30,000	60,000	45,000
T11	1 to 2,000	211	ITU	30,000	90,000	60,000
			ANSI	30,000	90,000	60,000
T12	1 to 2,000	212	ITU	800	1,500	1,150
			ANSI	800	1,500	1,150

Specific Timer	OAM TimerVal Id	TimerId	Standard	MinVal (ms)	MaxVal (ms)	CurrentVal (ms)
T13	1 to 2,000	213	ITU	800	1,500	1,150
			ANSI	800	1,500	1,150
T14	1 to 2,000	214	ITU	2,000	3,000	2,500
			ANSI	2,000	3,000	2,500
T15	1 to 2,000	215	ITU	2,000	3,000	2,500
			ANSI	2,000	3,000	2,500
T16	1 to 2,000	216	ITU	1,400	2,000	1,700
			ANSI	1,400	2,000	1,700
T17	1 to 2,000	217	ITU	800	1,500	1,150
			ANSI	800	1,500	1,150
T18	1 to 2,000	218	ITU	0	0	0
			ANSI	2,000	20,000	10,000
T19	1 to 2,000	219	ITU	67,000	69,000	68,000
			ANSI	480,000	600,000	540,000
T20	1 to 2,000	220	ITU	59,000	61,000	60,000
			ANSI	90,000	120,000	105,000
T21	1 to 2,000	221	ITU	63,000	65,000	64,000
			ANSI	90,000	120,000	105,000
T22	1 to 2,000	222	ITU	180,000	360,000	240,000
			ANSI	0	0	0
T23	1 to 2,000	223	ITU	180,000	360,000	240,000
			ANSI	0	0	0
T24	1 to 2,000	224	ITU	500	500	500
			ANSI	0	0	0
T25	1 to 2,000	225	ITU	N/A	N/A	N/A
			ANSI	30,000	35,000	32,500
T26	1 to 2,000	226	ITU	N/A	N/A	N/A
			ANSI	12,000	15,000	13,500
T27	1 to 2,000	227	ITU	N/A	N/A	N/A
			ANSI	2,000	5,000	3,500

Specific Timer	OAM TimerVal Id	TimerId	Standard	MinVal (ms)	MaxVal (ms)	CurrentVal (ms)
T28	1 to 2,000	228	ITU	N/A	N/A	N/A
			ANSI	3,000	35,000	19,000
T29	1 to 2,000	229	ITU	N/A	N/A	N/A
			ANSI	60,000	65,000	62,500
T30	1 to 2,000	230	ITU	N/A	N/A	N/A
			ANSI	30,000	35,000	32,500
T31	1 to 2,000	231	ITU	100	65,000	5,000
			ANSI	100	65,000	5,000
T32	1 to 2,000	232	ITU	4,000	12,000	8,000
			ANSI	N/A	N/A	N/A
T33	1 to 2,000	233	ITU	120,000	600,000	360,000
			ANSI	120,000	600,000	360,000
T34	1 to 2,000	234	ITU	30,000	90,000	60,000
			ANSI	N/A	N/A	N/A
T35	1 to 2,000	235	ITU	N/A	N/A	N/A
			ANSI	100	65,000	65,000
T36	1 to 2,000	236	ITU	N/A	N/A	N/A
			ANSI	100	650,000	330,000
T37	1 to 2,000	237	ITU	N/A	N/A	N/A
			ANSI	100	65,000	63,000
T38	1 to 2,000	238	ITU	100	65,000	30,000
			ANSI	100	65,000	30,000
T39	1 to 2,000	239	ITU	2,000	5,000	5,000
				2,000	5,000	5,000

CLI Example

```
1 :SS7[]:MTP3[]:MTP3Timers[MTP3TimerProfileId = #]> modify T1[] CurrentVal
= 1000
```

MTP3 Timer Profile Operation

The following section provides a description of the operation that can be performed with the MTP3 Timers.

GetAllTimers()

The Get All Timers operation will retrieve and display all the timer information for the MTP3 Timers. It will display the minimum, maximum, and current values of all the timers.

Command syntax:

```
SS7[]:MTP3[]:MTP3Timers[MTP3TimerProfileId = 1]> GetAllTimers()
```

Route

Name

`Route`

Description

Route specifies the destination signaling points that are accessible from the Signaling Point (SP) being configured. One route is required for each remote signaling point/network/cluster that is to be accessible from the SP being configured (DPC). Routes are used to route outgoing messages to the appropriate signaling links. Each route is assigned to one combined linkset, which in turn identifies all linksets which may be used to reach that destination. Each linkset within the route's associated combined linkset may have an optional priority assigned, such that MTP routing will choose the highest priority available linkset when routing an outgoing packet to a particular destination. Any number of routes may be assigned to a Combinedlinkset.

CLI Navigation

SS7[] ➤ MTP3[] ➤ Route

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:MTP3[]> add Route[NSapId = 1; CombinedLinkSetId = 1-255; RouteToAdjSP
= 0,1; DPC = 1-255; MTP3TimerProfileId = 1-32; BroadcastFlag = 0,1]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 150: Route Mandatory Attributes

Attribute	Value Range	Default	Description
`NSapId`	1	N/A	The ID of the MTP3NSap to which this Route is connected to. Read only.

Attribute	Value Range	Default	Description
Combined-LinkSetId	1 to 255	N/A	The instance identifier of this entity. Read only.
RouteToAdjSP	0 or 1	0	The point code being configured is adjacent to this node. Read only. 0 = false 1 = true
DPC	1 to 255	N/A	Destination Point Code (SignallingPoint ID). Read only.
MTP3Timer-ProfileId	1 to 32	N/A	The identifier of the instance of this Mtp3TimerProfile.

Table 151: Route Optional Attributes

Attribute	Value Range	Default	Description
State	0 (UNAVAILABLE), 1 (AVAILABLE)	0	Indicates the state of the route. Read only. This state is changed automatically by the system on reception of the alarms: `LSN_EVENT_RESUME, LSN_EVENT_PAUSE LSN_EVENT_RMTUSRUNAV` 0 = unavailable 1 = available Refreshed automatically by the Tekelec ngHLR.
RouteId	1 to 255	N/A	The instance identifier of this entity. Read only. Generated by the Tekelec ngHLR.
Broadcast-Flag	0 or 1	0	Route management messages are broadcast to every destination in the network. 0 = false 1 = true

Attribute	Value Range	Default	Description

Congestion-State	0 (UNCONGESTED), 1 (CONGESTED)	0	Flag indicating if the Route to the destination signaling point is congested. Read only.
			This state is changed automatically by the system on reception of the alarms:
			`LSN_EVENT_CONG`
			`LSN_EVENT_STPCONG`
			Refreshed automatically by the Tekelec ngHLR.

Example:

```
:SS7[]:MTP3[]> add Route [NSapId = 1; CombinedLinkSetId = 2; RouteToAdjSP
= 0; DPC = 1; MTP3TimerProfileId = 1; BroadcastFlag = 1]
```

Signaling Point

Name

`SignallingPoint`

Description

A signaling point can represent either a local (Own Signalling Point - OPC) or a remote signaling point (Destination Signalling Point - DPC). The remote signaling point is an adjacent or far-end node.

If the ProtocolVariant is set to: ANS or ANS96, the following attributes are set to:

- PCLength = 24_BITS
- SlsRange = ANSI_8BITS
- MultiCongestionPriority = true
- RouteSetCongestion = true

If the ProtocolVariant is set to: ITU, the following attributes are set to:

- PcLength = 14_BITS
- SlsRange = ITU
- MultiCongestionPriority = true
- RouteSetCongestion = true

CLI Navigation

`SS7[]> MTP3[]> SignallingPoint`

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:MTP3[]> add SignallingPoint[ProtocolVariant = 1,2,6;
SignallingPointCode = x.y.z; PCType = 0,1; SignallingPointId = 1-255;
NetworkIndicator = 0-3; SignallingType = 0-2; PCLength = 0,1; SlsRange =
16,32,256; RestartReqProcedure = 0-3; MultiCongestionPriority = 0,1;
RouteSetCongestion = 0,1; TransferRestrict = 0,1; Name = text]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 152: SignallingPoint Mandatory Attributes

Attribute	Value Range	Default	Description
`Protocol-Variant`	1 (ANS), 2 (ITU), 6 (ANS96)	N/A	Protocol variant supported by MTP3 layer. For variant identical to Bellcore GR-246, use ANS96.
`Signalling-PointCode`	x.y.z (where x, y & z = 1 to 255) ANSI (max: 255.255.255) ITU (max: 7.255.7)	N/A	Point code of this signaling point. Read only. For ANSI: x = Network y = Cluster z = Member For ITU: x = Zone y = Area z = Signaling Point
`PCType`	0 (OPC) or 1 (DPC)	N/A	Type of Point Code. Read only. 0 = Originating Point Code 1 = Destination Point Code

Table 153: SignallingPoint Optional Attributes

Attribute	Value Range	Default	Description
`Signalling-PointId`	1 to 255	N/A	The instance identifier of this entity. Read only. Generated by the Tekelec ngHLR.
`Network-Indicator`	0 (INTERNATIONAL_00), 1 (INTERNATIONAL_01), 2 (NATIONAL_10), 3 (NATIONAL_11)	2	Network Indicator. 0 = International 1 = Not used 2 = National 3 = Not used
`Signalling-Type`	0 (SEP), 1 (STP), 2 (STEP)	0 (SEP)	Type of Signaling Point. 0=Signaling End Point 1=Signaling Transfer Point 2=Signaling Transfer Point End Point
`PCLength`	0 (14_BITS) or 1 (24_BITS)	N/A	Select Point Code Length according to protocol variant: 0 = ITU 1 = ANSI
`SlsRange`	16 (ITU), 32 (ANSI_5BITS), 256 (ANSI_8BITS)	N/A	Signalling Link Selection (SLS). The selection of outgoing link is based on information in the DPC and Signalling Link Selection field. Not undatable.
`RestartReq-Procedure`	0 (NO), 1 (ITU88), 2 (ITU92), 3 (ANS)	0 (NO)	Restart Procedure for adjacent point code compliant to specified standard.
`Multi-Congestion-Priority`	0 or 1	0	Multiple Congestion Priority flag. 0 = disabled 1 = enabled

Attribute	Value Range	Default	Description
RouteSet-Congestion	0 or 1	0	Route-set-congestion test flag. 0 = disabled 1 = enabled
Transfer-Restrict	0 or 1	0	Transfer Restrict Route Management Procedure. 0 = disabled 1 = enabled
Name	up to 255 digits and/or letters	N/A	User defined name.

Example:

```
1 :SS7[]:MTP3[]> add SignallingPoint[ProtocolVariant = 2; SignallingPointCode
= 1.255.7; PCType = 0; NetworkIndicator = 0; SignallingType = 0; PCLength
= 0; SlsRange = 16; RestartReqProcedure = 0; MultiCongestionPriority = 1;
RouteSetCongestion = 1; TransferRestrict = 0]
```

TCP/UDP Convergence Layer (TUCL) configuration

TCP/UDP Convergence Layer (TUCL)

Name

TUCL

Description

TCP/UDP Convergence Layer.The TUCL protocol layer provides support for TCP, UDP and RAW transport mechanisms. This protocol replaces the MTP Level 1 when using the SIGTRAN feature. The alarm attributes for the TUCL layer can be accessed through this table.

CLI Navigation

SS7[]> TUCL

CLI Inherited Attributes

None.

CLI Command Syntax

SS7[]>display TUCL[]

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 154: TUCL Mandatory Attributes

Attribute	Value Range	Default	Description
`AlarmOn`	0 or 1	1	Enable or disable alarm generation. Read only. 0 = disabled 1 = enabled

CLI Example

```
1 :SS7[]>display TUCL[]
```

TUCL Operations

The following section provides a description of the operations that can be performed with the TUCL layer of the SIGTRAN feature.

Status()

This operation allows you to view in which state each SIGTRAN element is, in the TUCL layer.

Command syntax:

```
SS7[]:TUCL[]>Status() Element=1
```

Value of Element (Name of Element): Description

0 (STSID): Get the system ID

1 (STTSAP): Get the TSAP status

Statistics()

This operation allows you to view the statistics of the SS7 messages for each SIGTRAN element, in the TUCL layer. The Action attribute also allows you to choose if you wish to view the statistics of an element starting at 0 following a reset of the statistics (Action=0 ZEROST) or if you wish to view the statistics in a continuous manner following the previous statistics.

Command syntax:

```
SS7[]:TUCL[]>Statistics() Element=1 ; ElementId=1; Action=0
```

- Values of Element:
  - 0 (STGEN): General statistics
  - 1 (STTSAP): TUCL TSAP statistics

- Values of ElementId:
  - A defined TUCL TSAP identifier.
- Values of Action:
  - 0 ZEROST
  - 1 NOZEROST

TUCL Service Access Point (TSAP)

Name

`TSap`

Description

The TSap (Service Access Point) stands for TUCL Sap and is used to configure the Sap provider in the TUCL layer. This table is used to configure the TUCL with a TSap on the slot on which it runs.

Note:

1. A minimum of two TUCL SAPs must be configured on two different Hlr Instances (on two different blades, for different SlotIds) to support High Availability failure. See also TSapID attribute in *Table 155: TSap Mandatory Attributes*
2. Some parameters require a restart of the Tekelec ngHLR after modification. These parameters are identified by an asterisk in *TUCL Service Access Point (TSAP)*.

CLI Navigation

```
SS7[]> TUCL[]> ]UCL
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:TUCL[]>display TSAP [SlotId=1-14; TSapId=integer;
HeartbeatFlag=bool;HeartbeatInterval=int]
```

CLI Operations Permitted

```
Add, delete, Display, modify
```

Attributes and Values

Table 155: TSap Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1-16	N/A	The shelf Slot ID on which runs the TUCL for which you

Attribute	Value Range	Default	Description
			wish to configure a TSap provider.
HeartbeatFlag	0,1	0	Enables or disables the TUCL Heartbeat function. 0=disabled (Off) 1=enabled (On)
HeartbeatInterval	Integer	N/A	Value of the TUCL heartbeat, which is one second.
TSapId	Integer	N/A	Numerical identification of the TSap (Service Access Point). See Note 1.
RtoInitial*	1-120000	3000	Retransmission initial timeout. See Note 2.
RtoMin*	1-120000	1000	Retransmission timeout minimum. See Note 2.
RtoMax*	1-120000	60000	Retransmission timeout maximum. See Note 2.
TxbufferSize*	1024-16777216	1747600	Transmit buffer size. See Note 2.
MaxSACKDelay*	1-500	200	Maximum selective acknowledgment delay. See Note 2.

CLI Example

```
1 :SS7[]:TUCL[]> add TSAP
[TSapId=1;SlotId=5;HeartbeatFlag=1;HeartbeatInterval=30]
```

MTP3 User Adaption Layer (M3UA) configuration

Some M3UA configurations require more than one table.

Configuring the SCT Service Access Point (SAP) requires the following tables:

- SCTSAP
- LocalAddresses
- Provider

Configuring the Peer Signaling Process (PSP) requires the following tables:

- PSP

- RemoteAddresses
- Network
- PS

Configuring an M3UA route requires the following tables:

- Route
- Network
- NSAP
- PS

Configuring the Peer Server (PS) requires the following tables:

- PS
- Network

Refer to the respective table for navigation examples.

MTP3-User Adaptation Layer (M3UA)

Name

`M3UA`

Description

MTP3-User Adaptation Layer. M3UA corresponds to OSI Layer 3 and provides the transport of MTP-TRANSFER primitives across an established SCTP association between SIGTRAN nodes. The primary purpose of this protocol level is to route MAP messages over the SIGTRAN IP network. This table allows you to configure the M3UA Layer parameters.

CLI Navigation

```
SS7[]> M3UA
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]>display M3UA[]
```

Operations Permitted

`Modify, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 156: M3UA Mandatory Attributes

Attribute	Value Range	Default	Description
`Alarm`	0 or 1	1	Enable or disable alarm generation. Read only. 0 = disabled 1 = enabled
`MaxNbUpperSap`	4	4	Maximum number of upper Saps that can be used.
`MaxNbLowerSap`	4	4	Maximum number of lower Saps that can be used.
`ReEstablishCommunicationTimer`	Integer	30	Timer used to re-establish the association when the remote peer has brought down the association. The Tekelec ngHLR will only try to re-establish the association if the PSP association type is configured as a client.
`MaxNumPs`	Integer	4	Maximum number of peer servers that can be configured at the ASP, SGP, and IPSP. This value includes both the local and remote PS.
`MaxNumPsp`	Integer	8	Maximum Number of Peer Signaling Processes.

CLI Example

```
1 :SS7[]>display M3UA[]
```

M3UA Timers

Name

`M3uaTimers`

Description

This entity contains all the Timer Profile parameters for the M3UA layer.

CLI Navigation

```
SS7[]> M3UA[]> M3uaTimers
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]> M3UA[]>display M3uaTimers[]
```

Operations Permitted

```
Display
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 157: M3uaTimers

Attribute	Value Range	Default	Description
`M3uaTimerProfileId`	Integer	1	Identifier of the M3UA Timer Profile.
`RestartTimerEnabled`	0 or 1 (bool)	1 (On)	Indicates whether or not the Restart hold-off timer is turned On.
`RestartTimer`	Integer (in seconds)	5	Restart hold-off timer. At the SG, this is the period that the M3UA waits to gather remote point code status information from the co-resident MTP3 after a restart. A value of**0** is permissible for this timer, in which case no hold-off is applied on restart.
`Mtp3StatusPollTimerEnabled`	0 or 1 (bool)	1 (On)	Indicates whether or not the MTP3 status poll timer is turned On.
`Mtp3StatusPollTimer`	Integer (in seconds)	5	MTP3 status poll timer. Period of the status poll timer used to poll the coresident MTP3 point codes status through the nodal interworking function

Attribute	Value Range	Default	Description
BeatIntervalTimerEnabled	0 or 1 (bool)	1 (On)	Indicates whether or not the M3UA heartbeat (BEAT) timer is turned On.
BeatIntervalTimer	Integer (in seconds)	30	M3UA heartbeat timer. If this timer is enabled, M3UA sends out**BEAT** messages to remote servers with the selected period, and expects**BEAT_ACK** messages in return. Similarly, M3UA expects**BEAT** messages from remote clients and responds with**BEAT_ACK**. In both cases, successive incoming**BEAT** or**BEAT_ACK** messages are expected to arrive within a minimum period of twice the timer value; otherwise, the remote peer is declared to be “down.”
RecoveryTimerEnabled	0 or 1 (bool)	1 (On)	Indicates whether or not the Recovery Timer is turned on.
RecoveryTimer	Integer (in seconds)	2	Timer T (r). Value is in seconds
AspUp1TimerEnabled	0 or 1 (bool)	1 (On)	Indicates whether or not the AspUp1 Timer is turned on.
AspUp1Timer	Integer (in seconds)	1	Initial period between ASPUP messages when attempting to bring up the path to the SGP (initiated from ASP) or to the IPSP peer node (for IPSP-IPSP communication). This period is used for**nmbAspUp1** tries.
AspUp2TimerEnabled	0 or 1 (bool)	1 (On)	Indicates whether or not the AspUp2 Timer is turned On.
AspUp2Timer	Integer (in seconds)	1	Steady state period between ASPUP messages when attempting to bring up the

Attribute	Value Range	Default	Description
			path to the SGP (initiated from ASP) or to the IPSP peer node (for IPSP-IPSP communication). This period is used after**nmbAspUp1** number of attempts
`AspDownTimerEnabled`	0 or 1 (bool)	1 (On)	Indicates whether or not the ASP Down Timer is turned On.
`AspDownTimer`	Integer (in seconds)	1	Period between ASPDN messages while attempting to bring down the path to the SGP (initiated from ASP) or to the IPSP peer node (for IPSP-IPSP communication).
`AspmTmoTimerEnabled`	0 or 1 (bool)	1 (On)	Indicates whether or not the ASPM timeout is turned On.
`AspmTmoTimer`	Integer (in seconds)	1	ASPM timeout. The time to wait after sending ASPAC or ASPIA before failing.
`DaudTimerEnabled`	0 or 1 (bool)	1 (On)	Indicates whether or not the Daud Timer is turned On.
`DaudTimer`	Integer (in seconds)	30	Period between the DAUD messages while auditing a destination state at ASP or at IPSP.
`DrkmTimerEnabled`	0 or 1 (bool)	0 (Off)	Indicates whether or not the Drkm Timer is turned On.
`DrkmTimer`	Integer (in seconds)	0	Time period between the DRKM (**REG REQ** and**DEREG REQ**) messages when registering or deregistering RKs from the ASP or IPSP. This period is used for the**maxNmbRkTry** number attempts. If**drkmSupp** is enabled, the value of this parameter should not be configured as zero.

Attribute	Value Range	Default	Description
SeqCtrlTimerEnabled	0 or 1 (bool)	0 (Off)	Indicates whether or not the Sequence Control Timer is turned On.
SeqCtrlTimer	Integer (in ms)	0	Sequence Control Timer. M3UA can distribute the traffic in the loadsharing mode on the multiple Active PSPs for a PS by distributing SLSs across those PSPs. If a PSP becomes unavailable (due to an association going down, or because of a DUNA message received from that PSP), the traffic is diverted to other PSPs in the loadsharing manner, after holding the traffic for**tmrSeqCntrl** time to avoid misequencing. Similarly, this timer is used to divert the traffic back onto a PSP when the PSP becomes available again. This timer must be enabled to use this time-controlled traffic diversion procedure. If enabled, a value of zero is not allowed.

CLI Example

```
SS7[]> M3UA[]>display M3UA[]
```

M3UA Operations

This section describes the operations that can be performed on the MTP3-User Adaptation Layer.

Status()

This operation allows you to view in which state each SIGTRAN element is, in the M3UA layer.

Command syntax:

```
SS7[]:M3UA[]>Status() Element=1; ElementId=1
```

- Value of Element (Name of Element) - Description

- 0 (STITGEN) - Status of the layer
- 1 (STITSID) - System ID (version and part number)
- 2 (STITNSAP) - Status of upper SAP
- 3 (STITADRTRAN) - Status of the address translation table
- 4 (STITAPC) - Status of the Point Code
- 5 (STITNWK) Status of a Network
- 6 (STITROUT) - Status of a Route
- 7 (STITPS) - Status of a peer server
- 8 (STITSCTSAP) - Status of a lower SAP
- 9 (STITPSP) - Status of the remote signaling process
- 10 (STITRK) - Status of the dynamically registered routing keys
- 11 (STITPSPRKID) - Status of the routing key registration requests sent to server PSP

- Value of ElementId
  - A defined PS, PSP, Network, SCTSAP, Route, or NSAP identifier

Statistics()

This operation allows you to view the statistics of the SS7 messages for each SIGTRAN element, in the M3UA layer. The Action attribute also allows you to choose if you wish to view the statistics of an element starting at 0 following a reset of the statistics (Action=0 ZEROST) or if you wish to view the statistics in a continuous manner following the previous statistics.

Command syntax:

```
SS7[]:M3UA[]> Statistics() Element =1 ; ElementId =1; Action=0
```

- Value of Element (Name of Element) - Description
  - 0(STITGEN) - General statistics
  - 1(STITNSAP): Upper MTP3 SAP of M3UA
  - 2(STITSCTSAP) - Lower MTP3 SAP of M3UA
  - 3(STITPSP) - Remote signaling process (ASP or SGP)
- Value of ElementId
  - A defined PSP, SCTSAP, or NSAP identifier.
  - Values of Action:
  - 0 ZEROST
  - 1 NOZEROST

Network Service Access Point (NSAP)

Name

NSAP

Description

NSAP (Network Service Access Point) defines the interface between the SCCP layer and the MTP3-User Adaptaion Layer (M3UA). One Network SAP is defined for each M3UA layer interface that the SCCP layer uses. Typically, the SCCP layer has only a single Network SAP. The Sigtran feature is supported only on the ITU-T network.

This table defines, displays, and modifies the slot on which the Sigtran network runs.

CLI Navigation

`SS7[]> M3UA[]> NSAP`

`SS7[]>M3UA[]>Route[]>NSAP`

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:M3UA[]> add NSAP [NSapId = integer; NetworkId=integer]
```

Operations Permitted

`Add, display, modify, delete`

Attributes and Values

Table 158: NSAP Mandatory Attributes

Attribute	Value Range	Default	Description
`NSapId`	Integer	N/A	The NSap instance that is connected to this SAP. Read only.
`NetworkId`	Integer	N/A	Numerical identification of the network used by the SAP.

CLI Example

```
:SS7[]:M3UA[]> add NSAP [NetworkId=2; NSapId = 1]
```

SCT Service Access Point (SCTSAP)

Name

`SCTSAP`

Description

The SCTSap (Service Access Point) stands for SCTP Sap and is used to configure the SCTSap user in the M3UA layer. This table is used to configure the M3UA with a SCTSap user on the slot on which it runs.

Note: A M3UA's SCT Sap should be created for all existing instance(s) of TUCL Sap.

CLI Navigation

```
SS7[]> M3UA[]> SCTSAP
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:M3UA[]>display SCTSAP [SctSapId = integer; ProviderId= integer;
StateInfo= string; Port=int]
```

Operations Permitted

Add, modify, display, delete.

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 159: SCTSAP Mandatory Attributes

Attribute	Value Range	Default	Description
SctSapId	integer	N/A	Numerical identification of the SCTSap (Service Access Point).
ProviderId	integer	N/A	Numerical identification of the SCTSap provider for this SCTSap user in the M3UA layer.
Port	Integer	2905	Port number on which the Tekelec ngHLR will accept SCTP associations from peer nodes. Its value range is: 0 to 65 535.

Table 160: SCTSAP Optional Attributes

Attribute	Value Range	Default	Description
StateInfo	Offline online bound end point open		This gives the information on the state of the TSap. • offline: When the Hlr service is stopped on a blade (slot), the TSap running on that blade is said to be in an offline state. • online : The state of the TSap is said to be online when the Hlr service is starting or when the Hlr service is up and running, but the TSap user is not bound. • bound: the TSaps are bound together. The bind() operation has been executed for the TSap user. • end point open: End point ready to establish association.

CLI Example

```
:SS7[]:M3UA[]> add SCTSAP [SctSapId = 1; ProviderId=1;Port=3003]
```

Local Addresses

Name

LocalAddresses

Description

This table is used to provision the Tekelec ngHLR with Local Addresses that will be used by SIGTRAN. The system supports multiple address configurations for the local address of each SCTP association. The M3UA SctSap has been changed to be able to allow the Network Operator to assign a sub-list of all the local multi-homing IP that will be used for a SCT Sap. Note that a minimum of two local IP addresses must be configured for multihoming to be functional.

CLI Navigation

```
SS7[]> M3UA> SCTSAP> LocalAddresses
```

CLI Inherited Attributes

`SapId`

CLI Command Syntax

```
SS7[]> M3UA[]> SCTSAP[SapId=int]> add LocalAddresses[IPAddress= IP
Address;Netmask= string; Description=string ]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 161: LocalAddresses Mandatory Attributes

Attribute	Value Range	Default	Description
`SS7SigtranLocalIpId`			Read-Only. This value is automatically generated by the system upon creation of a local IP address.
`IPAddress`	`String` (15)	N/A	Slot IP Address.
`Netmask`	`String` (15)	N/A	Netmask used with slot IP address.

Table 162: LocalAddresses Optional Attributes

Attribute	Value Range	Default	Description
`Description`	`String`	N/A	Description of the Local IP Address.
`StateInfo`	`Unbound` `bound`		This gives the information on the state of the local IP address. unbound: The local IP address has not been bound by the system's platform due to an error. bound: The local IP address is bound by the system's platform. When defining a local IP address, the system 's

Attribute	Value Range	Default	Description
			platform automatically binds the IP address.
SctSapId	integer	N/A	Numerical identification of the SCTSap (Service Access Point).

CLI Example:

```
1 :SS7[]> M3UA[]> SCTSAP[SapId=1]> add
LocalAddresses[IPAddress=192.168.135.100;Netmask=255.255.256.0]
```

Provider

Name

Provider

Description

This is a reference to the SCTSAP configured in the M3UA layer. For more information about this table, please refer to the previous section "".

CLI Navigation

SS7[]> M3UA[]> SCTSAP>Provider

CLI Example

```
1 :SS7[]:M3UA[]>SCTSAP [SctSapId=1] >display Provider []
```

SCTSAP Operations

The following section provides a description of the operations that can be performed with the SCTSap in the M3UA layer of the SIGTRAN feature.

Bind()

This operation allows you to manually create a relation between the SCTSap user in the M3UA layer and its TUCL Sap provider in the TUCL layer. This operation must be done once both the SCTSap are configured.

Command syntax:

```
SS7[]:M3UA[]:SCTSAP[SctSapId=1]> Bind()
```

Unbind()

This operation allows you to manually erase the relation between the SCTSap user in the M3UA layer and its TUCL Sap provider in the TUCL layer.

Note: This operation must be executed if you need to change anything in the configuration of the SCTSap user or provider.

Command syntax:

```
SS7[]:M3UA[]:SCTSAP[SctSapId=1]> Unbind()
```

OpenEndpoint()

This operation allows you to manually open the SCTP end point.

Note: This operation can be executed only if the SCTSap are already bound.

Command syntax:

```
SS7[]:M3UA[]:SCTSAP[SctSapId=1]> OpenEndpoint()
```

Remote Addresses

Name

```
RemoteAddresses
```

Description

This table is used to provision the Tekelec ngHLR with the remote IP addresses of the peer nodes with which the Tekelec ngHLR will communicate using SIGTRAN. It contains the list of the remote IP addresses.

The Tekelec ngHLR supports multiple incoming addresses from the peer as multi-homing addresses for each SCTP association. Through this entity, the Network Operator can assign a sub-list of all the remote multi-homing IP that will be used for a PSP.

CLI Navigation

```
SS7[]>M3UA>PSP>RemoteAddresses
```

CLI Inherited Attributes

```
PspId.
```

CLI Command Syntax

```
SS7[]> M3UA[]> PSP[PspId=int]> add RemoteAddresses[IPAddress= IP Address
Description=string; M3uaPrimaryIpAddress=0,1]
```

Operations Permitted

```
Add, display, modify, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 163: RemoteAddresses Mandatory Attributes

Attribute	Value Range	Default	Description
SS7SigtranRemoteIpId	integer	N/A	Read-Only. ID that is automatically generated by the system upon creation of a Remote IP Address. This uniquely identifies a Remote IP Address.
IPAddress	String (15)	N/A	IP Address of the peer node. **Note:** The first remote IP Address defined must be the primary address (IP address to use when connecting with the peer). **This means that the first IP address created must be set as 'Primary' before creating the remaining ones.**
M3uaPrimaryIpAddress	Bool 0,1	0	**This parameter indicates to the Tekelec ngHLR which IP address to use when connecting with the peer.** 0: not primary 1:primary IP address **When defining multiple remote IP addresses, one and only one remote IP address must be defined as the 'Primary' IP address (only one primary remote IP address must be defined for all PSP associations).**

Table 164: RemoteAddresses Optional Attributes

Attribute	Value Range	Default	Description
Description	String	N/A	Description of the Remote IP Address.
M3uaPspId			Read-Only. Numerical identification of the PSP in the M3UA layer for which this remote IP address is defined for.

CLI Example

```
1 :SS7[]> M3UA[]> PSP[PspId=1]> add RemoteAddresses[IPAddress=
192.168.20.100; M3uaPrimaryIpAddress=1]
```

Network

Name

Network

Description

This table identifies the network and defines the slot on which to run the SIGTRAN network.

CLI Navigation Examples

SS7[]>M3UA[]>Network

SS7[]>M3UA[]>PS[]>Network

SS7[]>M3UA[]>PSP[]>Network

SS7[]>M3UA[]>Route[]>Network

CLI Inherited Attributes

None.

CLI Command Syntax

SS7[]:M3UA[]> add Network [NetworkId=integer ; NetworkAppearance=integer]

SS7[]:M3UA[]>display Network[NetworkId= integer; StateInfo= offline, online]

Operations Permitted

Add, display, delete

Attributes and Values

Table 165: Network Mandatory Attributes

Attribute	Value Range	Default	Description
NetworkId	Integer	N/A	Numerical identification of the network. The Network Appearance identifies an SS7 network context for the purposes of logically separating the signaling traffic between the SG and the Application Server Processes over a common SCTP Association.

Attribute	Value Range	Default	Description
NetworkAppearance	Integer	0	List of network appearance values specific to the peer ID. This parameter is used in the network appearance field of the M3UA messages sent to the peer. **Note:** The HLR must be restarted every time the NetworkAppearance is changed.

Table 166: Network Optional Attributes

Attribute	Value Range	Default	Description
StateInfo	Offline Online	N/A	Read-Only. This is automatically set by the system. It indicates the state of the M3UA Network.

CLI Example

```
1 :SS7[]:M3UA[]> add Network [NetworkId = 1] ; NetworkAppearance = 10
```

Peer Server (PS)

Name

PS

Description

This table identifies the Peer Server (PS) on which to run the SIGTRAN network and defines the server as the local or remote PS for the Peer Server Process (PSP). This table is part of the M3UA table.

CLI Navigation

```
SS7[ ]> M3UA[ ]> PS
SS7[]>M3UA[ ]> Route[ ]> PS
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:M3UA[]>display PS[NetworkId= integer; M3uaPsId= integer;
M3uaPsType=0,1; RoutingContext=50; StateInfo= string]
```

Operations Permitted

`Add, display, modify, delete`

Attributes and Values

Table 167: PS Mandatory Attributes

Attribute	Value Range	Default	Description
`NetworkId`	Integer	N/A	Numerical identification of the Network in the M3UA layer
`M3uaPsId`	Integer	N/A	Numerical identification of the PS in the M3UA layer.
`M3uaPsType`	0,1	N/A	Type of PS. 0= Local; receives the messages. 1= Remote; sends the messages to the peer.
`RoutingContext`	Integer(2^{32})	N/A	Value that uniquely identifies the Routing Key, which determines the distribution of SS7 messages between the SGP and the Application Servers.

Table 168: PS Optional Attributes

Attribute	Value Range	Default	Description
`StateInfo`	offline online as-active as-inactive	N/A	This gives the information on the state of the PS. offline: the Tekelec ngHLR is stopped. online: the Hlr service is starting or when the Hlr service is up and running. as-active: the Tekelec ngHLR is ready to process signaling traffic. as-inactive: the Tekelec ngHLR is not ready to process signaling traffic.

CLI Example

```
1 :SS7[]:M3UA[]> add PS[NetworkId=1; M3uaPsId=2; M3uaPsType=0;
RoutingContext=1]
```

Peer Signaling Process (PSP)

Name

PSP

Description

The PSP (Peer Signalling Process) table defines the IP associations between the Tekelec ngHLR and the peer nodes for SIGTRAN communication.

CLI Navigation
SS7[]>M3UA[]>PSP

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:M3UA[]>display PSP[NetworkId= integer; RemoteAddressId= integer;
M3uaPspId= integer; M3uaPsId= integer; PspType=0,1,2; AssocType=0,1; ]
```

Operations Permitted

Add, display, modify, delete

Attributes and Values

Table 169: PSP Mandatory Attributes

Attribute	Value Range	Default	Description
NetworkId	integer	N/A	Numerical identification of the Sigtran network.
RemoteAddressId	integer		Numerical identification of the remote IP address.
M3uaPspId	integer		Numerical identification of the PSP in the M3UA layer.
M3uaPsId	Integer	N/A	Numerical identification of a remote PS.

Attribute	Value Range	Default	Description
PspType	1 (SGP) 2 (IPsP) 3 (IPsP2)	N/A	Type of remote peer used to communicate with the Tekelec ngHLR using SIGTRAN. IPsP is the standard IPsP mode as per RFC4666 where the server will send the ASP Active. IPsP2 is a similar way of Exchange than the ASP-SGP communication (5/1/1/1), where it is the client that will send the ASP Active.
AssocType	0 (Client) 1 (Server)	N/A	Type of IP Association used for SIGTRAN. 0= Tekelec ngHLR acts as client and initiates any external M3UA-related operation.* 1= Tekelec ngHLR acts as server; remote peer initiates M3UA-related operations and Tekelec ngHLR responds to peer. **Note:** Note that when the SGP type is selected as the PspType, the association type can only be *Client*.
NetworkAppIncl	0 or 1 (bool)		Network appearance flag. 1(On): The optional network appearance parameter is included when communicating with the remote peer. The network appearance is taken from the network configuration. Set this parameter to**TRUE** only if two M3UA peer nodes exchange messages belonging to different types of networks over the same**SCTP** association.

Attribute	Value Range	Default	Description
			Otherwise, all the messages received from a peer node can be assumed to be of a default network type.
RxTxAspId	0 (NONE) 1 (RX) 2 (TX) 3 (RXTX)		Receive-Transmit**ASP_ID** flag. At SG/IPSPs, this flag specifies whether**ASP_ID** is mandatory to be received in an ASPUP message. As per RFC 4666, it also specifies whether**ASP_ID** is mandatory to be received in the ASPUP Ack on the IPSP. **0 (NONE):** Signifies it is NOT mandatory to receive ASP Id in the ASP UP/ASP UP Ack message. **1 (RX):** Signifies it is MANDATORY to receive ASP Id in the ASP UP message on SGP/IPSP or in the ASP Up Ack message on the IPSP. **2 (TX):**Prompts to send own ASP Id specified in the**selfAspId** on the ASP/IPSP node in the ASPUP/ASPUP Ack message as applicable. **3 (RXTX):**Does the action as specified under both the values mentioned above.
SelfAspId	Integer		Self ASP ID. This value specifies the ID of the self ASP/IPSP node. At ASPs/IPSPs, this value is sent in the**ASP_ID** parameter of the ASPUP message towards SGP/IPSP or in the ASP UP Ack from the IPSP. This parameter is reconfigurable only in the ASP Down state.
`Port`	Integer (0 to 65 535)	N/A	Port number of the peer node from which and to which

Attribute	Value Range	Default	Description
			SIGTRAN traffic will be exchanged.

CLI Example

```
1 :SS7[]:M3UA[]> add PSP[NetworkId = 1; RemoteAddressId = 1; M3uaPspId =
1; PspType = 3; AssocType = 2]
```

PSP State

Name

PspState

Description

The PspState table indicates the status of the SCTP association and PSP state for each PSP. An entry is created in the table using the Establish Association and providing the SCT Sap identifier. This table is used to display the PSP StateInfo.

CLI Navigation

SS7[ ]>M3UA[ ]>PSP[ ]>PspState[ ]

CLI Inherited Attributes

M3uaPspId.

CLI Command Syntax

```
SS7[ ]:M3UA[ ]:PSP[M3uaPspId = 1]>display PspState[SctSapId = integer ;
StateInfo = string]
```

Operations Permitted

Display

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 170: PspState Mandatory Attributes

Attribute	Value Range	Default	Description
M3uaPspId	integer	N/A	Read-Only. Numerical identification of the Psp.
SctSapId	integer		Read-Only. Numerical identification of the SCT Sap. Only shown after you have

Attribute	Value Range	Default	Description
			established PSP association on the SctSapId.
StateInfo	• establish-association • terminate-association • asp-up • asp-down • asp-active • asp-inactive • inhibit • uninhibit		Read-Only. Only shown after you have established PSP association on the SctSapId. This gives the information on the state of the IP association. • establish-association: The connection is being established for this IP association • terminate-association: The connection is being terminated for this IP association. • asp-up: the Application Server process is being brought up • asp-down: the Application Server process is being brought down • asp-active: The Application Server process is ready to receive traffic. • asp-inactive: The Application Server process is being deactivated. • inhibit: the PSP Association is not available to carry traffic. • uninhibit: the PSP Association is available to carry traffic.

PSP Operations

Operations that can be performed with the PSP in the M3UA layer of the SIGTRAN feature.

The following section provides a description of the operations that can be performed with the PSP in the M3UA layer of the SIGTRAN feature.

EstablishAssociation()
This operation allows to manually establish the association between the Tekelec ngHLR and the remote peer (PSP).

Command syntax:

```
SS7[ ]:M3UA[ ]:PSP[M3uaPspId=1]> EstablishAssociation() SctSapId = Integer;
```

Performing this operation automatically adds an entry in the PspState [ ] entity.

Description of the PspState [] entity: The PspState table indicates the status of the SCTP association and PSP state for each PSP. An entry is created in the table using the Establish Association and providing the SCT Sap identifier. This table is used to display the PSP StateInfo.

Navigation: SS7[] —> M3UA[] —> PSP[] —> PspState[]

Inherited Attributes: M2uaPspId

Command syntax:

```
SS7[]:M3UA[]:PSP[M3uaPspId = 1]> display PspState[SctSapId = integer ;
StateInfo = string]
```

Operations permitted:

Attributes	Value Range	Default	Descriptions
M3uaPspId	integer	N/A	Read-Only. Numerical identification of the Psp.
SctSapId	integer		Read-Only. Numerical identification of the SCT Sap. Only shown after you have established PSP association on the SctSapId.
StateInfo	• establish-association • terminate-association • asp-up • asp-down • asp-active • asp-inactive • inhibit • uninhibit		Read-Only. Only shown after you have established PSP association on the SctSapId. This gives the information on the state of the IP association. • establish-association: The connection is being established for this IP association • terminate-association: The connection is being terminated for this IP association. • asp-up: the Application Server process is being brought up. asp-up: the Application Server process is being brought up. • asp-down: the Application Server process is being brought down • asp-active: The Application Server process is ready to receive traffic. • asp-inactive: The Application Server process is being deactivated. • inhibit: the PSP Association is not available to carry traffic. • uninhibit: the PSP Association is available to carry traffic.

TerminateAssociation()

This operation allows to manually terminate the association between the Tekelec ngHLR and the remote peer (PSP). Performing this operation deletes an entry in the StateInfo [] entity. For information on this entity, refer to the EstablishAssociation() operation, just above.

Command syntax:

```
SS7[]:M3UA[]:PSP[M3uaPspId=1]> TerminateAssociation() SctSapId = Integer;
```

Table 171: TerminateAssociation() Attributes

Attribute	Value Range	Default	Description
SctSapId	integer	N/A	Read-Only. Numerical identification of the SCT Sap.

AspUp()

This operation allows to manually indicate to the peer that the SIGTRAN applications are ready to receive traffic. Executing this operation indicates that the Application Server process is up.

Command syntax:

```
SS7[]:M3UA[]:PSP[M3uaPspId=1]> AspUp() SctSapId = Integer;
```

Table 172: AspUp() Attributes

Attribute	Value Range	Default	Description
SctSapId	integer	N/A	Read-Only. Numerical identification of the SCT Sap.

AspDown()

Executing this operation indicates that the Application Server process is down. This operation allows to manually indicate to the peer that the SIGTRAN applications are no longer ready to receive traffic.

Command syntax:

```
SS7[]:M3UA[]:PSP[M3uaPspId=1]> AspDown() SctSapId = Integer;
```

Table 173: AspDown() Attributes

Attribute	Value Range	Default	Description
SctSapId	integer	N/A	Read-Only. Numerical identification of the SCT Sap.

Inhibit()

This operation allows to manually make the PSP Association not available to carry traffic.

Command syntax:

```
SS7[]:M3UA[]:PSP[M3uaPspId=1]> Inhibit() SctSapId = Integer;
```

Table 174: Inhibit() Attributes

Attribute	Value Range	Default	Description
SctSapId	integer	N/A	Read-Only. Numerical identification of the SCT Sap.

Uninhibit()

This operation allows to manually make the PSP Association available to carry traffic.

Command syntax:

```
SS7[]:M3UA[]:PSP[M3uaPspId=1]> Uninhibit() SctSapId = Integer;
```

Table 175: Uninhibit() Attributes

Attribute	Value Range	Default	Description
SctSapId	integer	N/A	Read-Only. Numerical identification of the SCT Sap.

ActivateAsp()

This operation allows to manually activate the applications by activating the Application Server Process. This operation can only be done once the following operations have been executed: EstablishAssociation operation from the PSP and the AspUp operation from PSP.

Command syntax:

```
SS7[]:M3UA[]:PSP[M3uaPspId=1]> ActivateAsp() SctSapId = Integer;
```

Table 176: ActivateAsp() Attributes

Attribute	Value Range	Default	Description
SctSapId	integer	N/A	Read-Only. Numerical identification of the SCT Sap.

DeactivateAsp()

This operation allows to manually inactivate the applications by inactivating the Application Server Process.

Command syntax:

```
SS7[]:M3UA[]:PSP[M3uaPspId=1]> DeactivateAsp() SctSapId = Integer;
```

Table 177: DeactivateAsp() Attributes

Attribute	Value Range	Default	Description
SctSapId	integer	N/A	Read-Only. Numerical identification of the SCT Sap.

Route

Name

`Route`

Description

The M3UA Route specifies the destination signalling points that are accessible from the Signalling Point (SP) being configured. One route is required for each remote signalling point/network/cluster that is to be accessible from the SP being configured (DPC). Routes are used to route outgoing messages to the appropriate signalling IP associations. Each route is assigned to one IP association which may be used to reach that destination.

CLI Navigation

```
SS7[]> M3UA[]> Route
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:M3UA[]>display Route[NSapId = integer; DpcSignallingPoint = integer;
M3uaPsId=integer; M3uaRouteId=integer; StateInfo= string ]
```

Operations Permitted

`Add, modify, delete, display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 178: Route Mandatory Attributes

Attribute	Value Range	Default	Description
`NSapId`	integer	N/A	The ID of the M3UA NSap to which this Route is connected to.
`M3uaPsId`	integer	N/A	Numerical Identification of the PS used.
`M3uaRouteId`	integer	N/A	Numerical Identification of the Route used.
`DpcSignallingPoint`	integer	N/A	Destination Point Code (SignallingPoint ID).

Table 179: Route Optional Attributes

Attribute	Value Range	Default	Description
StateInfo	offline online	N/A	This gives the information on the state of the Route. offline: When the Hlr service is stopped on a blade (slot), the TSap running on that blade is said to be in an offline state. online : The state of the TSap is said to be online when the Hlr service is starting or when the Hlr service is up and running, but the TSap user is not bound.

CLI Example

```
1 :SS7[]:M3UA[]> add Route [NSapId = 1; DpcSignallingPoint= 1; M3uaPsId=1;
M3uaRouteId=1]
```

Signaling Connection Control Part (SCCP) configuration

SCCP

Name

SCCP

Description

Signalling Connection Control Part is defined in ITU-T Q.711-Q.716 and ANSI T1.112. The SCCP sits on top of MTP3 and M3UA in the SS7 protocol stack. The SCCP provides additional network layer functions to provide transfer of noncircuit-related signaling information, application management procedures, and alternative flexible methods of routing. This entity is used to manage the other SCCP entities. The alarm attributes for the SCCP layer can be accessed.

CLI Navigation
SS7[]> SCCP

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]>display SCCP[]
```

Operations Permitted

```
Modify, display
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 180: SCCP Mandatory Attributes

Attribute	Value Range	Default	Description
AlarmOn	0 or 1	1	Enable or disable alarm generation. Read only. 0 = disabled 1 = enabled
AuditSignal-ConnStateOn	0 or 1	0	Audit of Signalling Connection Status. 0 = disabled 1 = enabled

CLI Example:

```
1 :SS7[]>display SCCP[]
```

SCCP Operations

The following section provides a description of the operations that can be performed with the SCCP.

GetActiveSccpNSaps()

This operation will retrieve and display all active SCCP Network Service Access Points.

Command syntax:

```
SS7[]:SCCP[]> GetActiveSccpNSaps()
```

GetActiveSccpUSaps()

This operation will retrieve and display all active SCCP User Service Access Points.

Command syntax:

```
SS7[]:SCCP[]> GetActiveSccpUSaps()
```

Concerned Area

Name

ConcernedArea

Description

The ConcernedArea defines all the subsystems of the Point Code for which a SccpRoute is defined. A maximum of 5 Concerned Areas per Route can be added.

CLI Navigation
SS7[]>SCCP[]>SCCPRoute[]>ConcernedArea

CLI Inherited Attributes

SCCPRouteId

CLI Command Syntax

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = #]> add ConcernedArea [RemoteSSN =
0-255; ReplicatedMode = 1,3; ConcernedAreaStatus = 1,254]
```

Operations Permitted

Add, display, modify, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 181: ConcernedArea Mandatory Attributes

Attribute	Value Range	Default	Description
Concerned-AreaId	1 to 1275	N/A	The instance identifier of this entity. Read only. Generated by the Tekelec ngHLR.
RemoteSSN	0 to 255	N/A	Remote SubSystem Number.

Table 182: ConcernedArea Optional Attributes

Attribute	Value Range	Default	Description
SCCPRoute-Id	1 to 255	N/A	The Route to which this Concerned Area belongs to. Read only.

Attribute	Value Range	Default	Description
Replicated-Mode	1 (DOMINANT) or 3 (DOMINANT_ALTERNATE)	1	Mode of replicated subsystems. 1=DOMINANT Each backup node of the subsystem is assigned a unique priority. The subsystem configured on the route is the primary subsystem and is selected as the preferred subsystem when accessible. On failure of the preferred subsystem the next higher priority available backup node for the subsystem is selected as the preferred node. 3=DOMINANT_ALTERNATE This mode is significant only for *RouteVariant* ANS96 and for class 0 traffic. In this mode, class 0 traffic is prevented from reaching an accessible subsystem on congested node. For class 1 traffic, this mode is the same as DOMINANT mode. In this mode, each backup node of the subsystem is assigned a unique priority. The subsystem configured on the route is selected as the primary subsystem and is the preferred subsystem when accessible and the node is not congested. On failure of the preferred subsystem or congestion of the node hosting preferred subsystem, the next higher priority available and uncongested backup node of the subsystem is selected as the preferred node for the subsystem.
Concerned-AreaStatus	1 (ACC) or 254 (SNR)	1	Status of Concerned Area. ACC= Subsystem is accessible by default

Attribute	Value Range	Default	Description
			SNR= Subsystem normal routed - valid in ANSI and Bellcore networks only.

CLI Example

```
:SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = #]> add ConcernedArea [RemoteSSN =
8; ReplicatedMode = 1; ConcernedAreaStatus = 1]
```

Concerned Area Operations

The following section provides a description of the operations that can be performed with Concerned Area.

AddConcernedPC()

Add a Concerned Point Code to this RemoteSSN (Subsystem Number). Maximum of 2 Concerned Point Codes can be added. A SignallingPointId also must be specified to run this operation.

Command syntax:

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = 1]:ConcernedArea[ConcernedAreaId = 1]>
addConcernedPC() SignallingPointId = #
```

RemoveConcernedPC()

Remove a Concerned Point Code (PC) to this Remote SSN. A Signalling Point Id also must be specified to run this operation.

Command syntax:

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = 1]:ConcernedArea[ConcernedAreaId = 1]>
RemoveConcernedPC() SignallingPointId = #
```

GetConcernedPCs()

Retrieve and display the Concerned Point Codes for this specific RemoteSSN.

Command syntax:

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = 1]:ConcernedArea[ConcernedAreaId = 1]>
GetConcernedPCs()
```

AddBackupPC()

Add a Backup Point Code (PC) to this Remote SSN. Maximum of 5 Backup Point Codes can be added. The SignallingPointId of the SSN also must be specified to run this operation.

Command syntax:

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = 1]:ConcernedArea[ConcernedAreaId = 1]>
addBackupPC() SignallingPointId = #;
```

RemoveBackupPC()

Remove a Backup Point Code (PC) from this RemoteSSN. The SSN SignallingPointId must be specified to run this operation.

Command syntax:

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = 1]:ConcernedArea[ConcernedAreaId = 1]>
RemoveBackupPC() SignallingPointId = #;
```

GetBackupPCs()

Retrieve and display the list of Backup Point Codes.

Command syntax:

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = 1]:ConcernedArea[ConcernedAreaId = 1]>
GetBackupPCs()
```

Global Title Entry

Name

`GlobalTitleEntry`

Description

The SS7 SCCP layer supports global title translation, a feature which allows applications to address messages with a string of digits, such as a telephone number or a mobile identification number, and rely on the network configuration to route the message to the correct destination signaling point and subsystem. This can help isolate applications from changes in the network structure, such as when a particular network database is moved from one signaling point code to another. This feature is available for both applications accessing the SCCP layer directly and for applications using the SCCP layer indirectly through the TCAP layer. The SCCP layer can translate a global title into its final destination address (point code and subsystem number) or, more likely, into the address of a gateway STP. A gateway STP is typically an STP containing a global title translation capability which acts as the entry point to a network for all requests originating from outside the network. In either case, the global title digits may be carried through in the translated address for subsequent translation by the gateway STP or analysis by the destination application.

CLI Navigation
`SS7[]>SCCP[]>GlobalTitleEntry`

CLI Inherited Attributes

None

CLI Command Syntax

```
SS7[]:SCCP[]> add GlobalTitleEntry[ProtocolVariant = 1,2; Format = 0-4;
OddEven = 0,1; NatAdd = 0-5; TType = integer; NumPlan = 0-7,14; EncSch =
0-3; Digits = integer; NI=0,1; ActionType=1-7; Mode=1,2; NoCoupling=0,1;
NumEntity=1,2; ReplaceGT=0,1; SCCPAddressId=int]
```

Operations Permitted

`Add, delete, display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Table 183: GlobalTitleEntry Mandatory Attributes

Attribute	Value Range	Default	Description
`Protocol-Variant`	1 (ITU) or 2 (ANSI)	N/A	Protocol Variant of this entity.
`Format`	0 (FORMAT_0), 1 (FORMAT_1), 2 (FORMAT_2), 3 (FORMAT_3), 4 (FORMAT_4)	N/A	Global Title Format (Function format). Please refer to NOTE below. Read only.
`Mode`	1 (DOMINANT) 2 (LOADSHARE)	1	Mode of operation of SCCP entries. Applicable only in ITU96. Loadsharing among SCCP entities will be achieved on the basis of SLS for class 1 traffic and on round-robin fashion for class 0 traffic. Read only.
`Digits`	Maximum of 16	N/A	BCD Digits (Outgoing Address). The system deducts the 'StopDigit' by inferring from the length of the values specified by this new parameter.
`NI`	0(INTERNATIONAL) 1(NATIONAL)	N/A	This parameter indicates whether the GT address is National or International.
`ActionType`	1 (FIX), 2 (VAR_ASC), 3 (DES), 4 (CONST), 5 (GT_TO_PC), 6 (INSERT_PC),	N/A	Type of action. Read only. `Fix` = Use a fixed range of digits to perform GTT. `VAR_ASC` = Use variable number of digits in ascending order to perform GTT.

Attribute	Value Range	Default	Description
	7 (STRIP_PC)		DES = Use variable number of digits in descending order to perform GTT. CONST = Always translate the incoming GT to a fixed address. GT_TO_PC = Use digits in incoming GT as the point code for routing purposes. INSERT_PC = Insert PC in the beginning of GTAI - for Generic Numbering Plan. STRIP_PC = Strip off PC from the beginning of GTAI - for Generic Numbering Plan.
NoCoupling	0 or 1	N/A	Flag for no coupling of connection section. Read only. 0 = no coupling 1 = coupling
NumEntity	1 or 2	1	Number of SCCP entities. Valid only in ITU96. Loadsharing can be done between SCCP entities on the basis of SLS provided as input to GTT function. ITU96 = 2 All other versions = 1
ReplaceGT	0 or 1	N/A	Specify whether to replace the Global Title of the Outgoing SCCP Address with the Global Title of the Incoming SCCP Address. Read only. 0 = no 1 = yes
SCCPAddressId	1 to 255	N/A	SCCP address. Read only.

Table 184: GlobalTitleEntry Optional Attributes

Attribute	Value Range	Default	Description
`Global-Title-EntryId`	1 to 255	N/A	The instance identifier of this entity. Read only. Generated by the Tekelec ngHLR.
`EncSch`	0 (UNKNOWN), 1 (ODD), 2 (EVEN), 3 (NATIONAL_SPEC)	N/A	Encoding scheme. Read only. 0 = unknown 1 = BCD odd 2 = BCD even 3 = National Specific
`NatAdd`	0 (UNKNOWN), 1 (SUBSCRIBER), 3 (NATIONAL), 4 (INTERNATIONAL), 5 (RESERVED)	N/A	The Nature of Address. Read only.
`NumPlan`	0 (UNKNOWN), 1 (ISDN_TEL), 2 (GENERIC), 3 (DATA), 4 (TELEX), 5 (MARITIME_MOBILE), 6 (LAND_MOBILE), 7 (ISDN_MOBILE), 14 (NETWORK)	N/A	Numbering Plan. Read only. 2 = Generic numbering plan (ITU96). 14 = Private network or network specific numbering plan.
`OddEven`	0 (EVEN), 1 (ODD)	N/A	This parameter only applies for a GT Entry of FORMAT_1. It indicates whether the Global Title is odd or even in length. Read only.
`SCCPAddressId2`	1 to 255	0	SCCP address. Read only

Attribute	Value Range	Default	Description
TType	0 to 255	N/A	Translation Type. Read only.
TTypePres	0 or 1	0	Specified whether translation type is to be used for matching the GT. Read only.

The CCPU stack requires the following mandatory parameters according to the GT Format and Protocol variant.

- GT_FORMAT1 ANSI
  - TranslationType
  - NumberingPlan
  - EncodingScheme
- GT_FORMAT1 ITU
  - OddEven
  - NatureOfAddress
- GT_FORMAT2
  - TranslationType
- GT_FORMAT3
  - TranslationType
  - NumberingPlan
  - EncodingScheme
- GT_FORMAT4
  - TranslationType
  - NumberingPlan
  - EncodingScheme
  - NatureOfAddress

Note: Format is the equivalent of GTI (Global Title Indicator in the Address Indicator). See ITU-T Recommendation Q.713 Section 3.4.1.

8	7	6	5	4	3	2	1
Reserved for national use	Routing indicator	Global title indicator				SSN indicator	Point code indicator

Format	Bits 6 5 4 3	

0	0 0 0 0	no global title included
1	0 0 0 1	global title includes nature of address indicator only
2	0 0 1 0	global title includes translation type only (National Use only)
3	0 0 1 1 (ITU) 0 0 0 1 (ANSI)	global title includes translation type, numbering plan and encoding scheme
4	0 1 0 0	global title includes translation type, numbering plan, encoding scheme and nature of address indicator

CLI Example

```
1 :SS7[]:SCCP[]> add GlobalTitleEntry [ProtocolVariant = 2; Format = 2;
OddEven = 0; NatAdd = 0; TType = 10; NumPlan = 0; EncSch = 0; Digits =
156342; ActionType=1; Mode=1; NoCoupling=0; NumEntity=1; ReplaceGT=1;
SCCPAddressId=1]
```

SCCP Address

Name

`SCCPAddress`

Description

All SCCP connectionless data requests and connection establishment requests contain a mandatory called and calling party address (the calling address is optional for the connection request message). These addresses are passed to and from user applications via this class, which is a C++ object representation of the actual address passed in the SCCP protocol message. SCCP addresses can take several forms, containing various combinations of point code, subsystem number, and global title. The combination of the address and routing indicator constructed by applications (or received from the SS7 network) together with the SCCP configuration allow these messages to be routed to the correct destination or local application.

CLI Navigation

`SS7[]>SCCP[]>SCCPAddress`

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:SCCP[]> add SCCPAddress [DPC = 1-255; AddressPres = 0,1; SsfPres =
0,1; RtgInd = 0,1; PCInd = 0,1; SSNInd = 0,1; SSN = 1-255; HdrOpt = 0,1]
```

Operations Permitted

`Add, delete, display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 185: SCCPAddress Mandatory Attributes

Attribute	Value Range	Default	Description
`DPC`	1 to 255	N/A	Destination Point Code. Used if routing indicator is PC_SSN and Point Code indicator is set to true.
`SCCPAddressId`	1 to 255	N/A	The instance identifier of this entity. Read only. Generated by the Tekelec ngHLR.
`AddressPres`	0 or 1	0	Address is present. Read only. 0 = Present 1 = Not present
`SsfPres`	0 or 1	0	SubService Field is present. Read only. 0 = Present 1 = Not present
`RtgInd`	0 (GT), 1 (PCSSN)	0	Routing Indicator based on Global Title Translation or Point Code SubSystem Number. Read only.
`PCInd`	0 or 1	0	Point Code Indicator. Read only. 0 = Present 1 = Not Present
`SSNInd`	0 or 1	0	Presence of SubSystem Number Indicator. Read only. 0 = Present 1 = Not present
`SSN`	1 to 255	N/A	SubSystem Number. Used if routing indicator is Point Code Subsystem number (PC

Attribute	Value Range	Default	Description
			SSN) and if Subsystem number is present. **Note:** For the HLR-Proxy (used with the LTE-HSS application), the SSN of the SCCP addresses for the local routes must be defined exactly the same as the SSN of the TCAP Sap and of the GSM MAP Sap, as well as the same as the RoutingSubSystemNumber of the HLR Configuration (HlrConfig entity). Example, the HLR may have a SSN=6. In this case, make sure that the following is set to the same value '6' for the HLR-Proxy: SubSystemNumber in the TcapSap entity. SubSystemNumber for the GsmMapSap entity. RoutingSubSystemNumber for the HLR Configuration (HlrConfig entity).
`HdrOpt`	0 (DEF), 1 (NO_PC)	1	SCCP Header Point Code Option. Specifies SCCP header filling options. The user can specify whether the PC passed in the SccpAddress should be included in the SCCP message header. It is valid for outgoing message (SCCP to MTP3) for called and calling party address. Read only. 0 = always include the point code in the SCCP header. 1 = do not include the point code in the SCCP header.

CLI Example

```
1 :SS7[]:SCCP[]> add SCCPAddress [DPC = 1; AddressPres = 1; SsfPres = 0;
RtgInd = 0; PCInd = 1; SSNInd = 0; SSN = 0; HdrOpt = 1]
```

SCCP General Configuration

Name

SCCPGenCfg

Description

The SCCPGenCfg initializes the general configuration parameters like the values of various SCCP timers and threshold values that apply to the entire SCCP Layer.

CLI Navigation
SS7[]>SCCP[]>SCCPGenCfg

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:SCCP[]> modify SCCPGenCfg[SccpTimerProfileId = 1,2; NmbXudCb = integer;
NmbConn = integer; MngmtOn = 0,1; SogThresh = 1-10; MaxRstLvl = 0-8;
MaxRstSubLevel = 0-4; ConnThresh = 1-10; QueThresh = 1-10; ItThresh = 1-10]
```

Operations Permitted

Modify, display

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 186: SCCPGenCfg Mandatory Attributes

Attribute	Value Range	Default	Description
SccpTimer ProfileId	1 to 2	N/A	Timer definitions for the general configuration.

Table 187: SCCPGenCfg Optional Attributes

Attribute	Value Range	Default	Description
NmbXudCb	0 to 65535	N/A	Read only. Maximum number of control blocks used for reassembling segmented connectionless data.

Attribute	Value Range	Default	Description
NmbConn	0 to 65535	N/A	Read only. Maximum number of simultaneous connections.
MngmtOn	0 or 1	0	Management messages. 0 = enabled 1 = disabled
SogThresh	1 to 10	6	Subsystem Out-Of-Service (OOS) grant threshold. Threshold for granting coordinated state change.
MaxRstLvl	0 to 8	2	Maximum number of restriction levels.
MaxRstSubLevel	0 to 4	2	Maximum number of restriction sub-levels.
ConnThresh	1 to 10	2	Threshold for granting connections.
QueThresh	1 to 10	2	Threshold for queuing connection-oriented data message if it is outside the class 3 flow control window.
ItThresh	1 to 10	2	Inactivity send threshold is used to initiate audit of signaling connection status.

Example:

```
1 :SS7[]:SCCP[]> modify SCCPGenCfg[SccpTimerProfileId = 1; MngmtOn = 1;
SogThresh = 5; MaxRstLvl = 3; MaxRstSubLevel = 3; ConnThresh = 3; QueThresh
= 1; ItThresh = 1]
```

SCCP Network Service Access Point (NSAP)

Name

SCCPNSap

Description

The Signalling Connection Control Part (SCCP) Network Service Access Point (NSap) defines the interface between the SCCP layer and the MTP Layer 3. One Network Sap is defined for each MTP 3 layer interface that the SCCP layer uses. Typically the SCCP layer has only a single Network Sap. If a layer supports multiple protocol variants (ANSI and ITU-T) then the SCCP layer would have a separate network SAP for each variant.

CLI Navigation
`SS7[]>SCCP[]>SCCPNSap`

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:SCCP[]> add SCCPNSap[ProtocolVariant = 1,2; NSapType = integer;
NSapId=integer; SCCPTimerProfileId = 1,2; MsgLength = 0-272; SioPrioImpPres
= 0,1; HopCount = 1-15]
```

Operations Permitted

`Add, display, modify`

Note: Not all users (User Groups) are allowed to perform these operations.

Table 188: SCCPNSap Mandatory Attributes

Attribute	Value Range	Default	Description
`Protocol-Variant`	1 (ITU), 2 (ANSI)	N/A	Protocol variant used to provide service to the user part connected through this upper SAP. Read only.
`NSapType`	0 M3UA 1 MTP3	N/A	The type of the NSAP provider. The NSAP user has an NSAP provider of type MTP3 in the case where the MTP2 or SAAL protocols are used and the NSap user has an NSap provider of type M3UA in the case where the SIGTRAN feature is used.
`NSapId`	1	N/A	Identification of the NSAP used. Generated by the Tekelec ngHLR when the MTP3 NSAP or M3UA NSAP is created.
`SCCPTimer-ProfileId`	1 to 2	N/A	Read only. The identifier SccpTimerProfile instance from which the timers of this entity will be set.

Table 189: SCCPNSap Optional Attributes

Attribute	Value Range	Default	Description
`MsgLength`	0 to 272	256	Maximum message length delivered to service provider layer from this SAP.
`SioPrio-ImpPres`	0 or 1	N/A	Flag indicating if SIO (Service Information Octet) priority to importance mapping is supported.
`HopCount`	1 to 15	2	The originating end node sets the value of the SS7 hop counter to the maximum value (15 or less). Each time the relay function is invoked within an intermediate (relay) node, the SS7 hop counter is decremented. When the value reaches zero, the return or refusal procedures are invoked with reason "Hop counter violation". This is to prevent looping.

CLI Example

```
:SS7[]:SCCP[]> add SCCPNSap[ProtocolVariant = 2; NSapType = 1; SlotId=5;
NSapId=1; SCCPTimerProfileId = 1; MsgLength = 200; SioPrioImpPres = 1;
HopCount = 2]
```

SCCP NSAP Operations

The following section describes the operations that can be performed with the SCCP Network Service Access Point (NSAP).

AddSiPriority() SioPriority = #

This maps a Service Information Octet (SIO) priority to the importance of the message. A maximum of 4 SIO priorities can be added (0 = highest, 4 = lowest). A SioPriority must be specified.

Command syntax:

```
SS7[]:SCCP[]:SCCPNSap[SCCPNSapId = 1]> addSioPriority() SioPriority = 1
```

Remove SioPriority() SioPriority = #

Removing a SIO priority. A SioPriority (0-4) must be specified.

Command syntax:

```
SS7[]:SCCP[]:SCCPNSap[SCCPNSapId = 1]> RemoveSioPriority() SioPriority = 1
```

GetSioPriorities()

Returns the SIO priorities set for the SCCP SAP specified.

Command syntax:

```
SS7[]:SCCP[]:SCCPNSap[SCCPNSapId = 1]> GetSioPriorities()
```

Activate()

Activate the SCCP Network Service Access Point. This has the effect of binding the SCCP Layer with the MTP3 Layer or the M3UA layer, once the MTP3 or M3UA are activated and running, and then processing the SCCP messages. However, this operation can only be executed for the M3UA layer, since it is not a distributed layer.

Command syntax:

```
SS7[]:SCCP[]:SCCPNSap[SCCPNSapId = 1]> Activate()
```

Deactivate()

Deactivate the SCCP Network Service Access Point. This has the effect of unbinding the SCCP Layer with the MTP3 Layer or M3UA layer and then stop processing the SCCP messages. However, this operation can only be executed for the M3UA layer, since it is not a distributed layer.

Command syntax:

```
SS7[]:SCCP[]:SCCPNSap[SCCPNSapId = 1]> Deactivate()
```

SCCP Route

Name

`SCCPRoute`

Description

One route is defined for each destination signalling point that the SCCP Layer may route outgoing messages to. The route defines the destination point code of that signalling point and each subsystem (ConcernedArea) of interest at that signalling point as well as any backup point codes which replicate those subsystems.

CLI Navigation
`SS7[]>SCCP[]>SCCPRoute`

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:SCCP[]> add SCCPRoute[SCCPNSapId = 1; RouteVariant = 11-16; DPC =
1-255; RouteStatus = 1,4,8,16; ReplicatedMode = 1,3; PeerNwSupport = 1,254]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 190: SCCPRoute Mandatory Attributes

Attribute	Value Range	Default	Description
`SCCPNSapId`	1	N/A	SCCPNSap to which this route is associated. Read only.
`Route-Variant`	11 (ITU88), 12 (ITU92), 13 (ANS88), 14 (ANS92), 15 (ITU96), 16 (ANS96)	N/A	Route Variant.
`DPC`	1 to 255	N/A	Destination Point Code (SignallingPointID). Read only.

Table 191: SCCPRoute Optional Attributes

Attribute	Value Range	Default	Description
`SCCPRouteId`	1 to 255	N/A	The instance identifier of this entity. Read only. Generated by the Tekelec ngHLR.
`RouteStatus`	1 (SP_ONLINE), 4 (SP_TRANS), 8 (SP_ ADJACENT), 16 (SP_INS_CAPABLE)	1	Route Status bit mask. 1 = node online 4 = Translator node 8 = Adjacent node 16 = INS incapable node for BELL05
`Replicated-Mode`	1 (DOMINANT), 3 (DOMINANT_ALTERNATE)	1	Mode of replicated node (DPC). 1=DOMINANT

Attribute	Value Range	Default	Description
			Each backup node is assigned a unique priority. The node in this route is the primary node and is selected as the preferred node when accessible. On failure of the preferred node the next higher priority available backup node is selected as the preferred node. 3=DOMINANT_ALTERNATE This mode is significant only for RouteVariant ANS96 and for class 0 traffic. In this mode, class 0 traffic is prevented from reaching an accessible but congested node. For class 1 traffic, this mode is the same as DOMINANT mode. In this mode, each backup node is assigned a unique priority. The node configured on the route is selected as the primary node and is the preferred node when accessible and not congested. On failure or congestion of the preferred node, the next higher priority available and uncongested backup node is selected as the preferred node.
`PeerNw-Support`	1 (BROADBAND), 254 (NARROWBAND)	N/A	Flag indicating network support of the Peer SCCP on the route.

CLI Example

```
:SS7[]:SCCP[]> add SCCPRoute [SCCPNSapId = 1; RouteVariant = 16; DPC = 2;
RouteStatus = 1; ReplicatedMode = 1; PeerNwSupport = 254]
```

SCCP Route Operations

The following section provides a description of the operations that can be performed with SCCP Route.

AddBackupPC()

Add a Backup Signalling Point for the Destination Signalling Point (DPC). A maximum of 5 BackupPCs can be added per route. A Signalling Point Id must be specified.

Command syntax:

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = 1]> addBackupPC() SignallingPointId =
1
```

RemoveBackupPC()

Remove a Backup Signalling Point for the Destination SignallingPoint (DPC). A Signalling Point Id must be specified.

Command syntax:

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = 1]> RemoveBackupPC() SignallingPointId
= 1
```

GetBackupPCs()

Retrieves and displays the list of BackupPCs for the Destination Signalling Point (DPC).

Command syntax:

```
SS7[]:SCCP[]:SCCPRoute[SCCPRouteId = 1]> GetBackupPCs()
```

SCCP Timer Profile

Name

```
SccpTimerProfile
```

Description

The SccpTimerProfile is used to define the specified timers for the SCCP Layer.

When creating a new SCCPTimer, the OamTimerVal entities (Connect, Guard, IAR, IAS, Int, Reassembly, Release, RepeatRelease, Reset, CoordChg, IgnoreSST, RtgStatInfo, SST, RestartEnd, InterfaceBindEnquiry, StatusEnquiry, Attack, Decay, Congestion, and Freeze) will be automatically created. The minimum, maximum, and current values will be set to predefined values according to the Protocol Variant chosen (ITU Q.714 or ANSI T1.112.4). For detailed information on SCCP Timers, please refer to the following specifications: ITU Q.714 and ANSI T1.112.4.

CLI Navigation

```
SS7[]> SCCP[]> SccpTimerProfile
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:SCCP[]> add SCCPTimerProfile[ProtocolVariant = 1,2]
```

Operations Permitted

`Add, delete, display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 192: SccpTimerProfile Mandatory Attributes

Attribute	Value Range	Default	Description
`SccpTimer-ProfileId`	1 to 2	N/A	Read only. The instance identifier of this entity. Generated by the Tekelec ngHLR.
`Protocol-Variant`	1 (ITU), 2 (ANSI)	N/A	Protocol variant supported by SCCP layer. Read only.

Table 193: SccpTimerProfile Optional Attributes

Attribute	Value Range	Default	Description
`Connect`	ITU: 360,000-720,000 ms	540,000 ms	Connect timer. Waiting for connection confirm message.
	ANSI: 360,000-720,000 ms	540,000 ms	
`Guard`	ITU: 82,000,000-90,000,000 ms	86,000,000 ms	Guard timer. Waiting to resume normal procedure for temporary connection sections during the restart procedure.
	ANSI: 82,000,000-90,000,000 ms	86,000,000 ms	
`IAR`	ITU: 39,600,000-75,600,000 ms	62,600,000 ms	IAR timer. Waiting to receive a message on a connection section. This timer is reset when data is received. If the timer expires, the signalling connection is released.
	ANSI: 39,600,000-75,600,000 ms	62,600,000 ms	
`IAS`	ITU: 1,800,000-3,600,000 ms	2,400,000 ms	IAS timer. Delay to send an inactivity test message when no data is sent on a connection.
	ANSI: 1,800,000-3,600,000 ms	2,400,000 ms	
`Int`	ITU: 0-1,000 ms	500 ms	Int timer. Time to continue sending released messages

Attribute	Value Range	Default	Description
			after sending the second released message.
	ANSI: N/A	N/A	N/A
Reassembly	ITU: 10,000-20,000 ms	15,000 ms	Reassembly timer. Waiting to receive all the segments of the message.
	ANSI: 10,000-20,000 ms	15,000 ms	
Release	ITU: 10,000-20,000 ms	15,000 ms	Release timer. Waiting for release complete message.
	ANSI: 10,000-20,000 ms	15,000 ms	
Repeat-Release	ITU: 10,000-20,000 ms	15,000 ms	Repeat Release timer. Waiting for release complete message; or to repeat sending released message after the initial.
	ANSI: N/A	N/A	N/A
Reset	ITU: 10,000-20,000 ms	15,000 ms	Reset timer. Time to wait for the Reset Confirmation (RSC) message after sending a Reset Request (RSR) message.
	ANSI: 10,000-20,000 ms	15,000 ms	
CoordChg	ITU: N/A	N/A	N/A
	ANSI: 25,000-35,000 ms	30,000 ms	Out-of-service Grant Timer. Waiting for grant for subsystem to go out-of-service
IgnoreSST	ITU: N/A	N/A	N/A
	ANSI: 25,000-35,000 ms	30,000 ms	Ignore SST timer. Delay for subsystem between receiving grant to go out-of-service and actually going out of service.
RtgStatInfo	ITU: N/A	N/A	N/A
	ANSI: 25,000-35,000 ms	30,000 ms	Routing Stat Info timer. Delay between requests for subsystem routing status information.
SST	ITU: N/A	N/A	N/A
	ANSI: 25,000-35,000 ms	30,000 ms	Subsystem Status Test default timer. Time between sending SST messages to unavailable remote subsystem
RestartEnd	ITU: 0-35,000 ms	30,000 ms	Restart End Timer. Started when the restart begins status
	ANSI: 0-35,000 ms	30,000 ms	

Attribute	Value Range	Default	Description
			is received from MTP Level 3. Connections cannot be established while the timer is running.
Interface-BindEnquiry	ITU: 0-35,000 ms	5,000 ms	Interface timer to enquire about status of bind request.
	ANSI: 0-35,000 ms	5,000 ms	
Status-Enquiry	ITU: 0-35,000 ms	30,000 ms	Timer to enquire about status of Point Code at the MTP3 Layer.
	ANSI: 0-35,000 ms	30,000 ms	
Attack	ITU: 0-35,000 ms	10,000 ms	Attack Timer for traffic limitation procedures.
	ANSI: N/A	N/A	N/A
Decay	ITU: 0-35,000 ms	10,000 ms	Decay Timer for traffic limitation procedures.
	ANSI: N/A	N/A	N/A
Congestion	ITU: 0-35,000 ms	10,000 ms	Congestion Timer for SCCP congestion control procedures.
	ANSI: N/A	N/A	N/A
Freeze	ITU: 0-35,000 ms	1,000 ms	Default freeze timer. Timer to freeze a Source Local Reference (SLR) connection before reusing it.
	ANSI: 0-35,000 ms	1,000 ms	

CLI Example

```
1 :SS7[]:SCCP[]> add SCCPTimerProfile[ProtocolVariant = 1]
```

SCCP Timer Attributes

The attributes for each SCCP timer can be retrieved and displayed. The attributes are listed in the table below. The Minimum and Maximum values are defined according to the Protocol Variant (ITU or ANSI) that was selected. The Current value can be modified as long as it is between the Minimum and Maximum values.

Table 194: SCCPTimer Attributes

Attribute	Description
OAMTimerValId	Identifier of OAM Timer Value. Read only. Generated by the Tekelec ngHLR.
TimerId	Timer ID number from 301 to 320. Read only.

Attribute	Description
MinVal	Minimum Value of timer in milliseconds. Read only.
MaxVal	Maximum Value of timer in milliseconds. Read only.
CurrentVal	Current Value of timer in milliseconds.

CLI Navigation
SS7[]> Sccp[]> SccpTimerProfileId[]> specific Sccp timer

CLI Inherited Attributes

SccpTimerProfileId.

Command Syntax:
SS7[]:SCCP]:SccpTimerProfile[SccpTimerProfileId = #]> modify
SpecificTimerName[] CurrentVal = milliseconds

Operations Permitted

Modify, display

Note: Not all users (User Groups) are allowed to perform these operations.

Table 195: SCCPTimers Specific Timers

Specific Timer	OAMTimerValId	TimerId	Standard	MinVal (ms)	MaxVal (ms)	CurrentVal (ms)
Connect	1 to 2,000	301	ITU	360,000	720,000	540,000
			ANSI	360,000	720,000	540,000
Guard	1 to 2,000	302	ITU	82,000,000	90,000,000	86,000,000
			ANSI	82,000,000	90,000,000	86,000,000
IAR	1 to 2,000	303	ITU	39,600,000	75,600,000	62,600,000
			ANSI	39,600,000	75,600,000	62,600,000
IAS	1 to 2,000	304	ITU	1,800,000	3,600,000	2,400,000
			ANSI	1,800,000	3,600,000	2,400,000
Int	1 to 2,000	305	ITU	0	1,000	500
			ANSI	0	1,000	500
Reassembly	1 to 2,000	306	ITU	10,000	20,000	15,000
			ANSI	10,000	20,000	15,000

Specific Timer	OAMTimerValId	TimerId	Standard	MinVal (ms)	MaxVal (ms)	CurrentVal (ms)
Release	1 to 2,000	307	ITU	10,000	20,000	15,000
			ANSI	10,000	20,000	15,000
Repeat-Release	1 to 2,000	308	ITU	10,000	20,000	15,000
			ANSI	10,000	20,000	15,000
Reset	1 to 2,000	309	ITU	10,000	20,000	15,000
			ANSI	10,000	20,000	15,000
CoordChg	1 to 2,000	310	ITU	N/A	N/A	N/A
			ANSI	25,000	35,000	30,000
IgnoreSST	1 to 2,000	311	ITU	N/A	N/A	N/A
			ANSI	25,000	35,000	30,000
RtgStatInfo	1 to 2,000	312	ITU	N/A	N/A	N/A
			ANSI	25,000	35,000	30,000
SST	1 to 2,000	313	ITU	N/A	N/A	N/A
			ANSI	25,000	35,000	30,000
RestartEnd	1 to 2,000	314	ITU	0	35,000	30,000
			ANSI	0	35,000	30,000
Interface-BindEnquiry	1 to 2,000	315	ITU	0	35,000	5,000
			ANSI	0	35,000	5,000
Status-Enquiry	1 to 2,000	316	ITU	0	35,000	30,000
			ANSI	0	35,000	30,000
Attack	1 to 2,000	317	ITU	0	35,000	10,000
			ANSI	N/A	N/A	N/A
Deca	1 to 2,000	318	ITU	0	35,000	10,000
			ANSI	N/A	N/A	N/A
Congestion	1 to 2,000	319	ITU	0	35,000	10,000
			ANSI	N/A	N/A	N/A
Freeze	1 to 2,000	320	ITU	0	35,000	1,000
			ANSI	0	35,000	1,000

CLI Example

```
1 :SS7:SCCP[]:SccpTimerProfile[SccpTimerProfileId = #]> modify Connect[]
CurrentVal = 600000
```

SCCP Timer Profile Operation

The following operation can be performed with the SCCP Timer Profile.

GetAllTimers()

The Get All Timers operation will retrieve and display all the timer information for the SCCP. It will display the minimum, maximum, and current values of all the timers.

Command syntax:

```
SS7[]:SCCP[]:SccpTimerProfile[SccpTimerProfileId = 1]> GetAllTimers()
```

SCCP User Service Access Point (USAP)

Name

SCCPUSap

Description

SCCP User Service Access Point (USap) defines the interface between the user applications and the SCCP layer. One user SAP is defined for each application using the SCCP layer services. A user SAP is associated with a single subsystem number and protocol variant (ANSI or ITU-T). The user SAP lists any concerned point codes (nodes which must be notified of any change in the status of the application).

CLI Navigation

```
SS7[]> SCCP[]> SCCPUSap
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:SCCP[]> add SCCPUSap[SCCPNSapId = 1; TCAPSapId = 1-15]
```

Operations Permitted

Add, display, modify

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 196: SCCPUSap Mandatory Attributes

Attribute	Value Range	Default	Description
SccpUSapId	1 to 24	N/A	The instance identifier of this entity Read only. Generated by the Tekelec ngHLR.
SCCPNSapId	1	N/A	Specify the Network for which this USAP is being configured. Read only.

Table 197: SCCPUSap Optional Attributes

Attribute	Value Range	Default	Description
TCAPSapId	1 to 15	N/A	Upper User SAP (e.g., TCAPSap).
UserState	INS, OOS	N/A	State of the user. Read only. This state is changed on reception of the alarms: LSP_EVENT_USER_INS, LSP_EVENT_USER_OOS INS = Inservice OOS = Out Of Service Refreshed automatically by the Tekelec ngHLR.

CLI Example:

```
:SS7[]:SCCP[]> add SCCPUSap[SCCPNSapId = 1;TCAPSapId = 1]
```

SCCP User Service Access Point Operations

The following section provides a description of the operations that can be performed with the Signalling Connection Control Part User SAP.

AddConcernedPC()

Add a Concerned Point Code that must be notified of status change of this USAP. Maximum number of Concerned PC is 2. A Signalling Point Id must be specified.

Command syntax:

```
SS7[]:SCCP[]:SCCPUSap[SccpUSapId = 1]> addConcernedPC() SignallingPointId
= 1
```

RemoveConcernedPC()

Remove a Concerned Point Code. A Signalling Point Id must be specified.

Command syntax:

```
SS7[]:SCCP[]:SCCPUSap[SccpUSapId = 1]> RemoveConcernedPC() SignallingPointId
= 1
```

GetConcernedPCs()

Returns the list of ConcernedPC interested in the status change of this USAP.

Command syntax:

```
SS7[]:SCCP[]:SCCPUSap[SccpUSapId = 1]> GetConcernedPCs()
```

Transaction Capability Application Part Layer (TCAP) configuration

TCAP

Name

TCAP

Description

Transaction Capability Application Part Layer. The alarm attribute for the TCAP layer can be accessed.

CLI Navigation
SS7[]>TCAP

CLI Inherited Attributes

None.

CLI Command Syntax

```
:SS7[]>display TCAP[]
```

Operations Permitted

Modify, display

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 198: TCAP Mandatory Attributes

Attribute	Value Range	Default	Description
AlarmOn	0 or 1	1	Enable or disable alarm generation. 0 = disabled 1 = enabled

CLI Example

```
1 :SS7[]>display TCAP[]
```

TCAP SAP Operations

The following section provides a description of the operations that can be performed on TCAP SAPs.

DeleteAllUnusedDialogues()

This operation will delete all unused dialogue control blocks.

Audit Definition: This operation will run an audit on the TCAP SS7 Stack. Audits check the idle time (current time minus the time of the last modification) for each allocated control block, and the control block is deallocated if the idle time is more than the audit time. The control blocks may stay idle for a long time as a result of primitive/message loss. Subsequently, the dialogue control block will remain allocated forever.

Command syntax:

```
SS7[]:TCAP[]:TcapSap[TcapSapId = 1]> DeleteAllUnusedDialogues()
```

DeleteAllUnusedInvokes()

This operation will delete all unused invoke control blocks.

Audit Definition: This operation will run an audit on the TCAP SS7 Stack. Audits check the idle time (current time minus the time of the last modification) for each allocated control block, and the control block is deallocated if the idle time is more than the audit time. The control blocks may stay idle for a long time as a result of primitive/message loss. Subsequently, the dialogue control block will remain allocated forever.

Command syntax:

```
SS7[]:TCAP[]:TcapSap[TcapSapId = 1]> DeleteAllUnusedInvokes()
```

TCAP Timer Profile

Name

```
TcapTimerProfile
```

Description

The TcapTimerProfile is used to define the specified timers for the TCAP Protocol Layer. When creating a new TcapTimerProfile, the OamTimerVal entities (T1, T2, and TimerProviderConnection) will be automatically created and the minimum, maximum, and current values will be set to the predefined values according to the Protocol Variant chosen. Current values are set to default values.

CLI Navigation

`SS7[]>TCAP>TcapTimerProfile`

CLI Inherited Attributes

None.

CLI Command Syntax

```
SS7[]:TCAP[]> add TcapTimerProfileId[TcapProtocolVariant = 1-5,7]
```

Operations Permitted

`Add, delete, display.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 199: TcapTimerProfile Mandatory Attributes

Attribute	Value Range	Default	Description
`TcapProtocol-Variant`	1 (ITU88), 2 (ITU92), 3 (ANS88), 4 (ANS92), 5 (ANS96), 7 (ITU96)	N/A	Protocol variants supported by TCAP. The protocol variant selected will determine the timer default, minimum and maximum values.
`TcapTimer-ProfileId`	1 to 15	N/A	The identifier of the instance created for this TimerProfile. Read only. Generated by the Tekelec ngHLR.

Table 200: TcapTimerProfile Optional Attributes

Attribute	Value Range	Default	Description
`T1`	ITU: 0-720,000 ms	30,000 ms	Time to wait for a response to an invoke.
	ANSI: 0-720,000 ms	30,000 ms	

Attribute	Value Range	Default	Description
T2	ITU: 0-720,000 ms	30,000 ms	Time to wait for reject of a non-invoke component.
	ANSI: 0-720,000 ms	30,000 ms	
Timer-Provider-Connection	ITU: 0-720,000 ms	20,000 ms	This is used by TCAP provider to detect lost connections.
	ANSI: 0-720,000 ms	20,000 ms	

CLI Example

```
1 :SS7[]:TCAP[]> add TcapTimerProfile[TcapProtocolVariant=1]
```

TCAP Timer Attributes

The attributes for each TCAP timer can be retrieved and displayed. The attributes are listed in the table below. The Minimum and Maximum values are defined according to the Protocol Variant (ITU or ANSI) that was selected. The Current value can be modified as long as it is between the Minimum and Maximum values.

Table 201: TCAPTimer Attributes

Attribute	Description
OAMTimerValId	Identifier of OAM Timer Value. Read only. Generated by the Tekelec ngHLR.
TimerId	Timer ID number from 401 to 403. Read only.
MinVal	Minimum Value of timer in milliseconds. Read only.
MaxVal	Maximum Value of timer in milliseconds. Read only.
CurrentVal	Current Value of timer in milliseconds.

Navigation:

```
SS7[]> Tcap> TcapTimerProfile> specific Tcap timer
```

CLI Inherited Attributes

```
TcapTimerProfileId.
```

Command Syntax:

```
SS7[]:TCAP[]:TcapTimerProfile[TcapTimerProfileId = #]> modify SpecificTimer
[] CurrentVal = milliseconds
```

Operations Permitted

`Modify, display`

Note: Not all users (User Groups) are allowed to perform these operations. Please see Table 2-2 to know which ones have access to this entity and which operations they have permission to do.

Table 202: TCAPTimer Specific Timers

Specific Timer	OAMTimerValId	TimerId	Standard	MinVal (ms)	MaxVal (ms)	CurrentVal (ms)
T1	1 to 2,000	401	ITU	0	720,000	30,000
			ANSI	0	720,000	30,000
T2	1 to 2,000	402	ITU	0	720,000	30,000
			ANSI	0	720,000	30,000
Provider-Connection	1 to 2,000	403	ITU	0	720,000	20,000
			ANSI	0	720,000	20,000

CLI Example

```
1 :SS7[]:TCAP[]:TcapTimerProfile[TcapTimerProfileId = #]> modify T1[]
CurrentVal = 50000
```

TCAP Timer Profile Operation

The following section provides a description of the operation that can be performed on TCAP (Transaction Capabilities Application Part) Timer Profiles.

GetAllTimers()

The Get All Timers operation will retrieve and display all the timer information for the Tcap Timer Profile. It will display the minimum, maximum, and current values of all the timers.

Command syntax:

```
SS7[]:TCAP[]:TcapTimerProfile[TcapTimerProfileId = 1]> GetAllTimers()
```

Chapter 5

Session Initiation Protocol (SIP)

Topics:

- *SIP Server Configuration.....340*
- *SIP Security Configuration.....353*
- *SIP Registrar Configuration.....354*
- *SIP Redirect Server Configuration.....361*
- *SIP User Agent Configuration.....366*
- *SIP Operations.....373*

SIP Server Configuration

This chapter provides the entities required to configure the SIP functionalities:

- Server configuration:
  - SipServerConfig
  - SipServerIpConfig
  - Domain
  - AorDomain
  - SipServerTlsConfig
- Security
  - SecurityConfig
- Registrar
  - RegistrarConfig
  - SRegistrationBinding
- Redirect
  - RedirectConfig
- User Agent
  - SipUaConfig
  - SipUaRegisterConfig
  - SipUaPersistentConfig
  - SipUaRegistrationBinding
- SipTas
  - SipTasGt

Each entity provides parameters (attributes), navigation paths, syntax, and CLI example.

The mandatory attributes can take on different meanings, which are identified by referrring to these notes:

*

Note: These mandatory attributes that are the ones that need to be acknowledged or given by the operator at installation.

**

Note: These mandatory attributes need to be specified by the operator to proceed with the provisioning.

***

Note: These mandatory attributes are the ones that the system always compiles and thus that the operator will always be able to read.

SIP Server Configuration

Name

`SipServerConfig`

Description

To configure the SIP configuration parameters used at system startup.

CLI Navigation

`Sip[ ]> SipServer[ ] > SipServerConfig`

CLI Inherited Attributes

None

CLI Command Syntax

`Sip[] > SipServer[]> display SipServerConfig[]`

Operations Permitted

Display or Modify.

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 203: SipServerConfig Mandatory Attributes (Refer to *NOTE1)

Attribute Name	Type	Default	Description
`T1`	Small integer	500	It's the equivalent of T1 from RFC 3261 and it represents the initial retransmission interval.
`IsOptionsMethodAllowed`	0 or 1	0	This parameter specifies if Options method is allowed. 0 = Options method is not allowed. 1 = Options method is allowed. The SIP Server can answer to SIP OPTIONS messages and include its capabilities.
`IsAuthenticationEnabled`	0 or 1	0	This parameter specifies if Authentication is enabled. 0 = Authentication disabled.

Attribute Name	Type	Default	Description
			1 = Authentication enabled.
DnsServerList	String(255)	""	List of DNS (Domain Name System) servers which will be queried to translate domain names to A, SRV or NAPTR records. The DNS servers are comma separated. **Note:** DNS server configuration is currently not supported. All IP related configuration must use IP addresses.
IsRedirectServerEnabled	0 or 1	0	This parameter indicates if a SIP REDIRECT is issued or not as response to SIP INVITE. 0 = Redirect Server disabled. SIP REDIRECT is not issued. 1 = Redirect Server enabled. SIP REDIRECT is issued.
IsRegistrarEnabled	0 or 1	0	This parameter indicates if the incoming SIP REGISTER method is accepted or not. 0 = Registrar disabled. Incoming SIP REGISTER method is not accepted. 1 = Registrar enabled. Incoming SIP REGISTER method is accepted.
IsRegClientEnabled	0 or 1	0	Specifies if the Tekelec ngHLR sends or not SIP REGISTER to the external SIP Registrar based on GSM Location Update. 0 = The Tekelec ngHLR does not send SIP REGISTER to the external SIP Registrar. 1 = The Tekelec ngHLR sends SIP REGISTER to the external SIP Registrar.
IsLoadBalancingProxyEnabled	0,1	0	This parameter allows the operator to dynamically

Attribute Name	Type	Default	Description
			enable/disable the SIP-FMC scalability beyond 2 blades deployment. 0: the SIP-FMC scalability beyond 2 blades deployment is disabled. 1: the SIP-FMC scalability beyond 2 blades deployment is enabled. **Note:** This value can be dynamically modified during running time of the system, but the new value will only be used once all the HLR services (that run the SIP Server) are stopped and then started once again. Refer to the "Starting and Stopping services on a blade" section of the*SDM Monitoring, Maintaining, Troubleshooting – User Guide*.
`MaxLoadBalancingProxyCoreObjects`	0 to 10000	0	This parameter allows the operator to set the maximum of SIP INVITE messages (up to 10000) that can be simultaneously proxied by one single SIP Stack at one given moment. This allows dimensioning of the stack for the proxying of messages to other blades. The value configured for this parameter is added to the maximum number of Redirect clients. **Note:** The 2 values will be combined into a number of Proxy Core Objects shared for both functionalities). **Note:** : This value can be dynamically modified during running time of the system, but the new value will only be used once all the HLR services (that

Attribute Name	Type	Default	Description
			run the SIP Server) are stopped and then started once again. Refer to the "Starting and Stopping services on a blade" section of the*SDM Monitoring, Maintaining, Troubleshooting – User Guide*.
`ApplicationThreads`	Integer	16	Determines the number of threads used by its applications to send/receive and treat SIP messages.
`StackThreads`	integer	16	Determines the number of threads used by their respective SIP Stack to send/receive and treat SIP messages.
`T2`	integer	4000	It represents the maximum retransmission interval.
`T4`	integer	5000	It represents the Maximum duration a message will remain in the network.

CLI Example

```
Sip[]:SipServer[]:SipServerConfig[]> display
```

SIP Server IP Configuration

Name

`SipServerIpConfig`

Description

To configure the VIP addresses on the system for the SIP Server.

Note: SipUa and/or SipServer will not start if the IP addresses configured are not valid.

CLI Navigation

```
Sip[ ]> SipServer[ ] > SipServerIpConfig
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Sip[] > SipServer[] >display SipServerIpConfig[ShelfId=integer; SlotId=1-14;
IpAddress=IP Address; SipPort=integer ; SipsPort=integer;
IpAddressNetmask=string]
```

Operations Permitted

`Display, modify`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 204: SipServerIpConfig Mandatory Attributes (refer to *NOTE 1)

Attribute	Type	Default	Description
`ShelfId`	1 to 4294976295	N/A	Read only. The Shelf Id number assigned by system for the shelf on which the SIP application is enabled and for which you wish to configure a VIP address.
`SlotId`	1 to 14	N/A	Read only. Numerical identification of slot on the shelf. Identifies the slot for which you wish to configure a VIP address for the SIP application.

Table 205: SipServerIpConfig Optional Attributes

Attribute	Type	Default	Description
IpAddress	String (128) x.x.x.x	N/A	Sip server IP address. This parameter is dynamically configurable, which means that it can be edited during running-time.
SipPort	Int	5060	Sip server port number used for TCP and UDP. Its value range is: 0 to 65 535.
SipsPort	Int	5061	Sip server port number used for TLS. Its value range is: 0 to 65 535.
IpAddressNetmask	String(15)	N/A	Netmask used with the IP address.

CLI Example

```
Sip[]:SipServer[]:SipServerIpConfig[]>display
```

Domain

Name

`Domain`

Description

To configure the Domain parameters used at system startup.

To set up the 'SRI Router' functionality, the following SIP domains must be provisioned in the "Domain" entity before the SDM-HLR service is started:

1. Request-URI domain
2. TO URI domain

To allow this, multiple entries can be provisioned in this table. Simply add an entry (by clicking on the 'Add Domain' button beneath the Domain table) with the 'Request-URI domain' and then separately add another entry with the 'TO URI domain'.

If the SIP domain list is changed by the user, the Hlr service needs to be restarted.

CLI Navigation

```
Sip[ ]> SipServer[ ] > Domain
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Sip[ ]> SipServer[ ]>display Domain[Name = x.x.x.x or FQDN;
SipDomainId=integer]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 206: Domain Mandatory Attributes (refer to *NOTE 1)

Attribute	Type	Default	Description
Name	String (128) Fully qualified Domain Name Ex: x.x.x.x or blueslice.com	N/A	Fully qualified Domain Name. Resolvable address.

Attribute	Type	Default	Description
SipDomainId	integer	N/A	Read only. Numerical identification of the SIP Domain. This ID is generated automatically by the system and is for internal use only.

CLI Example

```
Sip[]:SipServer[]> modify Domain[] Name = 192.168.20.178
```

Address of Record (AoR) Domain

Name

`AorDomain`

Description

This entity allows to define domain names and associate them with an ID. The AddressOfRecord entity (used to provision an Address Of Record for a subscriber) refers to this table. Refer to the*SDM Subscriber Provisioning –Reference Manual* for more details on the AddressOfRecord entity.

CLI Navigation

`Sip[ ] > SipServer[ ] > AorDomain`

CLI Inherited Attributes

None

CLI Command Syntax

```
Sip[ ]> SipServer[ ]> add AorDomain[AorDomainName = x.x.x.x or FQDN;
AorDomainId=integer]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 207: AorDomain Mandatory Attributes (refer to *NOTE 1)

Attribute	Type	Default	Description
`AorDomainName`	String (128) Fully qualified Domain Name	N/A	Fully qualified Domain Name. Resolvable address.

Attribute	Type	Default	Description
	Ex: x.x.x.x or blueslice.com		
AorDomainId	integer	N/A	Numerical identification of the AOR Domain name.

CLI Example

```
Sip[]:SipServer[]> modify AorDomain[] AorDomainName = 192.168.20.178
```

SIP Server TLS Configuration

Name

SipServerTlsConfig

Description

This entity allows to display the TLS data configured by Tekelec at startup. The TLS Support is by default disabled and in order to change the activation status (enabled/disabled) or any TLS configuration data for that matter, you must call Tekelec *Customer Care Center* to make the change and if necessary restart the HLR service (only needed when modifying the value of the TlsSupport or TlsSessionMax parameters).

CLI Navigation

```
Sip[ ]> SipServer[ ] > SipServerTlsConfig
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Sip[ ]> SipServer[ ]>display SipServerTlsConfig[TlsCertIssuer=varchar;
TlsCertSubject=varchar; TlsCertificatePem =varchar;TlsPrivateKeyPem=varchar
; TlsPrivateKey=varchar ; TlsSupport= 0,1; TlsSessionMax=integer ]
```

Operations Permitted

Display

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 208: SipServerTlsConfig Mandatory Attributes (refer to *NOTE 1)

Attribute	Type	Default	Description
`TlsCertIssuer`	varchar(512)	N/A	Issuer of the Certificate: Name of the company that generated the certificate.
`TlsCertSubject`	varchar(512)	N/A	Subject that defines the use of the certificate (i.e. SIP over TLS)
`TlsCertificatePem`	varchar(4096)	'null'	Content of the PEM file that defines the Public key.
`TlsPrivateKeyPem`	varchar(4096)	'null'	Content of the PEM file that defines the Private key.
`TlsPrivateKey`	Provisioned, Unprovisioned	Provisioned	The value of this parameter is generated by the system and it indicates whether the private key has been provisioned or not.
`TlsSupport`	0 (TlsDisabled) 1 (TlsEnabled)	0 (TlsDisabled)	This parameter indicates whether the TLS Transport protocol is supported or not (enabled or disabled). **Note:** The support of TLS cannot be modified dynamically during running-time of the system, you must call Tekelec *Customer Care Center* to make the change and to then restart the Hlr service. 0 (TlsDisabled) 1 (TlsEnabled)
TlsSessionMax	integer	65 535	Maximum number of concurrent TLS connections. The maximum connections supported is 65 535. **Note:** This parameter's value cannot be modified dynamically during running-time of the system, you must call the Tekelec *Customer Care Center* to make

Attribute	Type	Default	Description
			the change and to then restart the HLR service.

CLI Example

```
Sip[]:SipServer[]>display SipServerTlsConfig[]
```

SIP TAS GT

Name

SipTasGt

Description

This entity allows to map the SIP registration binding to a TAS Gt address in the context of a 3rd party registration. In the context of the GSM/IMS Router functionality, where the subscriber is TAS-registered, the Tekelec ngHLR retrieves the TAS Gt address defined in this entity based on the subscriber's SIP registration bindings. The Tekelec ngHLR will send back this Gt address in the MAP response and set the Gt address in the SCCP Called Party Address.

WebCI Navigation

SIP ➤ SIP Tas

CLI Navigation

Sip[ ] > SipServer[ ] > SipTas[ ] > SipTasGt

CLI Inherited Attributes

None

CLI Command Syntax

Sip[ ]> SipServer[ ]> SipTas[ ]>add SipTasGt[TasId=integer; TasName=varchar; TasFqdn=varchar; Gt=varchar ; Tt=integer; OverrideTt= 0,1; Prefix= varchar; DefaultImsi=00000]

Operations Permitted

Add, display, modify, delete

Attributes and Values

Table 209: SipTasGt Mandatory Attributes

Attribute	Type	Default	Description
`TasId`	TINYINT	N/A	TAS identifier. This attribute is unique (primary key)
`TasName`	VARCHAR(64)	N/A	Descriptive name (used in GUI)
`TasFqdn`	VARCHAR(64)	N/A	TAS FQDN or IP address. This attribute is unique.
`Gt`	VARCHAR(15), 0-9 overdecadic digits A, B, C, D, E	N/A	Global Title of the TAS. **Note:** Global Title must be E.164 Overdecadic digits represent hexadecimal values and are encoded exactly as such.
`Tt`	TINYINT, 0-255	N/A	Translation Type
`OverrideTt`	BOOL (0,1)	N/A	Modifying Translation Type. 0: Do not change the Tt 1: Change the Tt
`Prefix`	Varchar 0-9 overdecadic digits A, B, C, D, E	Empty string	The prefix applies to the redirect mode for SRI messages only. It is used along with the MSISDN in order to make up the MSRN (Prefix+MSISDN) in the SRI-Ack message. **Note:** The prefix must be E.164. Overdecadic digits represent hexadecimal values and are encoded exactly as such.

Table 210: SipTasGt Optional Attributes

Attribute	Type/Range	Default	Description
`Prefix`	Varchar 0-9 overdecadic digits A, B, C, D, E	Empty string	The prefix applies to the redirect mode for SRI messages only. **Note:** The prefix must be E.164. Overdecadic digits represent hexadecimal values and are encoded exactly as such.
`DefaultImsi`	Varchar, 5 to 15	00000	IMSI returned by the Tekelec ngHLR in the MAP SRI/SRI-LCS/MT-SMS ACK message for the redirect mode. **Note:** When writing up the MT-SMS Ack message, the Tekelec ngHLR first checks if there is an IMSI provisioned in the IMSIForRedirectRouting table for the subscriber's MSISDN. If there is, the Tekelec ngHLR returns that provisioned IMSI in the MT-SMS Ack message instead of the defaultImsi. If there is no provisioned IMSI in the IMSIForRedirectRouting table, the Tekelec ngHLR returns the defaultImsi in the MT-SMS Ack message.

The SipTasGt entity contains a permanent entry. It cannot be updated or deleted. It is used by the Tekelec ngHLR for the default TasId. If the Subscriber is not found or the Subscriber is not SIP-registered and there is no routing template set, the Tt of the TasId 0 will be used. The Gt of TasId 0 is not used because only the Translation Type is changed in case of an Tekelec ngHLR error. The Network Operator can modify the value of the Translation Type for the default TasId 0.

Table 211: SipTasGT Permanent Entry

Tas Id	Tas Name	Tas Fqdn	Gt	Tt	Override Tt	Prefix	Default Imsi
0	Default		Not used	255	1	Not used	00000

CLI Example

```
Sip[]:SipServer[]>SipTas[]> add SipTasGt[TasId=1; TasName= TAS1;
TasFqdn=tas1.tekelec.com; Gt=15634110004 ; Tt=9; OverrideTt= 0; Prefix= 1;
DefaultImsi=00000]
```

SIP Security Configuration

SIP Security

Name

`SecurityConfig`

Description

To configure the Security parameters used at system startup.

Navigation

`Sip[ ] > SipServer[ ] > Security[ ] > SecurityConfig`

Inherited Attributes:

None

Command Syntax:

`Sip[ ]: SipServer[ ]:Security[ ] >display SecurityConfig[ ]`

Operations Permitted

`Display, modify`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 212: SecurityConfig Mandatory Attributes (refer to *NOTE 1)

Attribute	Type	Default	Description
NonceValidityDuration	Date and time	900	Validity period of a nonce in seconds.
NoncePrivateKey	String (64)	BluesliceNetworks	Private key used for generating the nonce.
GlobalRealm	String (128)	N/A	Name linked to user-password association.
GlobalQop	Auth or AuthInt or Auth,AuthInt	‘ ‘	The directive specifies the quality of the protection applied to the message. ‘ ‘ = Minimum level of protection.

Attribute	Type	Default	Description
			Auth = second level of protection: Authentication. AuthInt = third level of protection: Integrity and Authentication. Auth, AuthInt = One of these level of protection can be applied to the message.
DigestDomain	String (128) Fully qualified Domain Name Ex: x.x.x.x or blueslice.com	‘ ‘	Domain name sent in WWW-Authentication Header using Digest access authentication.
Opaque	String (32)	‘ ‘	Data string specified by the server and returned unchanged by the client.

CLI Example

```
Sip[]:SipServer[]:Security[]:SecurityConfig[]>display
```

SIP Registrar Configuration

Registrar Configuration

Name

RegistrarConfig

Description

To configure the Registrar Configuration parameters used at system startup.

CLI Navigation

```
Sip[ ] > SipServer[ ] > Registrar > RegistrarConfig
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Sip[ ] > SipServer[ ] >Registrar[ ] >display RegistrarConfig[ ]
```

Operations Permitted

```
Display, modify
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 213: RegistrarConfig Mandatory Attributes (refer to *NOTE 1)

Attribute	Type	Default	Description
MaxContactsPerAor	small int	10	It represents the maximum number of contacts in the RegistrationBinding for the same user. The user is identified by REGISTER TO URI.
MinRegistrationDuration	Unsigned int	3600	It represents the minimum expiration duration for a registered contact. Any register messages received with an "expires" value lower than the configured value will be rejected with 423 i.e. Interval Too Brief.
MaxRegistrationDuration	Unsigned int	7200	It represents the maximum expiration duration for a registered contact. Any register messages received with an "expires" value higher than the configured value, are stored in the system using the configured value.
DefaultRegistrationDuration	Unsigned int	3600	Default registration duration.
MaxRegClients	Unsigned int	3300	It represents the maximum number of REGISTER messages that can be handled simultaneously.
IsExpiryTimestampSet	Bool (0,1)	1	**This parameter allows to enable/disable the Expiry Timestamp.** **If this parameter is disabled (set to '0'), the expiry**

Attribute	Type	Default	Description
			timestamp will be set to "0". This means the registration binding will never expire (i.e. a re-registration is not required from the client, or main registrar). **If this parameter is enabled (set to '1'), the expiry timestamp will be set to the time when the binding will expire.** **Note:** The Expiry Timestamp cannot be disabled if the 'IsRegistrationCleanupEnabled' is enabled.
IsRegistrationCleanupEnabled	Bool (0,1)	0	This parameter allows to enable/disable the Registration cleanup. If this parameter is disabled (set to '0'), the RegistrationBinding cleanup is NOT performed. If this parameter is enabled (set to '1'), the RegistrationBinding cleanup is performed once a day at the time set in RegistrationBindingCleanupTime. **Note:** The Registration cleanup cannot be enabled if the 'IsExpiryTimestampSet' is disabled.
RegistrationBindingCleanupTime	VARCHAR(5)	00:00	This parameter indicates the GMT of the day the RegistrationBinding cleanup is performed.

Note: If 'IsRegistrationCleanupEnabled' is changed from "0" (disabled) to "1" (enabled), the first audit will be run at the time indicated in 'RegistrationBindingCleanupTime'. At this time, there may be Registration Bindings without a RegistrationExpiryTime (i.e. set to "0"). They will be removed by the audit.

CLI Example

```
Sip[]:SipServer[]:Registrar[]:RegistrarConfig[]>display
```

Registration Binding

Name

RegistrationBinding

Description

To view the system driven RegistrationBinding's parameters for a specific subscriber or for all subscribers. The system generates RegistrationBindings upon normal registration of SIP users (as per the 3GPP standards) and also upon 3rd party registrations from TAS nodes (The SIP Registrar allows third party registrations from TAS nodes with the 'SRI Router' feature).

CLI Navigation

```
Sip[ ]> SipServer[ ] > Registrar > RegistrationBinding
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Sip[ ]: SipServer[ ]:Registrar[]>display
RegistrationBinding[SubscriptionID=string; Scheme = sip or sips; User =
integer; AorDomainId=integer; Port = integer; DirectoryNumber= integer;
ContactUriScheme =0,1,2,3,4,5,6; ContactUriUser = string; ContactUriHost
=x.x.x.x, FQDN ; ContactUriPort =integer; ContactUriUriParameters
=OtherUriParameters; ContactUriAbsUriIdentifier =AbsoluteUri ; CallId
=string; Cseq =integer ; RegistrationExpiryTime =Date and Time ; Qvalue
=float; RegistrationPriority =integer ; TasId=integer; ActiveSubsTimestamp
=Date and Time]
```

Operations Permitted

```
Display
```

Note: Not all users (User Groups) are allowed to perform these operations.

Note: If in AddressOfRecord, the attribute ServiceAllowed = OperatorDisabled, then the RegistrationBinding is deleted.

Note: If the DirectoryNumber is updated/deleted in the AddressOfRecord, it is propagated to all applicable RegistrationBinding entries, if any.

Attributes and Values

Table 214: RegistrationBinding Mandatory Attributes (refer to ***NOTE 3)

Attribute Name	Value Range	Default	Description
SubscriptionID	string	N/A	Unique identifier of the subscription defined for a subscriber. This parameter must be specified if you wish to only display the RegistrationBindings of a specific subscriber. In the case where this parameter is not specified, the system may display the RegistrationBindings of various subscribers, depending on the other parameters specified when displaying the RegistrationBinding.
Scheme	1 (Sip) or 2 (Sips)	N/A	**Top level of the URI naming structure. (refer to *NOTE below)**
User	Alphanumeric with exceptions: ":" and ";" **Note:** to include a backslash in the user name, you need to double the quotes. (ex: if you want the user name to be: user\\name, you need to enter the following: user\\\\name.)	N/A	Part of the hierarchical part of the URI naming structure. (refer to***NOTE** below)
AorDomainId	integer	N/A	ID number configured in the AorDomain table (see SIP Redirect Server section of the SDM System Configuration-Reference Manual) for the AOR Domain Name that you wish to provision for this AOR.
Port	0 to 65 535	N/A	Part of the hierarchical part of the URI naming structure. (refer to***NOTE** below)

Attribute Name	Value Range	Default	Description
DirectoryNumber	Up to 15 alphanumberic characters Digits supported:0-9 Characters supported: ' *, #, a, b, c '	' '	The Tekelec ngHLR supports alphanumeric VoIP Directory Numbers (DN), as per the E164I GSM format. The E.164 Telephone number that exists in the SIP Domain and which is provisioned by the operator to whom the incoming calls will be redirected.
ContactUriScheme	(0) (1) sip (2) sips (3) tel (4) mailto (5) im (6) pres	0	Value of the Scheme of the Contact header in a Sip Register message. Not used for 3rd party registration.
ContactUriUser	String (64) with exceptions: ":" and ";"	""	Value of the User Info part of the Contact field in a Sip Register message. Not used for 3rd party registration.
ContactUriHost	String (128) IP ex: x.x.x.x or FQDN (Fully Qualified Domain Name)	""	Value of the Host Name part of the Contact header in a Sip Register message. Not used for 3rd party registration.
ContactUriPort	0 to 65 535 String(5)	""	Value of the Port part of the Contact field in a Sip Register message. Not used for 3rd party registration.
ContactUriUriParameters	transport user method	""	Value of the uri-parameters of the Contact field in a Sip Register message.

Attribute Name	Value Range	Default	Description
	ttl maddr lr other		Not used for 3rd party registration.
ContactUriAbsUriIdentifier	[Hierarchical-part] or [opaque-part] or a URI	""	Value of the Contact field in a Sip Register message. It is the absolute URI, which is a URI section equal to the hierarchical part or the opaque part.
CallId	String (255)	""	Value of the Call-id field in a Sip Register message. Uniquely identifies all registrations of a particular user agent client. Not used for 3rd party registration.
Cseq	0 - 65 535 (unsigned 16 bit integer)	""	Value of the Cseq field in a Sip Register message. This field contains a sequence number and the request method. Not used for 3rd party registration.
RegistrationExpiryTime	Date and Time <year>-<month>-<day> <hour>:<minutes>:<seconds> Example: 2011-03-14 19:41:07	0000-00-00 00:00:00	Date/Time this record must expire. When the RegistrarConfig's IsExpiryTimestampSet parameter is set to '1', the RegistrationExpiryTime indicates the time the registration gets expired. If the RegistrarConfig's IsExpiryTimestampSet parameter is set to '0', this parameter is set to 0000-00-00 00:00:00.
Qvalue	Float [0…1]	""	Value used for preferential registration. Preference order increases with Qvalue.

Attribute Name	Value Range	Default	Description
			Not used for 3rd party registration.
RegistrationPriority	Integer	1000	Qvalue times a thousand. Not used for 3rd party registration.
TasId	TinyInt	0	TAS identifier. Derived from the URI's host part of the 'FROM' header using the SipTasGt table. Set to "0" when a regular Register message is received (i.e. not a 3rd party registration).
ActiveSubsTimestamp	Date and Time <year>-<month>-<day> <hour>:<minutes>:<seconds> Example: 2011-03-14 19:41:07	CURRENT_TIMESTAMP	The timestamp the record was created or last updated.

Note: Internet standard STD 66 (also RFC 3986) defines the generic syntax to be used in all URI schemes. Every URI is defined as consisting of four parts, as follows: <scheme name> : <hierarchical part> [? <query>] [# <fragment>]

CLI Example that Displays All Registrations Bindings of All the Subscribers:

```
Sip[]:SipServer[]:Registrar[]>display RegistrationBinding[]
```

SIP Redirect Server Configuration

Redirect Configuration

Name

RedirectConfig

Description

To configure the SIP Redirect Server configuration parameters used at system startup.

CLI Navigation

```
Sip[ ]> SipServer[ ] > RedirectServer[ ] >RedirectConfig
```

CLI Inherited Attributes

None.

CLI Command Syntax

```
Sip[]:SipServer[]:RedirectServer[]>display
RedirectConfig[MaxRedirectClients=int;IsAdditionalInfoEnabled=0,1;IsGsmLocationInfoIncluded=0,1;
MaxPendingHlrRequests=int; MaxPendingHlrRequestsThreshold=0-100;
IsCamelInfoIncluded=0,1; IsDiversionHeaderIncluded=0,1;MsrnContactDomain =
varchar; MsrnContactExpires = unsigned integer;
IsVoipDnReverseSearchEnabled=0,1]
```

Operations Permitted

```
Display, modify
```

Note: Not all users (User Groups) are allowed to perform these operations. Please see *Table 8: Predefined access permissions to services per user group* to know which ones have access to this entity and which operations they have permission to do.

Attributes and Values

Table 215: RedirectConfig Mandatory Attributes (refer to ***NOTE 3)

Attribute Name	Value Range	Default	Description
MaxRedirectClients	integer	1000 transactions.	Read-Only. This parameter indicates to the SIP Redirect Server the maximum number of transactions that can be treated simultaneously for SIP Redirect Clients. This is a Stack dimensioning parameter.
IsAdditionalInfo Enabled	Bool 0,1	0	This parameter indicates to the ngHLR SIP Redirect Server whether or not a “Message Body” needs to be included in the 30x Response message. 1=On: A “Message Body” will be included in the 30x Response message and will contain the following additional information:

Attribute Name	Value Range	Default	Description
			• Timestamp: Field that provides the local system time when the SIP 30x message was generated. • ActiveImsi: Field that indicates current active IMSI for subscribers with Multi-IMSI feature activated. For subscribers without Multi-IMSI the value of ActiveImsi is the same as primary IMSI. 0=Off: The ngHLR sends the 30x Response message without any "Message Body", hence without any additional information. In this case, the 30x Response message will be as follows: SIP/2.0 302 Moved Temporarily From: <from details> To: <to details> Contact: <returned contact>
IsGsmLocationInfo Included	Bool 0,1	0	This parameter indicates to the ngHLR SIP Redirect Server whether or not to send, in addition to the Timestamp and ActiveImsi, the following subscriber information in the 30x Response 's "Message Body" : • VlrNumber : Field that indicates the VLR number from which last MAP-UpdLoc was received by Tekelec ngHLR for subscribers that are GSM attached. For subscribers that are not GSM attached, are not reachable, or have no GSM profile, the VlrNumber is zero. • SgsnNumber: Field that indicates the SGSN Number to which subscriber is attached for subscribers that are GPRS attached. For subscribers that are not GPRS attached, are not reachable, or have

Attribute Name	Value Range	Default	Description
			no GSM profile, the SgsnNumber is zero. **0=Off:** The ngHLR SIP Redirect Server doesn't send the VlrNumber and SgsnNumber information in the Message Body of the 30x Response. **1=On:** The Tekelec ngHLR SIP Redirect Server sends the VlrNumber and SgsnNumber information in the Message Body of the 30x Response.
`MaxPendingHlrRequests`	integer	100 000	Read-Only. Maximum number of pending Hlr requests supported by the system.
`MaxPendingHlr RequestsThreshold`	0-100 (%)	50	Threshold in percentage of the pending Hlr requests. When the threshold is reached, the following alarm is raised to notify the operator: Max PendingHlrRequestsThreshold Reached (Alarm Id:8043).
`IsCamelInfoIncluded`	Bool 0,1	0	`Indicates whether the SIP Redirection Server CAMEL information feature is enabled or not.` `0 (Off): This feature is disabled. The ngHLR never adds the CAMEL data in the 30x responses.` `1 (On): This feature is enabled. For the ngHLR to be able to add the CAMEL data in the 30x response, the IsAdditionalInfoEnabled parameter must also be set to 1 (On). In the case where these two parameters are enabled, the ngHLR returns a SIP INVITE response that includes the subscriber's CAMEL data in the case where the following conditions are met:` `-The Subscriber has CAMEL Data provisioned.`

Attribute Name	Value Range	Default	Description
			-The subscriber has T-CSI CAMEL services provisioned and active. -The subscriber has T-CSI Terminating Attempt Authorized provisioned.
IsDiversionHeader Included	Bool 0,1	0	This parameter allows the Network Operator to configure the Redirect Server to include or not a Diversion header in the 300 and 302 responses. 0 (Off): The Redirect Server doesn't include the Diversion header in the 300 and 302 messages. 1(On): the Redirect Server includes the Diversion header in the 30x message when it contains at least one GSM contact.
MsrnContactDomain	Varchar(128)	gateway. blueslice networks ims.test	Name of the Domain that the HLR sends in the contact header of the 302 Redirect response.
MsrnContactExpires	Uint 16	1	Expiry time (in seconds) associated with the contact.
IsVoipDnReverse SearchEnabled	Bool (0,1)	0 (disabled)	This parameter allows the Network Operator to enable/disable the Reverse Search the SIP Server performs in the case where the AOR is not found (see "VoIP DN allocation enhancements phase 1" section in SDM Product Description). 0 (Disabled): The SIP Server doesn't perform a Reverse Search in addition to its normal AOR search.

Attribute Name	Value Range	Default	Description
			1 (Enabled): The SIP Server performs an additional search in the AOR Directory Numbers when no AOR are found with the normal search.
IsSipRangeSupport Enabled	0,1	0	SIP support for AOR ranges feature activation flag.

CLI Example

```
Sip[]:SipServer[]:RedirectServer[]>display RedirectConfig []
```

SIP User Agent Configuration

SIP User Agent Configuration

Name

SipUaConfig

Description

To configure the SIP UA configuration parameters used at system startup.

CLI Navigation

```
Sip[ ]> SipServer > RegClient > SipUaConfig
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Sip[]: SipServer[]> RegClient[]>display SipUaConfig[]
```

Operations Permitted

Display

Attributes and Values

Table 216: SipUaConfig Mandatory Attributes

Attribute	Type	Default	Description
OutboundProxyIpAddress	String (128) x.x.x.x	N/A	IP Address of the Sip UA outbound proxy, which is a proxy that receives requests from a client, even though it may not be the server resolved by the Request-URI. Typically, a UA is manually configured with an outbound proxy, or can learn about one through auto-configuration protocols.
OutboundProxyPort	Uint 16	5060	Sip UA outbound proxy port number used for TCP or UDP.
MaxRegClients	Uint 16	2500	Maximum number of Register-Clients the Sip UA stack handles simultaneously.
ApplicationThreads	Integer	4	Determines the number of threads used by its applications to send/receive and treat SIP messages.
IsImsHeaderRequired	Bool 0 or 1	0	This parameter indicates whether or not the SIP UA needs to include IMS Headers in the REGISTER message. 0=Off: The SIP UA doesn't need to include IMS Headers in the REGISTER message. 1=On: The SIP UA needs to include IMS Headers in the REGISTER message.
IsUsernameSetInContactHeader	Bool 0 or 1	0	This parameter indicates whether or not the SIP UA needs to include the username in the Contact Header of the REGISTER message. 0=Off: The SIP UA doesn't need to include the username in the Contact header of the REGISTER message. 1=On: The SIP UA needs to include the username in the Contact header of the REGISTER message.
IsUsernamePhoneNumber	Bool 0 or 1	0	This parameter indicates whether or not the SIP UA needs to include a "user=phone" URI parameter in the Contact Header of the REGISTER message.

Attribute	Type	Default	Description
			0=Off: The SIP UA doesn't need to include a "user=phone" parameter in the Contact header of the REGISTER message. 1=On: The SIP UA needs to include a "user=phone" parameter in the Contact header of the REGISTER message.
IsPathHeaderRequired	Bool 0 or 1	0	This parameter indicates whether or not the SIP UA needs to include the Path Header in the REGISTER message. 0=Off: The SIP UA doesn't need to include the Path Header in the REGISTER message. 1=On: The SIP UA needs to include the Path Header in the REGISTER message. When the "IsPathHeaderRequired" parameter is set to "On", the "PathHeaderValue" parameter in the SipUaRegisterConfig entity is configured with the path value (in this case, the PathHeaderValue must absolutely be configured at system startup).
OutboundProxyTransport	1 UDP 2 TCP 3 TLS	2	Sip UA outbound proxy transport protocol used (TCP or UDP or TLS).

CLI Example

```
Sip[]:SipServer[]> RegClient[]>display SipUaConfig[]
```

SIP UA Register Configuration

Name

SipUaRegisterConfig

Description

To configure the SIP Register method's parameters defined at system startup.

CLI Navigation

```
Sip[ ]> SipServer > RegClient > SipUaRegisterConfig
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Sip[]: SipServer[]> RegClient[]>display SipUaRegisterConfig[]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 217: SipUaRegisterConfig Mandatory Attributes (refer to *NOTE 1)

Attribute Name	Type	Default	Description
`RequestUriScheme`	Sip or sips	‘’	Defines the Request-URI scheme of the REGISTER request issued by SipUa.
`RequestUriHost`	String (128) ex: x.x.x.x or FQDN (Fully Qualified Domain Name)	‘’	Defines the Request-URI host of the REGISTER request issued by the SipUa.
`FromScheme`	Sip or Sips	Sip	Defines the scheme of the From message-header of the REGISTER request issued by SipUa.
`FromUser`	String(64)	N/A	Defines the user of the From message-header of the REGISTER request issued by SipUa.
`FromHost`	String (128) ex: x.x.x.x or FQDN (Fully Qualified Domain Name)	N/A	Defines the host of the From message-header of the REGISTER request issued by SipUa.
`Expires`	Unsigned integer.	600 000	Defines the default value of the expired message-header / contact-param.
`OtherHeaderName`	String (64)	User-Agent	Used for the header-name of extension-header of the REGISTER request issued by SipUa. i.e. User-Agent.
`OtherHeaderValue`	String (128)	Blueslice GSM	Used for the header-value of extension-header of the

Attribute Name	Type	Default	Description
		Registration Agent	REGISTER request issued by SipUa.
RefreshTimeSlotDuration	Int	3000	Register refresh rate for a specific IMSI.
RefreshMargin	int	20	Margin,that represents a percentage of time of the RefreshTimeSlotDuration, used right before the Expiry time to give enough time for the register refresh to be completed.
IsThirdPartyRegistrationEnabled	0 or 1	0	Specifies if the SIP UA behaves like the Third Party Register or not. 0 = SIP UA does not behave like the Third Party Register. 1 = SIP UA behaves like the Third Party Register.
PathHeaderValue	String(128)	“”(empty string)	This parameter indicates the path value to be included in the Path header of the REGISTER message. This parameter is only used if the “IsPathHeaderRequired” parameter is set to “ON” (in SipUaConfiguration). Example value: Sip:*bgc@10.165.255.51*;lr

CLI Example

```
Sip[]: SipServer[]> RegClient[]>display SipUaRegisterConfig[]
```

SIP UA Persistent Contact

Name

SipUaPersistentContact

Description

To define the SIP contacts, more precisely their address bindings, that are sent in Register messages.

CLI Navigation

```
Sip[ ]> SipServer > RegClient > SipUaPersistentContact
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Sip[]: SipServer[]> RegClient[]>display SipUaPersistentContact[]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 218: SipUaPersistentContact Mandatory Attributes (refer to *NOTE 1)

Attribute	Type	Default	Description
`Host`	String (128)	N/A	The URI host of the provisioned contact.
`Scheme`	Sip or Sips	Sip	The URI scheme of the provisioned contact.
`User`	**Alphanumeric with exceptions: ":" and ";"** **Note:** to include a backslash in the user name, you need to double the quotes. (ex: if you want the user name to be: user\\name, you need to enter the following: user\\\\name.)	,,	The URI user of the provisioned contact.
`Port`	Unsigned 16 bit integer.	5060	The URI port of the provisioned contact.
`ContactType`	GSM or Other	GSM	Indicates if the provisioned contact is the mandatory one (Gsm type) or an optional one (Peristent type).

CLI Example

```
Sip[]: SipServer[]> RegClient[]>display SipUaPersistentContact[]
```

UA Registration Binding

Name

`SipUaRegistrationBinding`

Description

To view the system driven RegistrationBinding's parameters associated with the Sip User Agent. The display of SipUaRegBinding shows registration bindings between the SipUa and an external SIP Registrar. SipUa registration bindings are not persistent across a system restart. Therefore, after a restart, the SipUa registration bindings are empty.

CLI Navigation

```
Sip[ ]> SipServer > RegClient > SipUaRegistrationBinding
```

CLI Inherited Attributes

None.

CLI Command Syntax

Sip[]: SipServer[]> RegClient[]>`display SipUaRegistrationBinding[CanonicalUri = string ; RegistrationExpiryInterval =Date and Time ; FirstRegistrationTimestamp =Date and Time]`

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations. Please see Table 2-2 to know which ones have access to this entity and which operations they have permission to do.

Attributes and Values

Table 219: SipUaRegistrationBinding Mandatory Attributes

Mandatory Attributes (refer to ***NOTE3)			
Attribute	**Value Range**	**Default**	**Description**
`CanonicalUri`	SIP URI	N/A	The Tekelec ngHLR uses the basic canonical form of the request's ToUri for a lookup in the location store to retrieve matching contacts.

Table 220: SipUaRegistrationBinding Optional Attributes

Optional Attributes			
Attribute	**Value Range**	**Default**	**Description**
`Imsi`	5 to 15 digits	N/A	Unique identifier of the subscriber
`AuthUserName`	String (64)	N/A	Username used for the authentication.
`FirstRegistrationTimestamp`	Date and Time	‘’	The date and time the SIP UA first registered.
`RegistrationExpiryInterval`	0 to MAXINT32	‘’	The amount of time (seconds) this contact's registration remains valid with the SIP Registrar. RegistrationExpiryInterval = 0 indicates bindings that are no longer active and entries with RegistrationExpiryInterval > 0 indicate active registrations. When a SIP subscriber deregisters, SipUa registration bindings are marked as having a RegistrationExpiryInterval of 0 (i.e. deregistered) instead of being deleted.

CLI Example

```
Sip[]: SipServer[]> RegClient[]>display SipUaRegistrationBinding[]
```

SIP Operations

SipServerTracing provides operations to control Sip debug tracing output.The following section provides a description and the command syntax of the operations that can be performed on the SipServer through the SDM CLI. All the operations described below can be performed for the SipServer by following different command syntax.

EnableSipModuleTraceLevel()

This operation enables the trace level of SipServer modules. There are 4 different levels of traces (Info/Debug/Error/Alarm).

Command syntax:

```
Sip[]>SipServer[]> SipServerTracing[]>EnableSipModuleTraceLevel()
SipServerModule = 1;SipModuleTraceLevel = 1
```

- Where SipModuleTraceLevel can have the following values:

- 1 Info
- 2 Debug
- 3 Error
- 4 Alarm

- And, where SipServerModule can have the following values:
  - 1 Server
  - 2 Registrar
  - 3 Redirect
  - 4 Security
  - 5 Common
  - 6 RegClient

EnableSipStackTraceLevel()

This operation enables the trace level of SipStack modules. There are 4 levels of traces (Info/Warning/Error/Exception). The trace level can be enabled per module.

Command syntax for the SipServer:

```
Sip[]>SipServer[]> SipServerTracing[]>EnableSipStackTraceLevel()
SipStackModule = 10; SipStackModuleTraceLevel = 2
```

- Where SipStackModuleTraceLevel can have the following values:
  - 1 Info
  - 2 Warning
  - 3 Error
  - 4 Exception

- And, where SipStackModule can have the following values:
  - 1 SipServerMgr
  - 2 Policy
  - 3 SrvAuth
  - 4 RegServer
  - 5 ProxyList
  - 6 StackTransport
  - 7 CoreAPI
  - 8 StackSemaphore
  - 9 StackMutex
  - 10 StackLock
  - 11 StackMemory
  - 12 StackThread
  - 13 StackQueue
  - 14 StackSocket
  - 15 StackTls
  - 16 StackPortRange

DisableSipModuleTraceLevel()

This operation disables the trace level of the SipServer modules. By executing the command below, the trace levels can be disabled per module:

Command syntax for the SipServer:

```
Sip[]>SipServer[]> SipServerTracing[]>DisableSipModuleTraceLevel()
SipServerModule = 3;SipModuleTraceLevel = 4
```

- Where SipModuleTraceLevel can take the following values:
  - 1 Info
  - 2 Debug
  - 3 Error
  - 4 Alarm
- And, where SipServerModule can take the following values:
  - 1 Server
  - 2 Registrar
  - 3 Redirect
  - 4 Security
  - 5 Common
  - 6 RegClient

DisableSipStackTraceLevel

This operation disables the trace level of SipStack modules. The trace level can be disabled per module.

Command syntax for the SipServer:

```
Sip[]>SipServer[]> SipServerTracing[]>
DisableSipStackTraceLevel()SipStackModule = 1; SipStackModuleTraceLevel =
1
```

- Where SipStackModuleTraceLevel can take the following values:
  - 1 Info
  - 2 Warning
  - 3 Error
  - 4 Exception
- And, where SipStackModule can have the following values:
  - 1 SipServerMgr
  - 2 Policy
  - 3 SrvAuth
  - 4 RegServer
  - 5 ProxyList
  - 6 StackTransport
  - 7 CoreAPI
  - 8 StackSemaphore

- 9 StackMutex
- 10 StackLock
- 11 StackMemory
- 12 StackThread
- 13 StackQueue
- 14 StackSocket
- 15 StackTls
- 16 StackPortRange

DisplaySipTraceLevel()

The DisplaySipTraceLevel operation displays the SipServerModule and SipStackModule's trace levels.

Command syntax for the SipServer:

```
Sip[]>SipServer[]> SipServerTracing[]> DisplaySipTraceLevel()
```

```
Output:
                      Result 0                      |
-----------------------------------------------------
SipServerModule     Info   Debug  Error   Alarm    |
_____________________________________________________|
|
Server               Off    Off     On      On     |
Registrar            Off    Off     On      On     |
Redirect             Off    Off     On      On     |
Security             Off    Off     On      On     |
Common               Off    Off     On      On     |
RegClient            Off    Off     On      On     |
|
_____________________________________________________|
|
SipStackModule      Info  Warning Error Exception |
_____________________________________________________|
|
SipServerMgr         Off    Off     On      On     |
Policy               Off    Off     On      On     |
SrvAuth              Off    Off     On      On     |
RegServer            Off    Off     On      On     |
ProxyList            Off    Off     On      On     |
StackTransport       Off    Off     On      On     |
CoreAPI              Off    Off     On      On     |
StackSemaphore       Off    Off     On      On     |
StackMutex           Off    Off     On      On     |
StackLock            Off    Off     On      On     |
StackMemory          Off    Off     On      On     |
StackThread          Off    Off     On      On     |
StackQueue           Off    Off     On      On     |
StackSocket          Off    Off     On      On     |
StackTls             Off    Off     On      On     |
StackPortRange       Off    Off     On      On     |
```

DisableSipServerStack()

This operation has been implemented with the Handling of SS7 and SIP abnormal failure cases feature, in order to allow the SIP Client Application to react more accurately in the case where it communicates with two SDM systems working in a geo-redundant mode. This operation can be executed in the cases

where the SIP Client Application should route all the SIP transactions from the troubled site to the healthy site. When this operation is executed, the SIP Server performs the following:

Raises the Sip Server Stack Disabled critical alarm (alarmId: 8044) with the following Description SipServer - stack is Disabled, by OAM request received (manual operation)"

Answers to INVITE, OPTIONS and REGISTER valid SIP messages with “503 Service Unavailable”.

Note: The state established by this operations is not persistent.

Command syntax:

```
Sip[]:SipServer[]> DisableSipServerStack()
```

EnableSipServerStack()

This operation has been implemented with the Handling of SS7 and SIP abnormal failure cases feature and can be executed after the DisableSipServerStack () operation. When this operation is executed, the SIP Server performs the following:

Clears the SipServerStackDisabled alarm (alarmed:8044).

Answers to SIP INVITE, OPTIONS and REGISTER messages as per the usual (it no longer sends a 503 error code).

Command syntax:

```
Sip[]:SipServer[]> EnableSipServerStack()
```

LoadPEMFiles()

This operation has been implemented to allow the Network Operator to load a TLS certificate and private

```
key from the following well known PEM files onto the database:
/tmp/cacert.pem and /tmp/cakey.pem.
```

Note: In the current release, multiple certificates are not supported. Only one certificate and private key can be loaded.

```
At system startup, a certificate and a private key are provisioned and
stored by default in the well known /tmp/cacert.pem and /tmp/cakey.pem
files.

If the Network Operator chooses to use them, he must simply load them onto
the system by performing the LoadPEMFiles() operation. Otherwise, if the
Network Operator chooses to use another certificate or private key, he must
follow these steps:
```

1. Connect to the system’s active System Controller blade and store the certificate/private key onto the database’s well known PEM files: /tmp/cacert.pem and /tmp/cakey.pem.
2. Load the certificate/private key by performing the LoadPEMFiles() operation.

   Command syntax:

   ```
   Sip[]:SipServer[]:SipServerTlsConfig[]> LoadPEMFiles()
   ```

DisplayCertificate()

This operation allows the Network Operator to display the details of the TLS Certificate.

Command syntax:

```
Sip[]:SipServer[]:SipServerTlsConfig[]>DisplayCertificate()
```

Chapter 6

Home Subscriber Server (HSS)

Topics:

- *HSS Configuration.....380*
- *HSS Authentication Center (AuC).....386*
- *IMS-HSS Subscriber Profiles.....389*
- *IMS-HSS SPR.....395*
- *Shared Initial Filter Criteria.....409*
- *HSS Operations.....415*

This chapter provides details on the HSS CLI commands, operations, error notifications, and performance counts.

HSS Configuration

HSS Configuration

HSS Configuration

Name

`HssConfig`

Description

To provision the HSS configuration parameters used at system startup.

CLI Navigation
`Hss[]> HssConfig`

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]>display HssConfig [SlotId = integer; OriginatingRealm = string;
LocalFQDN = string; TCPTransport = 0,1; LocalTCPPort = integer; SCTPTransport
= 0,1; LocalSCTPPort = integer; HssHlrCommTmo= int; AutomaticPeerReconnect
= 0,1; FeatureEnabled=0,1]
```

Operations Permitted

display, modify (only the DeregistrationDefString attribute can be modified).

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 221: HssConfig Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 14	N/A	Read only. Numerical identification of slot on shelf. Identifies the slot that could be related to this alarm.

Table 222: HssConfig Optional Attributes

Attribute	Value Range	Default	Description
`Originating Realm`	String(100) (ex: blueslice.org)	originrealm.com	The Realm to which the HSS is belonging. Read-only attribute

Attribute	Value Range	Default	Description
LocalFQDN	FQDN (ex: oneHSS.blueslice.org)	localfdqn.com	Value used to uniquely identify the HSS node for purposes of duplicate connection and routing loop detection. Read-only attribute
TCPTransport	0 or 1	1	Enables or disables TCP transport. Read-only attribute 0 = disabled 1 = enabled
LocalTCPPort	Unsigned Integer (32)	3868	The TCP port on which the HSS will accept connections from diameter node on TCP transport. Read-only attribute.
SCTPTransport	0 or 1	1	Enables or disables SCTP transport. 0 = Disables SCTP transport. 1 = Enables SCTP transport.
LocalSCTPPort	Unsigned Integer (32)	3869	The SCTP port on which the HSS will accept connections from diameter node on SCTP transport. Read-only attribute.
Automatic Peer Reconnect	0 or 1	0	If the HSS has accepted a connection from the CSCF but there is a failure of the connection on the CSCF's side, the HSS will either try to reconnect with the CSCF automatically or not. 0 = No automatic reconnection 1 = Automatic reconnection
HssHlrCommTmo	Int (11)	5 seconds	This attribute is configured to delay sending the PNR from the SPR to the PCRF after a user profile has been modified. The delay, in seconds, ensures the PNR message contains the most up to date user profile data. This delay is dynamically configurable and can be changed while the HSS is running. If the value is set to 0 then the PNR is sent immediately after the user profile has been modified. By setting a delay before sending the PNR the possibility of the PNR containing invalid user profile data is reduced. The delay allows for the replication window between blades.

Attribute	Value Range	Default	Description
			Note: It is highly recommended that the value is not set to a value greater than 60 seconds. This is to avoid internal queuing that would affect system performance.
FeatureEnabled	0,1	0	To indicate if the HSS application is enabled or not. 0: HSS application is not enabled. 1: HSS application is enabled.
ShSubscribe NotifWatchdog period	integer	60	This is the timer that triggers every 60 seconds (by default) the verification of the expiry date of the Sh Subscription Notifications for each Application Server that have subscribed to by notified. The expired notifications are removed from the database. **Note:** This parameter is only configurable at installation of the system and is read-only during the running time of the system.

CLI Example

```
Hss[]>display HssConfig [SlotId = 5]
```

HSS Configuration TCP ListenAddress

Name

HssConfigTCPListenAddress

Description

To view the TCP IP address that accepts the connections.

CLI Navigation

```
Hss[]> HssConfig []> HssConfigTCPListenAddress
```

CLI Inherited Attributes

SlotId

CLI Command Syntax

```
Hss[]>HssConfig[SlotId = 5]>display HssConfigTCPListenAddress [SlotId =
integer; Address = IPAddress; Netmask=string]
```

Operations Permitted

`Add, Display`

Attributes and Values

Table 223: HssConfigTCPListenAddress Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 4294976295	N/A	Read only. Numerical identification of slot on shelf. Identifies the slot that could be related to this alarm.
`Address`	String (100) IPAddress or DNS resolvable name	N/A	Configured TCP address on which connection will be accepted. All local interfaces are configured to accept incoming connections.
`Netmask`	String(15)	N/A	Netmask used with slot IP address.

CLI Example

```
Hss[]> HssConfig[SlotId = 5]>display HssConfigTCPListenAddress [Address =
192.168.30.67]
```

HSS Configuration SCTP Listen Address

Name

`HssConfigSCTPListenAddress`

Description

To view the SCTP IP address that accepts the connections.

CLI Navigation

```
Hss[]> HssConfig []> HssConfigSCTPListenAddress
```

CLI Inherited Attributes

SlotId

CLI Command Syntax

```
Hss[]>HssConfig[SlotId = 5]>display HssConfigSCTPListenAddress [SlotId =
integer; Address = IPAddress; Netmask=string]
```

Operations Permitted

`Add, Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 224: HssConfigSCTPListenAddress Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 4294976295	N/A	Read only. Numerical identification of slot on shelf. Identifies the slot that could be related to this alarm.
`Address`	String (100) IPAddress or DNS resolvable name	N/A	Configured SCTP address on which connection will be accepted. All local interfaces are configured to accept incoming connections.
`Netmask`	String(15)	N/A	Netmask used with slot IP address.

CLI Example

```
Hss[]:HssConfig[SlotId = 5]>display HssConfigSCTPListenAddress [Address =
192.168.30.68]
```

HSS Configuration Destination Realm

Name

`HssConfigDestinationRealm`

Description

To provision the domains only from which the connections are accepted.

CLI Navigation

`Hss[]> HssConfig []> HssConfigDestinationRealm`

CLI Inherited Attributes

`SlotId`

CLI Command Syntax

```
Hss[]>HssConfig[SlotId = 5]>display HssConfigDestinationRealm [LocalRealm
= FQDN ]
```

Operations Permitted

`Add, display, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 225: HssConfigDestinationRealm Mandatory Attributes

Attribute	Value Range	Default	Description
LocalRealm	FQDN (ex:ims.blueslice.com)	N/A	Name of the Domain to which the HSS belongs to.

CLI Example

```
Hss[]>HssConfig[SlotId = 5]>display HssConfigDestinationRealm [LocalRealm
= ims.blueslice.com]
```

HSS Configuration Destination Hosts

Name

`HssConfigDestinationHosts`

Description

To provision the hosts only from which the connections are accepted.

CLI Navigation

`Hss[]> HssConfig []> HssConfigDestinationHosts`

CLI Inherited Attributes

SlotId

CLI Command Syntax

```
Hss[]>HssConfig[SlotId = 5]>display HssConfigDestinationHosts [LocalFQDN =
FQDN; SupportsSharedIfc=0,1]
```

Operations Permitted

`Add, display, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 226: HssConfigDestinationHosts Mandatory Attributes

Attribute	Value Range	Default	Description
`LocalFQDN`	FQDN (ex: hss.ims.blueslice.com)	N/A	Value used to uniquely identify the HSS node for purposes of duplicate connection and routing loop detection.

Table 227: HssConfigDestinationHosts Optional Attributes

Attribute	Value Range	Default	Description
`SupportsSharedIfc`	0 (Off) ,1 (On)	0 (Off)	Allows to configure the CSCF capable of handling Shared Initial Filter Criterias. It can be turned On or Off to signify the following: 0 (Off): The CSCF is not capable of handling Shared IFCs. 1 (On): The CSCF is capable of handling Shared IFCs.

CLI Example

```
Hss[]>HssConfig[SlotId = 5]>display HssConfigDestinationHosts [LocalFQDN =
hss.ims.blueslice.com]
```

HSS Authentication Center (AuC)

HSS Authentication Schema

Name

`HssAuthSchema`

Description

To provision the authentication centre with Authentication Schemas.

CLI Navigation

```
Hss[]> HssAuthSchema []
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]>display HssAuthSchema[AuthSchema = string]
```

Operations Permitted

```
Add, display, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 228: HssAuthSchema Mandatory Attributes

Attribute	Value Range	Default	Description
AuthSchema	String (100)	Digest-AKAv1-MD5	Used to encode the authentication parameters. The schemes supported are: “Digest”, "Digest-AKAv1-MD5", “Digest-MD5”, “HTTP_DIGEST_MD5”, “NASS-Bundled”, “NoSchema” and “Early-IMS-Security”.

CLI Example

```
1 :Hss[]> display HssAuthSchema[AuthSchema = Digest-AKAv1-MD5]
```

HSS Authentication Algorithm

Name

```
HssAucAlgorithm
```

Description

To provision the authentication algorithms.

CLI Navigation

```
Hss[]> HssAucAlgorithm []
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]>display HssAucAlgorithm[AuthSchema = string; AlgoName=text ;
HssOP=string; HssAmf=string ; SQNEncryption=0,1 ]
```

Operations Permitted

`Add, display, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 229: HssAucAlgorithm Mandatory Attributes

Attribute	Value Range	Default	Description
`AuthSchema`	String (100)	Digest-AKAv1-MD5	Used to encode the authentication parameters. The schemes supported are: “Digest”, "Digest-AKAv1-MD5", “Digest-MD5”, “HTTP_DIGEST_MD5” and “NASS-Bundled”, “NoSchema” and “Early-IMS-Security”.
`AlgoName`	up to 32 digits and/or letters.	N/A	Specify name of the authentication algorithm to be used by the HSS Authentication Center (AuC).

Table 230: HssAucAlogithm Optional Attributes

Attribute	Value Range	Default	Description
HssOP	Must be 32 digits and/or letters (a to f).	NULL	Operator variant for GSM Milenage algorithm.
HssAmf	2 bytes (16 bits)	0	Authentication Management field in the authentication vectors.
SQNEncryption	0,1	0	Determines whether or not the Sequence Number is to be encrypted or not. 0=SQN not to be encrypted 1=SQN to be encrypted

CLI Example

```
1 :Hss[]> display HssAucAlgorithm[AuthSchema =
Digest-AKAv1-MD5;AlgoName=GsmMilenage]
```

IMS-HSS Subscriber Profiles

HSS Charging Information

Name

`HssChargingInfo`

Description

To provision the charging information related to a subscriber.

CLI Navigation

`Hss[]> HssChargingInfo`

CLI Inherited Attributes

None

Command Syntax:

```
Hss[]>display HssChargingInfo [ChargingID = integer, PrimEventChargFunction
= Diameter URI, PrimChargCollectionFunction = Diameter
URI,SecEventChargFunction = Diameter URI, SecChargCollectionFunction =
Diameter URI]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 231: HssChargingInfo Mandatory Attributes

Attribute	Value Range	Default	Description
ChargingID	String (100)	N/A	Identifies the charging functions for an IMS user.

Table 232: HssChargingInfo Optional Attributes

Attribute	Value Range	Default	Description
PrimEventChargFunction	DiameterURI type	N/A	Identifies the Primary OCS Function node that performs on-line based charging.
PrimChargCollectionFunction	DiameterURI type	N/A	Identifies the primary Charging Collection Function node that provides off-line charging support for the IMS subscribers.
SecEventChargFunction	DiameterURI type	N/A	Identifies the Secondary OCS Charging Function node that performs on-line based charging.
SecChargCollectionFunction	DiameterURI type	N/A	Identifies the secondary Charging Collection Function node that provides off-line charging support for the IMS subscribers.

Note: DiameterURI type which must follow the URI syntax rules (refer to RFC 3588, sect.4.3):

`“aaa://” FQDN [port][transport][protocol]`

where

- FQDN = Fully qualified domain name
- Port = “:”1*DIGIT
- Transport = “;transport=” transport-protocol
- Transport-protocol = (“tcp”/”sctp”/”udp”)
- Protocol = “;protocol=” aaa-protocol
- aaa-protocol = ("diameter" / "radius" / "tacacs+")

(ex:`”aaa://” hostname.com:18131;transport=udp;protocol=radius`)

Note: A semicolon is used as a separator in the CLI. Therefore, if you wish to write a long format of DiameterURI type, such as:

```
PrimEventChargFunction: aaa://host.example1.com;transport=tcp
```

you have to enter it as follows in the CLI command:

```
PrimEventChargFunction: aaa://host.example1.com\;transport=tcp
```

You have to precede the semicolon with” \ ”.

CLI Example

```
1 :Hss[]> add HssChargingInfo [ChargingID =
ChargingID-1;PrimEventChargFunction=aaa://host.example1.com\;transport=tcp]
```

HSS SCSCF Server

Name

`HssScscfServer`

Description

To provision the name and capabilities of the S-CSCF server.

CLI Navigation

`Hss[]> HssScscfServer`

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]>display HssScscfServer [ServerCapabilitiesID = string; ServerName =
string; MandatoryCapability = integer; OptionalCapability = integer]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 233: HssScscfServer Mandatory Attributes

Attribute	Value Range	Default	Description
`ServerCapabilitiesID`	String (100) (ex: ServerCapabilitiesID-1)	N/A	Logical name to identify the server and its capabilities.

Table 234: HssScscfServer Optional Attributes

Attribute	Value Range	Default	Description
`Optional Capability`	Unsigned integer (32)	N/A	Contains the information to assist the I-CSCF in the selection of a S-CSCF. Each optional capability available in an individual operator's network shall be allocated a unique value.

Attribute	Value Range	Default	Description
ServerName	String (100) (ex: ScscfMontreal)	N/A	Name of the server.
MandatoryCapability	Unsigned integer (32)	N/A	Contains the information to assist the I-CSCF in the selection of a S-CSCF. Represents a single determined mandatory capability of an S-CSCF. Each mandatory capability available in an individual operator's network shall be allocated a unique value.

CLI Example

```
:Hss[]> display HssScscfServer [ServerCapabilitiesID =
ServerCapabilitiesID-1]
```

HSS Authorized Visited Networks

Name

HssAuthorizedVisitedNetworks

Description

To provision authorized visited network identifiers associated with the Public User Identity of IMS subscribers and their roaming profile.

CLI Navigation

```
Hss[]> HssAuthorizedVisitedNetworks
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]>display HssAuthorizedVisitedNetworks [RoamingProfileID = string;
NetworkIdentifier = Domain Name]
```

Operations Permitted

Add, display, modify, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 235: HssAuthorizedVisitedNetworks Mandatory Attributes

Attribute	Value Range	Default	Description
RoamingProfileID	String (100)	N/A	Logical name for an IMS user with a profile in the HSS to identify its roaming possibilities in the visited networks.
NetworkIdentifier	Domain Name or IP address format (ex:192.168.30.30)	N/A	An identifier that allows the home network to identify the Visited Network. This information element contains the domain name of the visited network.

CLI Example

```
1 :Hss[]>display HssAuthorizedVisitedNetworks[RoamingProfileID =
RoamingProfileID-1]
```

HSS AS Permission List

Name

HssASPermList

Description

To provision the operations the HSS allows the AS to make for every OriginHost and DataReference type.

CLI Navigation

```
Hss[]> HssASPermList []
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]>display HssASPermList[OriginHost = string; DataReference = 0,10-18;
PermissionList = 1-7]
```

Operations Permitted

Add, display, modify, delete

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 236: HssASPermList Mandatory Attributes

Attribute	Value Range	Default	Description
`OriginHost`	String (100) ex: x.x.x.x or FQDN (Fully Qualified Domain Name)	N/A	Information element that identifies the Application Server originator of the request and that is used to check the AS permission list.
`DataReference`	0 (RepositoryData) 10 (IMSPublicIdentity) 11 (IMSUserState) 12 (SCSCFName) 13 (InitialFilterCriteria) 14 (LocationInformation) 15 (UserState) 16 (ChargingInformation) 17 (MsIsdn) 18 (PSIActivation) 19 (DSAI) 20 (AliasesRepositoryData)	N/A	The Data-Reference AVP indicates the type of the requested user data in the operation UDR and SNR.
`PermissionList`	1 (Sh_Pull) 2 (Sh_Subs_Notif) 3 (Sh_Pull,Sh_Subs_Notif) 4 (Sh_Update) 5 (Sh_Pull, Sh_Update) 6 (Sh_Update,Sh_Subs_Notif) 7 (Sh_Pull, Sh_Update, Sh_Subs_Notif)	0	To manage whether an AS may request each element of Data-AVP with a specific command, the HSS shall maintain a list of AS permissions (the 'AS Permissions List'). AS permissions are identified by AS identity and Data Reference with the possible permissions associated with each Data Reference

CLI Example

```
1 :Hss[]> display HssASPermList[OriginHost = scscf4.ims.blueslice.com ;
DataReference = RepositoryData PermissionList=Sh_Pull]
```

IMS-HSS SPR

HSS SPR Service Indication List

Name

`HssSPRServiceIndList`

Description

This entity allows to define the Service Indications that are sent by the PCRF in the Sh messages. Defining Service Indications in this entity allows the following:

- The IMS-HSS to act as a true performant SPR by storing the data received from the PCRF in the SPR database, independently from all other IMS-HSS data.
- The Service Data to be encrypted in the SPR database.

Moreover, this entity allows to define the Service Indications that can be requested through the OAM (provisioning) and associate them with the Service Indications provided in the Sh messages.

At setup of the SPR functionality, the Tekelec *Customer Care Center* will load all Service Indications into the system.

Schema Hierarchy:
`Hss[]> HssSPRServiceIndList[]`

WebCI Navigation
HSS ➤ HSS System Features ➤ HssSPRServiceIndication

CLI Navigation
`Hss[]> HssSPRServiceIndList[]`

CLI Inherited Attributes

None

CLI Command Syntax
```
Hss[]> add HssSPRServiceIndList [ServiceIndication = string;
ProvisionedServiceIndication = string; PooledService = char ]
```

Operations Permitted

`Add, display, delete`

Attributes and Values

Table 237: HssSPRServiceIndList Mandatory Attributes

Attribute	Value Range	Default	Description
`Service Indication`	String (max 100 characters)	N/A	Chain of characters that defines a specific Service Indication that is sent by the PCRF in the Sh messages. The data received in the Sh messages for this ServiceIndication will be stored in the SPR database. The list of available SPR Service Indications includes: • CamiantDynamicQuotaData • CamiantPoolData • CamiantPoolDynamicQuotaData • CamiantPoolQuotaData • CamiantPoolStateData • CamiantQuotaData • CamiantStateData • CamiantUserData

Table 238: HssSPRServiceIndList Optional Attributes

Attribute	Value Range	Default	Description
`Provisioned Service Indication`	String (max 100 characters)	N/A	Chain of characters that defines the Service Indications requested through the OAM (provisioning). Defining a Provisioned Service Indication for a specific Service Indication creates an association between the two and allows the IMS-HSS to answer to an OAM request with the data stored for the associated Service Indication, as per received in the Sh message. Basically, when a request coming from the provisioning interface is received, and if the given ServiceIndication (e.g., *CamiantDynamicQuotaData*) is provisioned into the ProvisionedServiceIndication attribute (e.g., as *DynamicQuota*), the data will be stored in the SPR database with the corresponding ServiceIndication (*CamiantDynamicQuotaData*). The list of available SPR Provisioned Service Indications includes: • DynamicQuota • Pool • PoolDynamicQuota

Attribute	Value Range	Default	Description
			• PoolQuota • PoolState • quota • state • CamiantUserData
PooledService	0, 1	N/A	Defines whether the service indication is added to a regular service indication or to a Pooled Service Indication. 0=No, 1=Yes

CLI Example

```
Hss[]>display HssSPRServiceIndList[]
```

```
Hss[]>add HssSPRServiceIndList [ServiceIndication = CamiantDynamicQuota;
ProvisionedServiceIndication = dynamicquota; PooledService = 1]
```

HSS SPR Configuration

Name

`HssSPRConfig`

Description

This entity allows the Network Operator to perform the following tasks:

- Turn On/Off dynamically the *SPR PUR Auto-Enrollment* feature (`PURAutoEnrollment`). This feature is for Sh Auto-Enrollment and is used when the subscriber profiles are initially stored outside of the SPR. For more details on the *SPR PUR Auto-Enrollment* feature, refer to the *SDM Product Description*'s *SPR Diameter Sh Auto-Enrollment* section.
- Set dynamically the compression level the IMS-HSS must use when storing the service data in the SPR database (`SPRRepDataCompression Level`).
- Turn On/Off dynamically the *SPR XML Auto-Enrollment* feature (`XMLAutoEnrollment`). This feature is for XMLREST/XML/SOAP Auto_Enrollment and is used when the subscriber profiles are initially stored outside of the SPR. For more details on the *XML Auto-Enrollment* feature, refer to the *SDM Product Description*'s *SPR XML-REST/XML/SOAP Auto-Enrollment* section.
- Turn On/Off dynamically the *SPR SNR Auto-Enrollment* feature (`SNRAutoEnrollment`). This feature is used when the SNR is received and the subscriber profile is stored outside of the SPR. For more details on the *SPR SNR Auto-Enrollment* feature, refer to the *SDM Product Description*'s *SPR Auto-Enrollment on SNR* section.
- Turn On/Off dynamically the *SPR DB Cleanup of Auto-Enrolled Profiles* feature (`AutoEnrollmentCleanup`). This feature provides a mechanism for the SPR to manage auto-enrolled subscribers by automatically removing these subscribers from the database when these subscribers become inactive or upon reception of an unsubscribe message.

  The following attributes can be set to customize the automation of the *SPR DB Cleanup of Auto-Enrolled Profiles* feature:

  - `TimeoutOfAuto EnrolledProfile` - defines time (days) policies can remain inactive.
  - `PeriodicCheckStart Time` - defines time of day check is run.
  - `CheckingPeriod` - defines interval.

  For more details on the *SPR DB Cleanup of Auto-Enrolled Profiles* feature, refer to the *SDM Product Description*'s *SPR DB Cleanup of Auto-Enrolled Profiles* section.
- Configure internal receive queue with the number of requests that can be received and processed by the HSS (`ReceivedMessageQueueSize`). Requires service restart.
- Receive accurate responses when performing sequential write/read/write (e.g., PUT/GET/PUT) requests for the same subscriber (`ForceReadOnMaster`). Requires service restart.
- Configure SPR parameters to improve HTTP and XML-REST request processing related to compatibility issues, user errors, or customer-specific provisioning systems. Each parameter requires service restart.

  - `MNCCodeLength`
  - `HttpChunkedTimeout`
  - `HttpDisablePlus`
  - `HttpDoubleEncoding`
  - `HttpEscaping`
  - `RESTCDataSectionEscaped`
  - `RESTIgnoreAcceptHeader`
  - `RESTIgnoreContentType`
  - `RESTIgnoreOpaqueDataMismatchName`
  - `RESTIgnoreUnknownBody`
  - `RESTTransactionCommitTimeout`
  - `RESTTransactionMaxRequest`

Schema Hierarchy
`Hss>HssSPRConfig`

WebCI Navigation
HSS ➤ HSS System Features ➤ HssSPRConfig

CLI Navigation
`Hss[]> HssSPRConfig[]`

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]> modify HssSPRConfig [PURAutoEnrollment = 0,1; SNRAutoEnrollment =
0,1; XMLAutoEnrollment = 0,1; AutoEnrollmentCleanup = 0,1;
TimeoutOfAutoEnrolledProfile = 0-90; PeriodicCheckStartTime =
00:00:00-24:00:00; CheckingPeriod = 0-90;SPRRepDataCompressionLevel = 0-10;
ReceivedMessageQueueSize = 0-12000; ForceReadOnMaster = 0,1; MNCCodeLength
= 2,3; HttpChunkedTimeout = 0-4294967296; HttpDisablePlus = 0,1;
HttpDoubleEncoding = 0,1; HttpEscaping = 0,1; RESTCDataSectionEscaped =
```

```
0,1; RESTIgnoreAcceptHeader = 0,1; RESTIgnoreContentType = 0,1;
RESTIgnoreOpaqueDataMismatchName = 0,1; RESTIgnoreUnknownBody = 0,1;
RESTTransactionCommitTimeout = 0-4294967296; RESTTransactionMaxRequest =
0-30; AutoEnrollRemoveFlagOnUpdate = 0,1]
```

Operations Permitted

`Modify, Display`

Attributes and Values

Table 239: HssSPR Config Optional Attributes

Attribute	Value Range	Default	Description
`SPRRepData Compression Level`	0= Z_NO_COMPRESSION 1= Z_BEST_SPEED 2 = Z_COMPRESSION_LEVEL_2 3= Z_COMPRESSION_LEVEL_3 4 = Z_COMPRESSION_LEVEL_4 5= Z_COMPRESSION_LEVEL_5 6= Z_COMPRESSION_LEVEL_6 7= Z_COMPRESSION_LEVEL_7 8= Z_COMPRESSION_LEVEL_8 9= Z_BEST_COMPRESSION 10= Z_DEFAULT_COMPRESSION	9	Level of compression (based on Z lib) of the ServiceData stored in the SPR database. ;AutoEnrollRemoveFlagOnUpdate=0]

Attribute	Value Range	Default	Description
PURAutoEnrollment	Bool 0,1	0	Attribute that allows the Network Operator to dynamically turn On/Off the PUR Auto-Enrollment feature. 0 (Off): Upon reception of a Sh PUR message for an un-provisioned subscriber, the SPR sends back a DIAMETER_ERROR_USER_UNKNOWN answer and rejects the request. 1 (On): This allows the SPR to receive a Sh PUR message for an un-provisioned subscriber. Upon reception of such a request for an un-provisioned subscriber, the SPR automatically provisions a policy subscription with all mandatory keys and populates the transparent data as per PUR inputs.
SNRAutoEnrollment	Bool 0,1	0	Attribute that allows the Network Operator to dynamically turn On/Off the SNR Auto-Enrollment feature. 0 (Off): Upon reception of a SNR message for an un-provisioned subscriber, the SPR sends back a DIAMETER_ERROR_USER_ UNKNOWN answer and rejects the request. 1 (On): This allows the SPR to receive an SNR message for an un-provisioned subscriber. Upon reception of such a request for an un-provisioned subscriber, the SPR automatically provisions a policy subscription with all mandatory keys and populates the transparent data as per SNR inputs.
XMLAutoEnrollment	Bool 0,1	0	Attribute that allows the Network Operator to dynamically turn On/Off the XMLAuto-Enrollment feature. 0 (Off): Upon reception of an XML-REST/ XML/SOAP message for an un-provisioned subscriber, the SPR sends back a DIAMETER_ERROR_USER_ UNKNOWN answer and rejects the request.

Attribute	Value Range	Default	Description
			1 (On): This allows the SPR to receive an XMLREST/ XML/SOAP message for an un-provisioned subscriber. Upon reception of such a request for an un-provisioned subscriber, the SPR automatically provisions a policy subscription with all mandatory keys and populates the transparent data as per XML-REST/XML/SOAP inputs
`AutoEnrollment Cleanup`	Bool 0,1	0	Attribute that allows the Network Operator to dynamically turn On/Off the SPR DB Cleanup of Auto-Enrolled Profiles feature.
`TimeoutOfAuto EnrolledProfile`	0 - 90	60	The number of days that an auto-enrolled policy can remain inactive before being removed.
`PeriodicCheck StartTime`	00:00:00 - 24:00:00	00:00:00	The time of day that the periodic check for inactive policies will be run. The default is midnight.
`CheckingPeriod`	0 - 90	0	The number of days between execution of the periodic check. A value of 0 will disable the periodic check.
`ReceivedMessage QueueSize`	Uint32	12000	Configures the internal receive queue of the HSS with the number of requests that can be received and processed by the HSS. If the queue reaches 80% of its capacity, the system returns the error message: DIAMETER_TOO_BUSY. **Note:** Carefully calculate the queue size based on the overall TPS dimensioning for the system. Setting a queue size too small may result in congestion due to queue exhaust. Setting the queue size too large may impact the ability to detect congestion. Recommended values based on SPR configuration (and the related TPS values) are: • 2-blade SPR configuration: 3000 • 2-blade+2 storage array SPR: 20000 • 4-blade+2 storage array SPR configuration: 24000

Attribute	Value Range	Default	Description
			• 2 DL360 + additional HDD SPR configuration: 10000
ForceReadOnMaster	0, 1	1	Turn on this function when performing sequential write/read/write (e.g., PUT/GET/PUT) requests for the same subscriber. This setting ensures that the system returns the latest values upon a GET/READ command. When turned on, this parameter forces all read-requests from XML provisioning interfaces (XML, XML-REST) to be sent directly to the master database instead of being load-shared across the backend databases. When messages are load-shared and a read-request immediately follows a write-request, the returned value may not reflect the changes from the last write-request.
MNCCodeLength	Uint32 2, 3	2	Sets the SPR IMSI Mobile Network Code (MNC) length used to build the public identity. MNC code length: • will be the same for the entire SPR system • is not dynamically configurable • is not configurable by MCC or by subscriber **2**: The MNC consists of "0" plus the 4th and 5th IMSI digits. For example, for an IMSI of 310150123456789, the public identity will be sip:310150123456789@ims.mnc015.mcc310.3gppnetwork.org. **3**: The MNC consists of the 4th, 5th, and 6th IMSI digits. For example, for an IMSI of 310150123456789, the public identity will be sip:310150123456789@ims.mnc150.mcc310.3gppnetwork.org. **Note:** Requires restart of DataAccess service.
HttpChunkedTimeout	uint32 0-4294967296 ms	0	This function allows the RAS server to support HTTP requests with chunked

Attribute	Value Range	Default	Description
			transfer mode with these coding type problems: • Body: None (no chunk data) • Chunk without Null-terminated character. **Prerequisites:** The following functions also must be turned on: • HttpDoubleEncoding • RESTIgnoreUnknownBody • RESTIgnoreContentType **0 = Off.** This function is turned off. System does not accept requests with chunked transfer mode without either the chunked data in the body or a chunk without a NULL-terminated character. **Note:** If this function is not turned on and a request is sent with "chunked" encoding but without a terminating character, the RAS service will wait indefinitely for the end of the request. **1-4294967296.** This function is turned on. The configured value indicates the number of milliseconds to wait for the chunked data before determining that there is no request Body coming. **Note:** Requires restart of RAS service.
`HttpDisablePlus`	bool 0, 1	0	Allows system to accept a plus symbol (+) directly in the REST command http URL without encoding (%2B), for example: `http://10.15.34.85:8787/rs/msr/sub/MSISDN/ +12345678914`.. **0 = Off.** System responds to an unencoded plus symbol (+) in a REST command http URL with `HTTP/1.1 404 Not Found` and error `MSR4001`. **1 = On.** System displays plus symbol (+) in the REST command http URL without encoding. **Note:** Requires restart of RAS service.

Attribute	Value Range	Default	Description
HttpDoubleEncoding	bool 0, 1	0	Allows the RAS system to decode double-encoded colon (:) and plus (+) symbols in an XML-REST GET-command HTTP URL. Use this function if the customer provisioning system uses double-encoding for special characters, specifically, for colon (:) and plus (+) symbols. Regular encoding uses %3A and %2B respectively, while double-encoding uses %253A and %252B as shown in this example: `http://10.15.34.85:8787/rs/msr/sub/MSISDN/50/field/custom3/2011-12-22T15%253A15%253A15%252B13%253A00`. **Note:** Field values in a body do not require encoding. **Note:** Tekelec recommends to use regular encoding in customer provisioning systems whenever possible. **0 = Off.** No double-encoding used in customer provisioning system. If double-encoding was used and the function is turned off, the RAS service will store in the database the string in regular encoding instead of no encoding: `2011-12-22T15%3A15%3A15%2B13%3A00`. **1 = On.** System can decode double-encoded colon (:) and plus (+) symbols in the HTTP URL. The RAS service will store in the database the string without encoding: `2011-12-22T15:15:15+13:00`. **Note:** Requires restart of RAS service.
HttpEscaping	bool 0, 1	1	Allows system to interpret encoded forward slashes (/) in an HTTP URL as being part of a field value. Use this function when using field values with forward slashes (/). Forward slashes in a URL are usually interpreted on the HTTP level. When sending the URL for this request `POST /rs/msr/sub/`

Attribute	Value Range	Default	Description
			`MSISDN/6421340362/field/Entitlement/CCC%2FBB`, the forward slash in the Entitlement value would be decoded as `POST /rs/msr/sub/MSISDN/6421340362/field/Entitlement/CCC/2FBB`. This function moves the decoding to the application level, which preserves the encoding and identifies the forward slash (/) as being part of the field value. **0 = Off.** SPR system rejects requests that it cannot decode properly, for example, because of unidentified forward slashes in the URL. **1 = On.** SPR System detects forward slashes (/) in a field and decodes them properly as part of the field value. **Note:** Requires restart of RAS service.
`RESTCDataSectionEscaped`	bool 0, 1	0	Allows to escape opaque data in an XML-REST request if the customer provisioning system was set up using something other than the MSR API document to communicate with the SPR. **0:** Escapes opaque data by using CDATA (default). `<?xml version="1.0" encoding="UTF-8"?> <subscriber><data name="quota"> <![CDATA[<?xml version="1.0" encoding="UTF-8"?> <usage> <version>1</version> <quota name="q1"> <cid>9223372036854775807</cid> <inputvolume>5000</inputvolume> <outputvolume>15000</outputvolume> </quota> </usage>]]></data></subscriber>`  **1:** Escapes opaque data by using escape characters (< = < > = &gt).  `<?xml version="1.0" encoding="UTF-8"?> <subscriber><data name="quota"> <usage> <version>1</version> <quota name="q1"> <cid>9223372036854775807</cid> <inputvolume>5000</inputvolume>`

Attribute	Value Range	Default	Description

			`<outputvolume>15000</outputvolume>`
			`</quota>`
			`</usage>`
			
			Note: Requires restart of RAS service.

`RESTIgnore AcceptHeader`	bool 0, 1	0	Allows system to ignore the Accept header when using Internet Explorer to retrieve a subscriber profile. Internet Explorer does not return the needed Accept header when a user enters the GET URL in the address bar, for example, `http://10.15.34.85:8787/rs/msr/sub/MSISDN/12345678915`. Turn on this function to allow the system to ignore the missing Accept header in an Internet Explorer request. **0 = Off.** System responds to a missing Accept header in an Internet Explorere request by returning `HTTP/1.1 400 Bad Request` and rejecting the request. **1 = On.** System ignores missing Accept header in an Internet Explorer request and respond correctly. **Note:** Requires restart of RAS service.
`RESTIgnoreContent Type`	bool 0, 1	0	Allows system to ignore the Content-Type header in PUT, POST, or DELETE XML-REST requests. Turn on this function to ignore this common user error. **0 = Off.** System responds to an invalid Content-Type with `HTTP/1.1 400 Bad Request` and an error code of `Invalid ContentType`. **1 = On.** System ignores Content-Type header and continues processing the request. **Note:** Requires restart of RAS service.
`RESTIgnore Opaque DataMismatchName`	bool 0, 1	0	Allows system to ignore a mismatch between the opaque data name and the actual data to be updated in a PUT request. For example, if the request specifies to

Attribute	Value Range	Default	Description

			update State data and provides a State data blob but the blob data name="quota", the system ignores the incorrect data name and continues to update the State data provided. Turn on this function to ignore this common user error.
			`PUT /rs/msr/sub/MSISDN/12345678915/data/state`
			`<subscriber><data name="quota">`
			`<![CDATA[<?xml version="1.0" encoding="UTF-8"?>`
			`<state><version>1</version>`
			`<property><name>p1</name><value>true</value></property>`
			`<property><name>p2</name>`
			`<value>1234567890</value></property>`
			`</state>]]></data>`
			0 = Off. System responds to a mismatched data name with `HTTP/1.1 400 Bad Request`, error code `MSR4000`, and rejection of the update.
			1 = On. System ignores a mismatched data name and continues the update with the data provided.

`RESTIgnore UnknownBody`	bool 0, 1	0	Allows system to ignore the Body section in an XML-REST request when a Body is not really required; for example, for updating a custom field or an entitlement, or for deleting a field, a profile, or a quota blob. **0 = Off.** System responds to UnknownBody with `HTTP/1.1 400 Bad Request`. **1 = On.** System ignores UnknownBody while processing a request.
`RESTTransaction CommitTimeout`	uint32 0-4294967296 ms	0	This function automatically groups XML-REST transaction requests to the same subscriber and sets the timeout that the system waits before committing the transaction. When a new request is received to the same subscriber after a commit, the timer resets to the timeout value. Grouping transaction requests minimizes the impact of multi-threaded replication. **0 = Off.** This function is turned off.

Attribute	Value Range	Default	Description
			1-4294967296. This function is turned on. The configured value indicates the number of milliseconds to wait for the system to commit the transaction. **Note:** Requires restart of RAS service.
RESTTransaction MaxRequest	uint32 0-30	0	If the RESTTransactionCommitTimeout value is greater than 0 (turned on), this parameter sets the maximum number of requests per transaction before the transaction will be committed automatically. **0 = Off.** This function is turned off. **1-30.** This function is turned on. The configured value indicates the maximum number of requests per transaction before the system commits the transaction automatically. **Note:** Requires restart of RAS service.
AutoEnrollRemove FlagOnUpdate	bool 0, 1	0	This is an attribute that allows the Network Operator to dynamically turn the AutoEnrollRemoveFlagOnUpdate feature On and Off. **0 = Off.** When this feature is switched off auto-enrolled subscribers are removed from the SPR database when auto-enrollment cleanup of the database takes place. 1 = On. When this feature is switched on it clears the auto-enrollment flag from the auto-enrolled subscribers. Then, when cleanup takes place, their user profiles are not removed from the SPR database.

CLI Example

```
Hss[]> modify HssSPRConfig [PURAutoEnrollment=1; SNRAutoEnrollment=1;
XMLAutoEnrollment=1; AutoEnrollmentCleanup=1; TimeoutOfAutoEnrolledPolicy=90;
PeriodicCheckStartTime=17:30:00;
CheckingPeriod=60;SPRRepDataCompressionLevel=9;
ReceivedMessageQueueSize=12000; ForceReadOnMaster=1;MNCCodeLength=3;
HttpChunkedTimeout=100; HttpDisablePlus=1; HttpDoubleEncoding=1;
HttpEscaping=1; RESTCDataSectionEscaped=0; RESTIgnoreAcceptHeader=1;
RESTIgnoreContentType=1; RESTIgnoreOpaqueDataMismatchName=1;
```

```
RESTIgnoreUnknownBody=1; RESTTransactionCommitTimeout]=3600;
RESTTransactionMaxRequest=30; AutoEnrollRemoveFlagOnUpdate=0]
```

Shared Initial Filter Criteria

Shared Initial Filter Criteria

This section describes each of the HSS CLI commands used to provision the Shared Initial Filter Criteria feature. The following information is provided: name, description, navigation, inherited attributes, command syntax, operations permitted, attributes (with value ranges, defaults, and description), and an example.

Name

`HssSharedInitialFilteringCriteria`

Description

To create and define the Shared Initial Filter Criterias.

CLI Navigation

```
Hss[]> HssSharedInitialFilteringCriteria
```

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]>display HssSharedInitialFilteringCriteria [SharedInitialFiltCritID =
string; SharedIfcSetID = String; ASDefaultHandling = 0,1; ASName = string;
ASServiceInfo = string; ConditionTypeCNF= 0,1; ProfilePartIndicator= 0,1;
iFCPriority= integer]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 240: HssSharedInitialFilteringCriteria Mandatory Attributes

Attribute	Value Range	Default	Description
`SharedInitial FiltCritID`	string	N/A	Identification of the Shared Initial Filter Criteria.

Attribute	Value Range	Default	Description
SharedIfcSetID	digits	N/A	Identification of the subsets of Initial Filter Criteria that are shared (shared Ifc sets) by several service profiles and that are implicitly downloaded by the HSS by downloading the unique identifiers of the shared iFC sets to the S-CSCF.

Table 241: HssShartedInitialFilteringCriteria Optional Attributes

Attribute	Value Range	Default	Description
ASDefaultHandling	0 or 1	N/A	Determines whether the dialog should be released if the Application Server could not be reached or not. 0= SESSION_CONT 1= SESSION_TERM
ProfilePartIndicator	0 or 1	Registered	attribute indicating if the Shared iFC is a part of the registered or unregistered user profile. 0 = REGISTERED 1= UNREGISTERED
ASName	SIP URI (ex: sip:AS-98-1 @home domain.com)	N/A	Server Name is the SIP URL of the application server to contact
ASServiceInfo	String (100)	null	Conveys the information that is allowed to be downloaded to S-CSCF and that is to be transferred transparently to an Application Server when the trigger points of a filter criterion are satisfied.

Attribute	Value Range	Default	Description
ConditionTypeCNF	0 or 1	1	Defines how the set of SPTs are expressed, i.e. either an Ored set of ANDed sets of SPT statements or an ANDed set of Ored sets of statements. Individual SPTstatements can also be negated. These combinations are termed, respectively, Disjunctive Normal Form (DNF) and Conjunctive Normal Form (CNF) for the SPT. 0 = if the Trigger Point is expressed in Disjunctive Normal Form (DNF) 1 = when the Trigger Point associated with the FilterCriteria is a boolean expression in Conjunctive Normal Form (CNF)
iFCPriority	integer	0	indicates the priority of the Shared Filter Criteria. The higher the Priority Number the lower the priority of the Shared Filter Criteria is; i.e., a Shared Filter Criteria with a higher value of Priority Number shall be assessed after the Shared Filter Criteria with a smaller Priority Number have been assessed. The same priority shall not be assigned to more than one shared initial Filter Criterion.

CLI Example

```
1 :Hss[]> add HssSharedInitialFilteringCriteria [SharedInitialFiltCritID =
sharedIfc1;SharedIfcSetID= 1]
```

HSS Shared Service PointTrigger

Name

HssSharedServicePointTrigger

Description

To define the Shared Service Point Trigger for a Shared Initial Filter Criteria.

CLI Navigation

```
Hss[]> HssSharedInitialFilteringCriteria> HssSharedServicePointTrigger
```

CLI Inherited Attributes

```
SharedInitialFiltCritID
```

CLI Command Syntax

```
Hss[]> HssSharedInitialFilteringCriteria[SharedInitialFiltCritID =
sharedIfc1]> display HssSharedServicePointTrigger [ServPointTriggerType =
0-4; SharedServicePointTriggerID = String; ConditionNegated = 0,1; GroupList
= string; RegistrationType = 0,1,2; RequestUriInfo= string; SessionCaseInfo=
0,1,2,3; SessionDescriptionContent= string ; SessionDescriptionLine= string;
SipHeaderContent= string; SipHeaderHeader= string; SipMethodInfo= string]
```

Operations Permitted

```
Add, display, modify, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 242: HssSharedServicePointTrigger Mandatory Attributes

Attribute	Value Range	Default	Description
ServPoint TriggerType	0 REQUEST_ URI 1 SIP_METHOD 2 SIP_HEADER 3 SESSION_CASE 4 SESSION_ DESCRIPTION	N/A	Identification of the Shared Initial Filter Criteria.
SharedService Point TriggerID	digits	N/A	Identification of the Shared ServicePointTrigger.

Table 243: HssSharedServicePointTrigger Optional Attributes

Attribute	Value Range	Default	+
Condition Negated	0 or 1	0	Defines whether the individual Shared SPT instance is negated (i.e. NOT logical expression). 0 = Not negated 1 = Negated

Attribute	Value Range	Default	+
GroupList	String (255)	0	allows the grouping of Shared SPTs that will configure the sub-expressions inside a CNF or DNF expression. For instance, in the following CNF expression (A+B).(C+D), A+B and C+D would correspond to different groups. In CNF, the attribute Group identifies the ORed sets of Shared SPT instances. If the Shared SPT belongs to different ORed sets, Shared SPT can have more than one Group values assigned. At least one Group must be assigned for each Shared SPT. In DNF, the attribute Group identifies the ANDed sets of Shared SPT instances. If the Shared SPT belongs to different ANDed sets, Shared SPTcan have more than one Group values assigned. At least one Group must be assigned for each SPI.
RegistrationType	0 or 1 or 2	N/A	is relevant only to the SIP Method Shared SPT with a value of "REGISTER" and its' support is optional in the HSS and in the S-CSCF. The RegistrationType may contain a list of values that define whether the Shared SPT matches to REGISTER messages that are related to initial registrations, re-registrations, and/or de-registrations. If RegistrationTypes are given, the SIP Method SPT with a value of "REGISTER" shall match if any of the RegistrationTypes match and the S-CSCF supports the RegistrationType attribute. If the SIP Method SPT contains value "REGISTER", and no RegistrationType is given, or if the S-CSCF does not support the RegistrationType attribute, the SIP Method Shared SPT matches to all REGISTER messages. The attribute RegistrationType may be discarded if it is present in an SPT other than SIP Method with value "REGISTER". 0 = INITIAL_REGISTRATION 1 = RE_REGISTRATION 2 = DE_REGISTRATION
RequestUriInfo	String (255)	null	defines Shared SPT for the Request-URI

Attribute	Value Range	Default	+
SessionCase Info	0 or 1 or 2 or 3	null	indicates if the filter should be used by the S-CSCF handling the Originating, Terminating for a registered end user or Terminating for an unregistered end user or Originating for an unregistered end user services. 0 = ORIGINATING 1 = TERMINATING_REGISTERED 2 = TERMINATING_UNREGISTERED 3= ORIGINATING_UNREGISTERED
Session Description Content	String (255)	null	Defines Shared SPT for the content of any SDP field within the body of a SIP Method. Defines the content of the line identified by Line.
Session Description Line	String (255)	null	identifies the line inside the session description
SipHeaderHeader	String (255)	Null	identifies the SIP Header, which is the SPT
SipHeader Content	String (255)	Null	defines the value of the SIP Header if required. The absence of the Content attribute and if ConditionNegated = TRUE indicates that the Shared SPT is the absence of a determined SIP header.
SipMethodInfo	String (50) 0 INVITE 1 REGISTER 2 OPTIONS 3 BYE 4 CANCEL 5 NOTIFY 6 UPDATE 7 PRACK 8 REFER 9 MESSAGE 10 INFO 11 SUBSCRIBE	N/A	holds the name of any SIP method.

Attribute	Value Range	Default	+
	12 ACK 4294967295 UNDEFINED		

CLI Example

```
1 :Hss[]> HssSharedInitialFilteringCriteria [SharedInitialFiltCritID =
sharedIfc1] > add
HssSharedServicePointTrigger[SharedServicePointTriggerID=sharedSPT1;
ServPointTriggerType=0]
```

HSS Operations

The following section provides a description and the command syntax of the operations that can be performed on the HSS system through BlueCLI.

GetNumApplications()

The `GetNumApplications` operation returns the number of applications.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumApplications()
```

GetNumConnectionsAccepted()

The `GetNumConnectionsAccepted` operation returns the number of connections accepted.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumConnectionsAccepted()
```

GetNumConnectionsCreated()

The`GetNumConnectionsCreated` operation returns the number of connections created.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumConnectionsCreated()
```

GetNumCurrentConnections()

The `GetNumCurrentConnections` operation returns the number of current connections.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumCurrentConnections()
```

GetNumRoutes()

The `GetNumRoutes` operation returns the number of routes in use.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumRoutes()
```

GetNumRejectedRequestsDiscardedDueToLicense()

The `GetNumRejectedRequestsDiscardedDueToLicense` operation returns the number of network incoming requests discarded due to license.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumRejectedRequestsDiscardedDueToLicense()
```

GetNumTransactions()

The `GetNumTransactions` operation returns the number of transactions. A transaction is completed when either a response to an incoming request is sent successfully, or a response to an outgoing request is received and dispatched to the application with no error.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumTransactions()
```

GetNumTransactionAttempts()

The `GetNumTransactionAttempts` operation returns the number of request that have been tried to be sent. Upon receipt of a request, this counter is incremented. When trying to send a new request, this counter is also incremented.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumTransactionAttempts()
```

GetNumActivePeers()

The `GetNumActivePeers` operation returns the number of active peers. An active peer is either a direct peer or a proxy peer. Direct Peer objects that are in the active table are either connected to a remote Diameter peer, or trying to connect (the Diameter stack periodically scans the active peer table and attempts to reconnect the disconnected peers). A Proxy Peer object acts as a proxy for a Direct Peer that is in another process. Proxy Peer objects exist only when the Scalability and High Availability API is used.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumActivePeers()
```

GetNumBackupPeers()

The `GetNumBackupPeers` operation returns the number of backup peers. The backup table is empty (not used) when the Scalability and High Availability API is not used. This table may only contain

Direct Peer objects that are inactive (not connected to a remote peer), until the S+HA algorithm determines that a backup peer needs to be switched to the active table and connected.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumBackupPeers()
```

GetNumActiveSessions()

The`GetNumActiveSessions` operation returns the number of current active sessions for this core. This is the total of all sessions that are currently active in all application related with this core.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumActiveSessions()
```

GetNumberOfUAR()

The `GetNumberOfUAR` operation returns the number of UAR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfUAR()
```

GetNumberOfLIR

The `GetNumberOfLIR` operation returns the number of LIR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfLIR()
```

GetNumberOfMAR()

The `GetNumberOfMAR` operation returns the number of MAR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfMAR()
```

GetNumberOfSAR()

The `GetNumberOfSAR` operation returns the number of SAR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfSAR()
```

GetNumberOfPPR()

The `GetNumberOfPPR` operation returns the number of PPR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfPPR()
```

GetNumberOfPPA()

The `GetNumberOfPPA` operation returns the number of PPA messages sent by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfPPA()
```

GetNumberOfRTR()

The `GetNumberOfRTR` operation returns the number of RTR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfRTR()
```

GetNumberOfRTA()

The`GetNumberOfRTA` operation returns the number of RTA messages sent by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfRTA()
```

GetNumberOfPUR()

The `GetNumberOfPUR` operation returns the number of PUR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfPUR()
```

GetNumberOfSNR()

The `GetNumberOfSNR` operation returns the number of SNR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfSNR()
```

GetNumberOfUDR()

The `GetNumberOfUDR` operation returns the number of UDR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfUDR()
```

GetNumberOfPNR()

The `GetNumberOfPNR` operation returns the number of PNR messages received by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfPNR()
```

GetNumberOfPNA()

The `GetNumberOfPNA` operation returns the number of PNA messages sent by the HSS.

Command syntax:

```
Hss[]:HssStatistics[]> GetNumberOfPNA()
```

ResetPasswdCounter()

The `ResetPasswdCounter` operation resets bad password counter concerning a given Private Identity and unlocks it.

Command syntax:

```
:Hss[]:HssSubscription[IMSSubscriptionID =
sub-1]:HssPrivateIdentity[PrivateIdentity = sub-1-Pri-1@blueslice.com]>
ResetPasswdCounter()
```

DisplayPasswdCounter()

The DisplayPasswdCounter operation shows current bad password counter value for a given Private Identity.

Command syntax:

```
:Hss[]:HssSubscription[IMSSubscriptionID =
sub-1]:HssPrivateIdentity[PrivateIdentity =
sub-1-Pri-1@blueslice.com]>DisplayPasswdCounter()
```

GetEnumCacheStatistics()

This command provides information regarding the ENUM Cache usage.

Command syntax:

```
Hss[]:DNSStatistics[]> GetEnumCacheStatistics()
```

Chapter 7

Authentication, Authorization, and Accounting (AAA)

Topics:

- *AAA Menu.....421*
- *AAA System Configuration.....421*
- *Provisioning Configuration.....432*
- *AAA Operations.....441*

This chapter provides details on the AAA WebCI application folder, the entities available to configure and provision the AAA, and details on each parameter.

AAA Menu

The AAA application folder provides the following:

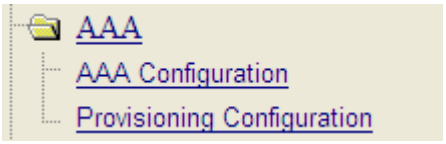

Figure 10: AAA Application Folder In The WebCI's Main Window

AAA System Configuration

AAA Configuration Window

The AAA Configuration window displays all the parameters that have been provisioned for the AAA Configuration Profile, the AAA SystemAccountingServers, the AAANetworkAccessServers, the AAANASAccountingServers, the AAASystemAuthenticationServers and the AAANASAuthenticationServers.

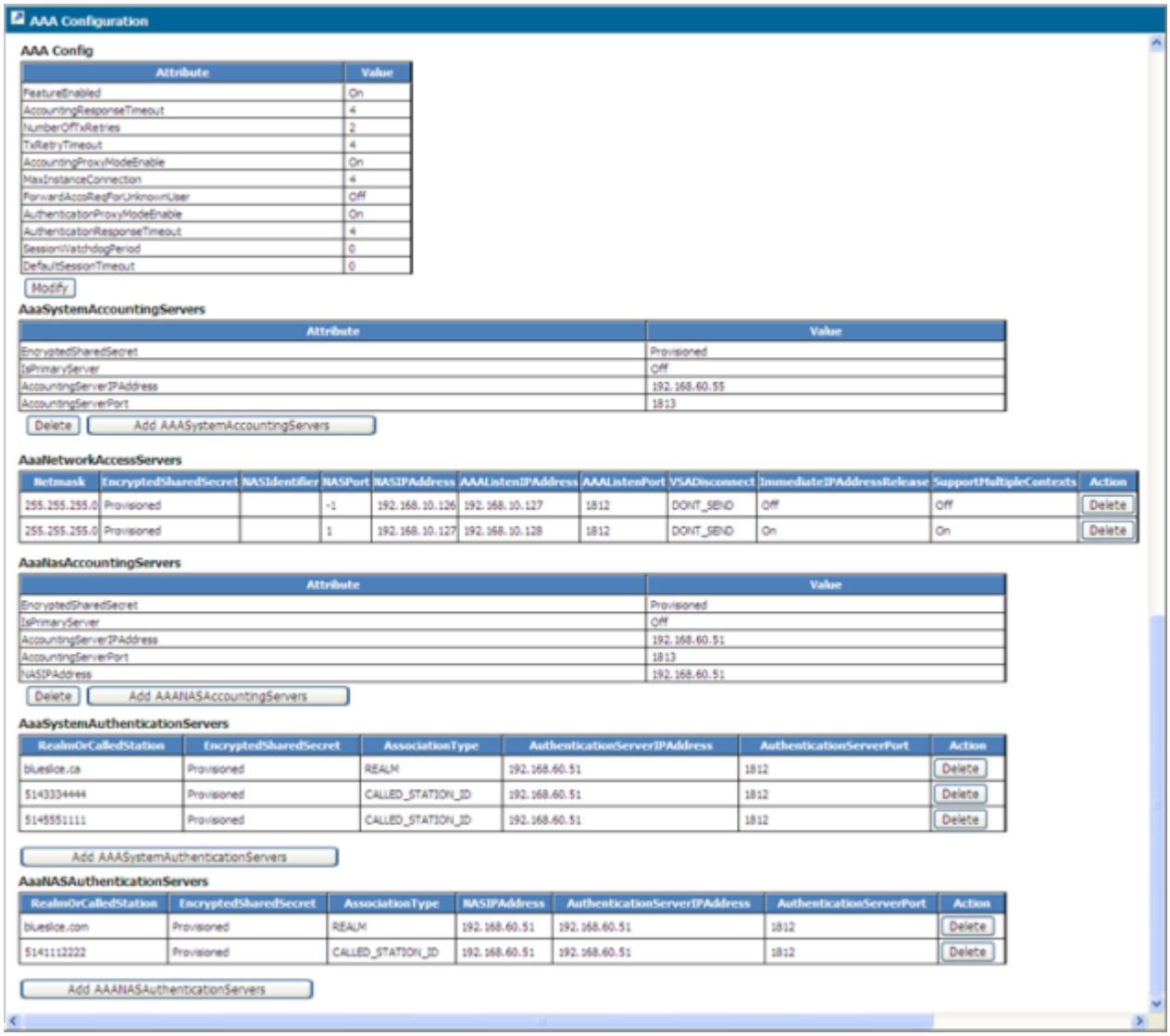

Figure 11: AAA Configuration Window

AAA Configuration

Name

- Entity in the database and CLI: `AAASystemConfig`
- Name of table in the WebCI: `AAA Configuration`

Description

This table is used at system startup to provision the AAA configuration parameters.

WebCI Navigation

AAA ➤ AAA Configuration

CLI Navigation
`Hss[]> AAASystemConfig[]`

Operations Permitted

`Display, modify`Note that the HSS service must be stopped before being able to modify this entity.

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 244: AAASystemConfig Mandatory Attributes

Attribute	Value Range	Default	Description
`FeatureEnabled`	0,1	0	Enables or disables the AAA functionalities. 0= AAA feature disabled. 1= AAA feature enabled.

Table 245: AAASystemConfig Optional Attributes

Attribute	Value Range	Default	Description
`NumberOfTxRetries`	Integer (11)	3	The number of allowed retries after a TxRetryTimeout delay when sending a disconnect message.
`TxRetryTimeout`	Integer (11)	3	The delay before retransmitting a Disconnect message.
`AccountingResponse Timeout`	Integer (11)	3	This indicates the delay before re-sending an accounting request message when the accounting request is forwarded to a primary accounting server and no response has been received.
`AccountingProxy ModeEnable`	Integer (1)	1	Configures the AAA as a forwarder for accounting requests.
`MaxInstanceConnection`	integer	N/A	The maximum number of AAA listening addresses that can be defined in the system.
`ForwardAccoReqFor UnknownUser`	0 (Off),1 (On)	0	Flag that enables or disables all accounting messages to be forwarded or not to accounting servers whether the user is provisioned in the SDM's database or not.

Attribute	Value Range	Default	Description
			0:disabled. Accounting messages are not forwarded to accounting servers if the user is not provisioned in the SDM. 1: enabled. Accounting messages are forwarded to accounting servers even if the user is not provisioned in the SDM.
`AuthenticationProxy ModeEnable`	0,1	0	This flag allows to enable/disable the AAA Authentication Proxy functionality. 0 (disable):The AAA Authentication Proxy functionality is disabled. 1 (enable):The AAA Authentication Proxy functionality is enabled.
`Authentication ResponseTimeout`	Integer (11)	4 seconds	The delay before re-sending an access request message to a remote server when the authentication proxy mode is enabled and no response has been received.
`SessionWatchdog Period`	integer	0 (infinite period, no expiration)	Defines, in seconds, the polling timer to delete the expired sessions. By default, the period is infinite and hence the session is never deleted.
`DefaultSession Timeout`	integer	0 (infinite period, no expiration)	Indicates the period of time (in seconds) during which the IP address remains allocated to a subscriber that is not provisioned in the AAA server. When the session timeout period is reached, the IP address allocated to the subscriber is freed up.

AAA System Accounting Servers

Name

`AAASystemAccountingServers`

Description

This table allows to configure the per system list of accounting applications to which accounting requests will be forwarded in case no per NAS accounting applications list is defined.

Operations Permitted

`Add, delete.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 246: AAASystemAccountingServers Mandatory Attributes

Attribute	Value Range	Default	Description
`EncryptedSharedSecret`	Provisioned Not Provisioned	Not Provisioned	The encrypted secret key that is shared between the AAA and accounting servers. When configured, the value displayed is 'Provisioned' and when it is not configured, the value displayed is 'Not Provisioned'.
`IsPrimaryServer`	1 (On) 0 (Off)	N/A	Define if this accounting application is a primary accounting server. That means, is a accounting answer is expected from that accounting application when a accounting requests is forwarded. If it is, a context is allocated to match the forwarded request and the expected answer. 1 = ON ;0 = OFF
`AccountingServerIPAddres`	varchar(100)	N/A	The accounting address to which an accounting request has to be forwarded. Format must be : a.b.c.d
`AccountingServerPort`	Integer (1000-65535)	1813	The accounting address port to which an accounting request has to be forwarded.

AAA Network Access Servers

Name

`AAANetworkAccessServers`

Description

This table allows to configure the list of allowed NAS that are able to send Radius packet to the AAA server. It also allows to configure the secret key that is shared between the AAA server and the NAS.

Operations Permitted

Add, delete.

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 247: AAANetworkAccessServers Mandatory Attributes

Attribute	Value Range	Default	Description
`Netmask`	varchar(100)	N/A	
`EncryptedSharedSecret`	Provisioned Not Provisioned	Not Provisioned	The encrypted secret key that is shared between the NAS and the AAA Server. When configured, the value displayed is 'Provisioned' and when it is not configured, the value displayed is 'Not Provisioned'.
`NASIPAddress`	varchar(100)	N/A	The IP address of a new NAS that is allowed to send RADIUS messages to the AAA Server. Format must be : a.b.c.d
`AAAListenIPAddress`	varchar(100) Format must be : a.b.c.d	N/A	The Listen IP Address on which the Access-Requests and/or Accounting-requests are accepted.
`AAAListenPort`	Integer (1000-65535)	1812	The address of the port through which the AAA Server can receive the Access-Requests and/or Accounting-Requests. The AAA Server can, as per the RFCs 2865 and 2866, receive the Access-Request and Accounting-Request messages on two different ports.*

Attribute	Value Range	Default	Description
			The AAA Server can receive both the Access-Request and Accounting-Request messages on the same Port.**

Note: To use two different ports, two entries must be provisioned in the AAA Network Access Servers entity for one single NAS. Both of these entries can have the same NASIPAddress and the same AAAListenIPAddress.

Note: To use one single port, only one entry needs to be configured in the AAA Network Access Servers entity for one single NAS, but the NAS must be able to send both Access-Request and Accounting-Request messages to the same port.

Table 248: AAANetworkAccessServers

Attribute	Value Range	Default	Description
`NASIdentifier`	String	N/A	The NAS Identifier
`NASPort`	All ports (-1)	N/A	The IP address port of a new NAS that is allowed to send RADIUS messages to the AAA Server
`ImmediateIPAddress Release`	0(Off),1(On)	0	Flag that enables or disables the system to release an IP address without having to wait for a Disconnect Ack. from the NAS. 0 (Off): disabled. The system only releases an IP address once it has received the Disconnect Ack. from the NAS. 1(On): enabled. The system releases an IP address when sending a Disconnect message to the NAS and does not wait to receive the Disconnect Ack.
`SupportMultipleCon texts`	0(Off),1(On)	0	Flag that allows or not multiple PDP contexts within a PDP session. 0 (Off): Multiple PDP contexts are not allowed within a PDP session. Accounting-Request

Attribute	Value Range	Default	Description
			STOP message releases the assigned IP address. 1 (On): Multiple PDP contexts are allowed within a PDP session. Accounting-Request STOP message releases the assigned IP address only if the StopSessionIndicator attribute is present.
`VSADisconnect`	0(DONT_SEND) 1(TEARDOWN_ ONE) 2(TEARDOWN_ALL)		The VSADisconnect field is used to specify if the AAA needs to include the 3gpp vendor specific sub-attribute, 3GPP-Teardown-Indicator, in the disconnect messages.
`SendUserDisconnect`	0 or 1 (bool)	1 (On)	This parameter can be used to set the AAA to send or not to the NAS, for which the DisconnectNAS() has been performed, Requests for each user registered with that NAS. 1(On): The AAA sends Requests for each user that is registered with the NAS for which a DisconnectNAS() has been performed. 0(Off): The AAA doesn't send any Requests to the NAS for which a DisconnectNAS() has been performed and simply de-allocates the IP addresses.

AAA NAS Accounting Servers

Name

`AAANASAccountingServer`

Description

This table allows to configure the NAS system list of accounting applications to which accounting requests will be forwarded. This table is looked at first, when an accounting request is received. If there is a NAS that matches the one from which the accounting request is coming from, the accounting application list is retrieved, and the accounting request is forwarded to that list.

Operations Permitted

`Add, delete.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 249: AAANASAccountingServer Optional Attributes

Mandatory	Value Range	Default	Description
`EncryptedSharedSecret`	Provisioned Not Provisioned	Not Provisioned	The encrypted secret key that is shared between the NAS and the AAA Server. When configured, the value displayed is 'Provisioned' and when it is not configured, the value displayed is 'Not Provisioned'.
`IsPrimaryServer`	1 (On) 0 (Off)	0	Define if this accounting application is a primary accounting server. That means, is a accounting answer is expected from that accounting application when a accounting requests is forwarded. If it is, a context is allocated to match the forwarded request and the expected answer. 1 = ON ;0 = OFF
`AccountingServerIPAddress`	varchar(100)	N/A	The accounting address to which an accounting request has to be forwarded
`AccountingServerPort`	Integer (1000-65535)	1813	The accounting address port to which an accounting request has to be forwarded.
`NASIPAddress`	varchar(100)	N/A	The IP address of a new NAS that is allowed to send RADIUS messages to the AAA Server

AAA System Authentication Servers

Name

`AAASystemAuthenticationServers`

CLI Navigation

```
Hss> AAASystemAuthenticationServers[]
```

CLI Inherited Attributes:

None

CLI Command Syntax

```
Hss[]> add AAASystemAuthenticationServers[RealmOrCalledStation = string;
EncryptedSharedSecret = string; AssociationType = 1,2;
AuthenticationServerIPAddress = ip; AuthenticationServerPort = int]
```

Operations Permitted

add, delete.

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 250: AAASystemAuthenticationServers Mandatory Attributes

Attribute	Value Range	Default	Description
`RealmOrCalledStation`	*String*	*N/A*	The Realm or CalledStationId to which the authentication server is associated.
`EncryptedSharedSecret`	*String*	*N/A*	The secret key that is shared between the AAA server and the remote authentication server.
`AssociationType`	*1, 2*	*N/A*	1= REALM, 2=CALLEDSTATION
`AuthenticationServerIPAddress`	*x.x.x.x*	*N/A*	The address of the authentication server to which an Access-Request message is forwarded.
`AuthenticationServerPort`	*0-65535*	*N/A*	The port of the authentication server to which an

Attribute	Value Range	Default	Description
			Access-Request message is forwarded.

AAA NAS Authentication Servers

Name

`AAANASAuthenticationServers`

Description

This table allows the operator to configure the NAS-level list of remote authentication servers to which authentication requests are forwarded.

CLI Navigation

```
Hss[]> AAANetworkAccessServers[NASIPAddress = x.x.x]>
AAANASAuthenticationServers[]
```

CLI Inherited Attributes:

`NASIPAddress`

CLI Command Syntax

```
Hss[]>add AAANASAuthenticationServers[RealmOrCalledStation = string;
EncryptedSharedSecret = string; AssociationType = 1,2;
AuthenticationServerIPAddress = ip; AuthenticationServerPort = int]
```

Operations Permitted

`Add, delete.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 251: AAANASAuthenticationServers Mandatory Attributes

Attribute	Value Range	Default	Description
`RealmOrCalledStation`	*String*	*N/A*	The Realm or CalledStationId to which the authentication server is associated.
`EncryptedSharedSecret`	*String*	*N/A*	The secret key that is shared between the AAA server and

Attribute	Value Range	Default	Description
			the remote authentication server.
`AssociationType`	*1, 2*	*N/A*	1= REALM, 2=CALLEDSTATION
`AuthenticationServerIPAddress`	*x.x.x.x*	*N/A*	The address of the authentication server to which an Access-Request message is forwarded.
`AuthenticationServerPort`	*0-65535*	*N/A*	The port of the authentication server to which an Access-Request message is forwarded.

Provisioning Configuration

AAA Provisioning Configuration Window

The AAA Provisioning Configuration window displays the four tables, including their parameters, used for the Address allocation policy. Moreover, it displays the AAA APN Configuration table, which allows the operator to define the IMS Private Identity (IMPI) association criteria for Early IMS Security on a Called-Station-Id (APN) basis.

Through this window, the tables depicted in the figure below can be provisioned and edited.

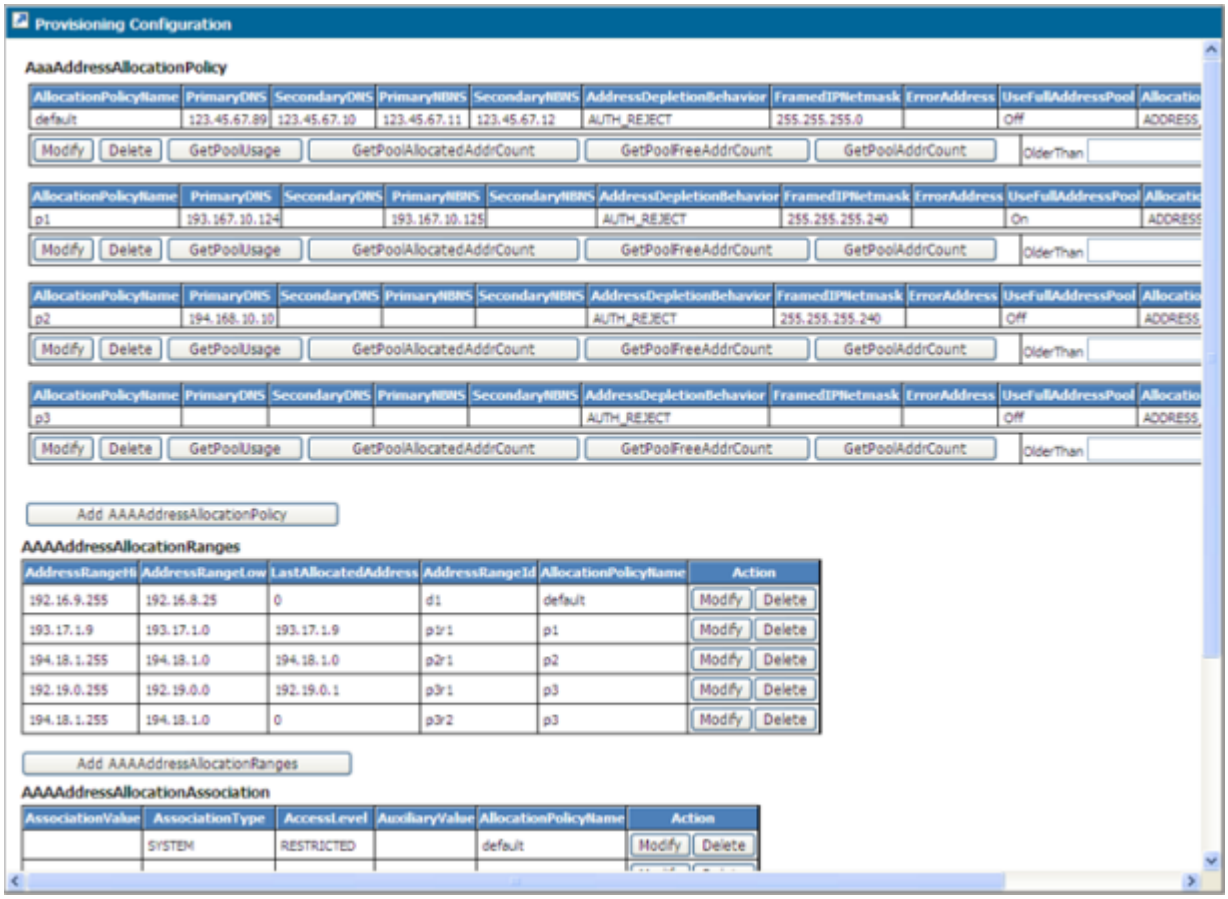

Figure 12: AAA Provisioning Configuration Window

The following section gives you detailed information on these tables and each of their parameters.

AAA Address Allocation Policy

Name

`AAAAddressAllocationPolicy`

Description

This table lists all of the allocation policies for each Address allocation policy.

Operations Permitted

`Add, display, modify, delete.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 252: AAAAdressAllocationPolicy Mandatory Attributes

Attribute	Value Range	Default	Description
`AllocationPolicyName`	String	"Default"	The name of the allocation policy.
`AllocationPolicyType`	0 ADDRESS_POOL 1 DHCP_IDENT 2 NO_IP_ALLOC	N/A	This field allows to define the address allocation policy for a specific Address allocation policy. 0 (ADDRESS_POOL): The AAA performs the IP address allocation procedure and sends back an IP address in the Access-Accept message. 1 (DHCP_IDENT)*: The AAA sends back a DHCP address instead of an IP address in the Access-Accept message. 2 (NO_IP_ALLOC)*: The AAA doesn't perform the IP address allocation procedure and in the case where the authentication is successful, the AAA won't send the Framed-IP-Address attribute (no IP address allocated to the user) in the Access-Accept message. **Note:** In the current release, there is a limitation on the length of the 'AAAUsername' for a AAA user with a AAA Address Allocation Policy of type 'DHCP_IDENT' or 'No_IP_ALLOC'. The following occurs: • The re-authentication of a AAA user fails, if its 'AAAUsername' is longer than 15 characters. • The authentication of a AAA user fails, if the first 15 characters of its 'AAAUsername' are the

Attribute	Value Range	Default	Description
			same as the ones of a AAA user already authenticated.

Table 253: AAAAddressAllocationPolicy Optional Attributes

Attribute	Value Range	Default	Description
`PrimaryDNS`	IP format (x.x.x.x)	Null	Contains the primary DNS server address for this APN.
`SecondaryDNS`	IP format (x.x.x.x)	Null	Contains the secondary DNS server address for this APN.
`PrimaryNBNS`	IP format (x.x.x.x)	Null	Contains the primary NetBios name server address for this APN.
`SecondaryNBNS`	IP format (x.x.x.x)	Null	Contains the secondary NetBios server address for this APN.
`FramedIPNetmask`	IP format (x.x.x.x)	Null	Contains the IP Netmask for this APN.
`ErrorAddress`	IP format (x.x.x.x)	Null	If the "AddressDepletionBehavior" field has been set to '1', the operator must define an "error address" to send in case of address depletion.
`UseFullAddressPool`	0 (Off), 1 (On)	0	Flag that enables or disables to use the full address pool before looking for a free address. 0(Off): The Full Usage of Address Pool feature is disabled and the original method is used to allocate IP Addresses, which consists in looking for a free address and allocating that first IP address that becomes free. 1(On): The Full Usage of Address Pool feature is

Attribute	Value Range	Default	Description
			enabled, which consists in allocating the least used IP address, hence fully using the pool.
AddressDepletionBehavior	0 (AUTH_REJECT) 1(ERROR_ADDRESS)	0	The behavior to implement in the case of addresss depletion. The choices are: 0 : send an Access-Reject 1: send an Access-Accept with an operator defined "error address" (i.e.0.0.0.0).
AuditLoggingEnabled	0 or 1	1	This flag allows the Network Operator to enable or disable the audit logging mechanism upon IP allocation and de-allocation for a specific Address allocation policy. 0: The audit logging mechanism is disabled which means that for the specified Address allocation policy, the AAA doesn't generate logs upon IP allocation and de-allocation. 1: The audit logging mechanism is enabled which means that for the specified Address allocation policy, the AAA generates logs upon IP allocation and de-allocation.

AAA Address Allocation Ranges

Name

AAAAddressAllocationRanges

Description

This table allows you to specify address ranges for specific Allocation Policies which are of type: Address Pool. Those ranges are identified by a starting address (Low) and an end address (Hi).

Operations Permitted

`Add, display, modify, delete.`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 254: AAAAddressAllocationRanges Mandatory Attributes

Attribute	Value Range	Default	Description
`AllocationPolicyName`	String	"Default"	The name of the allocation policy. This allocation policy must be of type: Address pool.
`AddressRangeHi`	String	Null	The upper IP address boundary within the range of that address pool. Must be an IPv4 IP address based on the following format: xxx.xxx.xxx.xxx.
`AddressRangeLow`	String	Null	The lower IP address boundary within the range of that address pool. Must be an IPv4 IP address based on the following format: xxx.xxx.xxx.xxx.
`AddressRangeId`	Integer	Null	The Range Identifier that must be unique within an address pool.

Table 255: AAAAddressAllocationRanges Optional Attributes

Attribute	Value Range	Default	Description
`LastAllocatedAddress`	IP Address (doted decimal notation: x.x.x.x)	N/A	Read-Only. This helps to keep track, among an IP Address range, of which IP address was the last one allocated by the AAA so far. Since the IP allocation is done sequentially, the last IP Address to have been allocated is always the highest one among the IP addresses already allocated.

AAA Address Allocation Association

Name

`AAAAddressAllocationAssociation`

Description

This table allows you to associate an Allocation Policy to one of the following attributes, in order to indicate how the AAA should make the allocation policy selection depending on the received attributes in the Access-Request message:

- SGSN Address
- SGSN Address combined with Called Station Id
- Realm
- Called-Station_id
- NAS Identifier
- System

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 256: AAAAddressAllocationAssociation Mandatory Attributes

Attribute	Value Range	Default	Description
`AllocationPolicyName`	String	"Default"	The name of the Allocation Policy.
`AssociationType`	0 (SYSTEM) 1 (REALM) 2 (CALLED_STATION_ID) 3 (NAS Identifier) 4 (SGSN Address) 5 (SGSN and Called Station)	0	Whether an allocation policy is associated with a realm, Called Station (APN), System, NAS Identifier, SGSN Address or a combination of the SGSN Address and Called Station.
`AssociationValue`	Char String (128) (ex: blueslice.com or	N/A	Value of the attribute to which the allocation policy is associated to.

Attribute	Value Range	Default	Description
	calledstation1)		In the case where the Association Type is set to 'SGSN and Called Station', this attribute must be provisioned with the SGSN Address and the AuxiliaryValue attribute (see below) can be provisioned with the Called Station Id. In case of absence of Realm or Called-Station-Id, the System allocation policy is used by default.
`AuxiliaryValue`	Char string (128)	N/A	For now, this parameter only needs to be provisioned in the case where the Association Type is set to 'SGSN and Called Station'. It allows to define the Called Station Id.
`AccessLevel`	0 (RESTRICTED) 1 (UNRESTRICTED)	0	A given Calling-Station-id (APN) may be associated to up to 2 different allocation policies, each with a different Restricted Access Level. 0:this level should be associated with an allocation policy which is only used for users who pass authentication. 1: this level should be associated with an allocation policy which may be associated with users who don't pass authentication.

AAA APN Configuration

Name

`AAAAPNConfigTable`

Description

This table allows the operator to define the IMS Private Identity (IMPI) association criteria for Early IMS Security on a Called-Station-Id (APN) basis.

WebCI Navigation
AAA ➤ Provisioning Configuration ➤ Add AAAAPNConfigTable

CLI Navigation
`Hss[]:AAAAPNConfigTable[]`

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]> add
AAAAPNConfigTable[CalledStationId=string;EarlyIMSSecurity=0,1;EarlyIMSSecurityFailureAction=0,1,2;
EarlyIMSSecurityIMPISelection=0,1,2,3]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 257: AAAAPNConfigTable Mandatory Attributes

Attribute	Value Range	Default	+
`CalledStationId`	String	None	The APN with Early IMS Security capabilities.
`EarlyIMSSecurity`	Boolean 0 (OFF) 1(ON)	0 (OFF)	Enables or disables the Early IMS Security function for the APN.
`EarlyIMSSecurity FailureAction`	0 (NOT_SET) 1 (PROCESS_ MESSAGE) 2 (DISCARD_ MESSAGE)	NOT_SET	The action (Proceed or DiscardMessage) to be taken in case an error occurs in the message.
`EarlyIMSSecurity IMPISelection`	0 (NOT_SET) 1 (CALLING_ STATION_ID) 2 (IMSI) 3 (USER_ NAME)	NOT_SET	Indicates to the HSS server to try and find a match between the IMPI provisioned with the Early IMS Security and one of the following attributes received in the RADIUS Accounting Reset message: CallingStationId, IMSI, or UserName.

Attribute	Value Range	Default	+
			Note: The CallingStationId is expected to carry the subscriber's MSISDN.

AAA Operations

The following section provides a description and the command syntax of the operations that can be performed on the AAA system through CLI.

GetNumberOfAccountingReqRcvd()

The GetNumberOfAccountingReqRcvd operation returns the number of accounting requests received from the NAS.

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfAccountingReqRcvd()
```

GetNumberOfAccountingReqSent()

The GetNumberOfAccountingReqSent operation returns the number of accounting requests sent to the Accounting Server.

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfAccountingReqSent()
```

GetNumberOfAccountingRespRcvd()

The GetNumberOfAccountingRespRcvd operation returns the number of accounting response received from the Accounting Server.

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfAccountingRespRcvd()
```

GetNumberOfAccountingRespSent()

The GetNumCurrentConnections operation returns the number of accounting response sent to the NAS from the Accounting Server.

Command syntax:

```
Hss[]:AAAStatistics[]> GetNumberOfAccountingRespSent()
```

GetNumberOfAccountingRespReturned()

The GetNumberOfAccountingRespReturned operation returns the number of returned accounting response to the NAS locally.

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfAccountingRespReturned()
```

GetNumberOfAccessRequest()

The GetNumberOfAccessRequest operation returns the number of access request

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfAccessRequest()
```

GetNumberOfAccessAccept()

The GetNumberOfAccessAccept operation returns the number of accepted access requests

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfAccessAccept()
```

GetNumberOfAccessReject()

The GetNumberOfAccessReject operation returns the number of rejected access requests.

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfAccessReject()
```

GetNumberOfRadiusDisconnect()

The GetNumberOfRadiusDisconnect operation returns the number of Radius Disconnect

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfRadiusDisconnect()
```

GetNumberOfRadiusDisconnectAck()

The GetNumBackupPeers operation returns the number of Radius Disconnect acknowledgment.

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfRadiusDisconnectAck()
```

GetNumberOfRadiusDisconnectNack()

The GetNumActiveSessions operation returns the number of Radius Disconnect Negative acknowledgment.

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfRadiusDisconnectNack()
```

GetNumberOfDataContextTimeout()

The GetNumberOfDataContextTimeout operation returns the number of data context time out

Command syntax:

```
Hss[]:AAAStatistics[]> GetNumberOfDataContextTimeout()
```

GetNumberOfDiscardedPackets()

The GetNumberOfDiscardedPackets operation returns the number of discarded packets

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfDataContextTimeout()
```

GetNumberOfAccessChallenge()

The GetNumberOfAccessChallenge operation returns the number of Access Challenge messages.

Command syntax:

```
Hss[]:AAAStatistics[]>GetNumberOfAccessChallenge()
```

GetPoolUsage()

The GetPoolUsage operation returns the percentage of used IP address in the pool.

Example 23.56 equal to 23.56% pool usage

Command syntax

```
Hss[]:AAAAddressAllocationPolicy[AddressPoolName = addresspool1]>
GetPoolUsage()
```

GetPoolAllocatedAddrCount()

The GetPoolAllocatedAddrCount operation returns the total number of IP addresses used in the pool. The result is for all ranges within the pool

Command syntax:

```
Hss[]:AAAAddressAllocationPolicy[AddressPoolName = addresspool1]>
GetPoolAllocatedAddrCount()
```

GetPoolFreeAddrCount()

The GetPoolFreeAddrCount operation returns the total number of available (not yet used) IP addresses in the pool. The result is for all ranges within the pool

Command syntax:

```
Hss[]:AAAAddressAllocationPolicy[AddressPoolName = addresspool1]>
GetPoolFreeAddrCount()
```

GetRangeUsage()

The GetRangeUsage operations returns the percentage of used IP address in the current range Id within the specified pool.

Command syntax:

```
Hss[]:AAAAddressAllocationPolicy[AddressPoolName =
addresspool1]:AAAAddressPoolRanges[AddressRangeId = 4]> GetRangeUsage()
```

GetRangeAllocatedAddrCount()

The GetRangeAllocatedAddrCount operation returns the total number of IP addresses used in the current range Id within the specified pool

Command syntax:

```
Hss[]:AAAAddressAllocationPolicy[AddressPoolName =
addresspool1]:AAAAddressPoolRanges[AddressRangeId = 4]>
GetRangeAllocatedAddrCount()
```

GetRangeFreeAddrCount()

The GetRangeFreeAddrCount operation returns the total number of available IP addresses in the current range Id within the specified pool

Command syntax:

```
Hss[]:AAAAddressAllocationPolicy[AddressPoolName =
addresspool1]:AAAAddressPoolRanges[AddressRangeId = 4]>
GetRangeFreeAddrCount()
```

GetRangeAddrCount()

The GetRangeAddrCount operation returns the total number of addresses in the pool (equal number of used addresses + number of free addresses) in the current range Id within the specified pool

Command syntax:

```
Hss[]:AAAAddressAllocationPolicy[AddressPoolName =
addresspool1]:AAAAddressPoolRanges[AddressRangeId = 4]> GetRangeAddrCount()
```

GetRangeLastAllocatedAddr()

The GetRangeLastAllocatedAddr operation returns the last IP address that has been allocated in the current range Id within the specified pool

Command syntax:

```
Hss[]:AAAAddressAllocationPolicy[AddressPoolName =
addresspool1]:AAAAddressPoolRanges[AddressRangeId = 4]>
GetRangeLastAllocatedAddr()
```

Chapter 8

ENUM Server

Topics:

- *DNS Configuration.....446*
- *DNS Domain Name List.....447*
- *DNS Listen Addresses Configuration.....449*
- *DNS Enum User Template.....451*

DNS Configuration

Name

`DNSConfig`

- Entity in the database and CLI: `DNSConfig`
- Name of table in the WebCI: :`ENUM Server Config`

Description

This entity allows the operator to enable/disable the feature that supports the Enum Server and also allows the operator to set the maximum number of Enum Users that can be configured under the same subscription Id.

CLI Navigation
`Hss[]> DNSConfig`

WebCI Navigation
ENUM folder ➤ ENUM Server Configuration ➤ ENUM Server Config

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]>display DNSConfig[FeatureEnabled=0,1; MaxEnumUserIdPerSub=0-65535]
```

Operations Permitted

`Display, modify`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 258: DNSConfig Mandatory Attributes

Attribute	Value Range	Default	Description
`FeatureEnabled`	0 or 1	0	This parameter indicates whether or not the ENUM Server functionality is enabled or disabled. 1(On): The ENUM Server functionality is enabled.

Attribute	Value Range	Default	Description
			0 (Off): The ENUM Server functionality is disabled.
MaxEnumUserIdPerSub	0-65535	65535	This parameter defines the maximum number of Enum Users that the operator can provision in the system for one subscription Id.

Table 259: DNSConfig Optional Attributes

Attribute	Value Range	Default	Description
EnumCacheSize	Integer unsigned	0	Maximum size of memory (in bytes) allowed to be allocated for the Enum Cache. A value of "0" means that the Enum Cache is disabled.

CLI Example

```
Hss[]>display DNSConfig[]
```

DNS Domain Name List

Name

- Entity in the database and CLI: `DNSDomainNameList`
- Name of table in the WebCI: `Domain Name List Configuration`

Description

- This entity allows the operator to define the different Domain Names supported by the Enum Server. When processing the DNS Query received, the Enum Server verifies that the domain name is supported, by comparing the domain name extracted from the DNS Query with the list of domain names configured by the operator in this entity.

CLI Navigation

```
Hss[]> DNSDomainNameList
```

WebCI Navigation:
ENUM folder ➤ Provisioning Configuration ➤ Domain Name List Configuration

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]> add DNSDomainNameList[EnumDomainName= varchar; EnumDomainNameId=int;
DefaultEnumDomainName=0,1]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 260: DNSDomainNameList Mandatory Attributes

Attribute	Value Range	Default	Description
`EnumDomainName`	Varchar (128)	N/A	Domain Name of the ENUM Server.
`EnumDomainNameId`	integer	N/A	Identifies a Domain Name. This identifier is used when configuring a new EnumUser, as follows: A domain name, defined in the DNSDomainNameList entity, can be associated to an EnumUser. This association is done by specifying this Identifier. The Enum User's associated domain name is the one used in the comparison of the domain name supported and the domaine name extracted from the DNS Query. If the EnumDomainNameId is not provided, the Default EnumDomainName will apply. See description for DefaultEnumDomainName.
`DefaultEnumDomainName`	0 or 1	0	This parameter defines whether or not the EnumDomainName being created should be considered as the Default one that will be affected to each EnumUser for which the field EnumDomainNameId is not provided at provisioning time. *

Attribute	Value Range	Default	Description
			Note: Only one EnumDomainName defined can be used as the default domain name. 0(Off): The EnumDomainName being created should not be used as the default one for Enum Users for which the field EnumDomainNameId has not been provided at provisioning time. 1(On): The EnumDomainName being created should be used as the default one for Enum Users for which the field EnumDomainNameId has not been provided at provisioning time.* **Note:** Only one entry of this entity can have the DefaultEnumDomainName field set to this value.

CLI Example

```
Hss[]> add DNSDomainNameList[EnumDomainName= e164.arpa; EnumDomainNameId=1;
DefaultEnumDomainName=1]
```

DNS Listen Addresses Configuration

Name

- Entity in the database and CLI: `DNSListenAddresses`
- Name of table in the WebCI: `:DNS Listen Addresses Configuration`

Description

This entity allows the operator to define the different DNS Listen Addresses (up to 2 listen addresses can be configured for the whole system) and Port Numbers on which the DNS Server will listen for incoming DNS Queries trough UDP transport.

CLI Navigation
`Hss[]> DNSListenAddresses`

WebCI Navigation
ENUM folder ➤ ENUM Server Configuration ➤ DNS Listen Addresses Configuration

CLI Inherited Attributes:

None

CLI Command Syntax

```
Hss[]> add DNSListenAddresses[Netmask= varchar; DNSListenAddress=varchar;
DNSListenPort=int]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 261: DNSListenAddresses Mandatory Attributes

Attribute	Value Range	Default	Description
`Netmask`	Varchar(128)	N/A	Netmask used with the IP address.
`DNSListenAddress`	Varchar(128) IP address	N/A	Configured IP address on which connection will be accepted. All local interfaces are configured to accept incoming connections.
`DNSListenPort`	unsigned int	N/A	The listening port on which the Enum Server can receive the DNS Queries. The default listening port of ENUM server is 53.

CLI Example

```
Hss[]> add DNSListenAddresses[Netmask= 255.255.255.0;
DNSListenAddress=192.168.10.99; DNSListenPort=53]
```

DNS Enum User Template

Name

- Entity in the database and CLI: `DNSEnumUserTemplate`
- Name of table in the WebCI: `:DNS Enum User Template`

Description

This entity allows to provision templates for ENUM profiles that can be shared by multiple subscriptions.

CLI Navigation
`Hss[]> DNSEnumUserTemplate`

WebCI Navigation
ENUM folder ➤ ENUM Server Configuration ➤ DNS Enum User Template

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]> add DNSEnumUserTemplate[DNSEnumUserTemplateId= int; NAPTRRegExp=
varchar]
```

Operations Permitted

`Add, display, modify, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 262: DNSEnumUserTemplate Mandatory Attributes

Attribute	Value Range	Default	Description
`DNSEnumUserTemplateId`	Smallint (5) unsigned	N/A	Identification of the template to be used for provisioning the Enum User.
`NAPTRRegExp`	Varchar(128)	N/A	The regular expression that corresponds to this phone number.

Table 263: DNSEnumUserTemplate Optional Attributes

Attribute	Value Range	Default	Description
NAPTROrder	Smallint (5) unsigned	10	A number indicating to the ENUM client the mandatory order for processing the NAPTR records.
NAPTRPreference	Smallint (5) unsigned	10	A number indicating to the ENUM client the mandatory order for processing the NAPTR records having the same NaptrOrder in the DNS answer.
NAPTRFlags	Varchar(8)	'u'	Set to "u" for IMS Networks. This value is sent in the reply.
NAPTRServices	varchar(96)	'E2U+sip'	Set to "E2U+sip" for IMS Networks. This value is sent in the reply. (Used for Sip services).
NAPTRReplacement	Varchar(128)	N/A	The next NAME to query for NAPTR. This value must be a fully qualified domain name.
NAPTRTtl	int(10) unsigned	3600	The Time To Live of the NAPTR record.
EnumDomainNameId	integer	N/A	Identification of one of the Domain Names already defined in the system's DNSDomainNameList entity. Specifying the Id of a Domain Name is associating a Domain Name to an Enum User Template. The Enum User Template's associated domain name is the supported domain name used by the Enum Server to compare the domain name extracted from the DNS Query.

Note: The provisioning system enforces the uniqueness of the NAPTR records (in the context of this application defined as the combination of NAPTRFlags, NAPTRServices, NAPTRRegExp and NAPTRReplacement) and also the uniqueness of DNSEnumUserTemplateId.

CLI Example

```
Hss[]> add DNSEnumUserTemplate[DNSEnumUserTemplateId= 1; NAPTRRegExp=
!^.*$!sip:information@examplecom!]
```

Chapter 9

LTE-HSS

Topics:

- *LTE-HSS Configuration.....454*
- *LTE-HSS System Features.....465*
- *LTE-HSS Operations.....467*

This chapter provides details on the LTE-HSS entities, their CLI commands, operations, error notifications and performance counts.

LTE-HSS Configuration

LTE-HSS Configuration

Name

`LteHssConfig`

Description

This entity allows to provision the LTE HSS configuration parameters used at system startup.

Note: The LTE HSS Server Configuration is static, which means that it cannot be modified while the HSS is running. The HSS has to be stopped before being able to modify this entity. After a restart, the new configuration is taken into account.

CLI Navigation

```
LteHss[]> LteHssConfig[]
```

CLI Inherited Attributes

None

CLI Command Syntax

```
LteHss[]>display LteHssConfig [SlotId = integer; OriginatingRealm = string;
LocalFQDN = string; TCPTransport = 0,1; LocalTCPPort = integer; SCTPTransport
= 0,1; LocalSCTPPort = integer; AutomaticPeerReconnect = 0,1;
FeatureEnabled=0,1;OdbNotSupportedAcceptMessage=0,1;
FeatureNotSupportedAcceptMessage = 0,1;ExtraAIRQueryForEPSSubscription =
0,1;SuperChargedEnabled = 0,1;CLREnabled = 0,1;AMFAdaptationEnabled =
0,1;HlrProxySynchroneMode = 0,1]
```

Operations Permitted

Display, modify (only the DeregistrationDefString attribute can be modified).

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 264: LteHssConfig Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 14	N/A	Read only. Numerical identification of slot on shelf. Identifies the slot on which the configuration will apply for the LTE-HSS.

Table 265: LteHssConfig Optional Attributes

Attribute	Value Range	Default	Description
`Originating Realm`	String (100) (ex: blueslice.org)	origin realm.com	The Realm to which the HSS is belonging. The Diameter Realm to be configured for the LTE-HSS on the current SlotId.
`LocalFQDN`	FQDN (ex:oneHss @blueslice.org)	local fdqn.com	The Diameter Origin Host to be configured for the LTE-HSS on the current SlotId. Value used to uniquely identify the LTE-HSS node for purposes of duplicate connection and routing loop detection.
`TCPTransport`	0 or 1	1	Enables or disables TCP transport protocol for the LTE-HSS. 0 = disabled 1 = enabled
`LocalTCPPort`	Unsigned Integer (32)	3868	The local TCP listening port on which LTE-HSS will accept connections from remote Diameter Peers.
`SCTPTransport`	0 or 1	0	Enables or disables the SCTP transport protocol for the LTE-HSS. 0 = Disables SCTP transport. 1 = Enables SCTP transport.
`LocalSCTPPort`	Unsigned Integer (32)	3869	The local SCTP listening port on which the LTE-HSS will accept connections from the remote Diameter Peers.
`AutomaticPeer Reconnect`	0 or 1	0	If the LTE-HSS has accepted a connection from the Diameter Peer but there is a failure of the connection on the Diameter Peer's side, the LTE-HSS will either try to reconnect automatically or not with the Diameter Peer. 0 = No automatic reconnection 1 = Automatic reconnection
`FeatureEnabled`	0,1	0	To indicate if the LTE-HSS application is enabled or not. 0: LTE-HSS application is not enabled. 1: LTE-HSS application is enabled.

Attribute	Value Range	Default	Description
			This parameter should remain set at 1. It will be mainly useful in future releases.
`OdbNotSupported AcceptMessage`	Bool (0,1)	1	1: If this flag is set to true and the MME/SGSN does not send any supported feature in the ULR, the LTE-HSS sends the LTE-HSS ODB supported feature in the ULA. The ODB-all-APN, ODB-HPLMN-APN and ODB-VPLMN-APN flags are sent in the ULA if the ULR was received over the S6a interface (MME). The ODB-all-APN, ODB-HPLMN-APN, ODB-VPLMN-APN, ODB-all-OG,ODB-all-InternationalOG, ODB-all-InternationalOGNotTo HPLMN-Country, ODB-all-InterzonalOG, ODB-all-InterzonalOGNotTo HPLMN-Country and ODB-all-InterzonalOGAnd InternationalOGNotTo HPLMN-Country flags are sent in the ULA if the ULR was received over the S6d interface (SGSN). Moreover, if the flag is set to 'true' (1), whatever the ODB configuration is, the status sent is always 'Service_Granted'. 0: If this flag is set to false and the MME/SGSN does not send any supported feature in the ULR, the HSS won't send any HSS ODB supported feature in the ULA. If the supported feature attribute is received in ULR, the LTE-HSS will apply them against the one supported whatever the value of the OdbNotSupportedAcceptMessage flag.
`FeatureNot SupportedAccept Message`	Bool (0,1)	0	1: If set to true, if a ULR is received without any Supported Features attribute, the ULR won't be rejected. If the ULR is received without the RegSub flag (part of the Supported Feature attribute) set in the Supported Feature, the lte-HSS may reject the location update. 0:If this flag is set to false, the ULR won't be rejected even if there is no Supported Feature Attribute within the ULR.

Attribute	Value Range	Default	Description
ExtraAIR QueryForEPS Subscription	Bool (0,1)	0	This flag is for optimization purposes, in order to avoid an extra query to the Database. If upon an AIR message, the IMSI in the request is known but the subscriber has no EPS or GPRS subscription, the LTE-HSS may (as a configuration option) return a result code of DIAMETER_ERROR_ UNKNOWN_EPS_SUBSCRIPTION. If this flag is set, the LTE-HSS will always do the test, if not the LTE-HSS will return the authentication vector even if there is no EPS/GPRS subscription configured for the received IMSI.
SuperCharged Enabled	Bool (0,1)	0	If this flag is set to true, the HSS will manage Subscription Data age and in certain condition upon Location Update the subscription data won't be sent to the MME/SGSN.
CLREnabled	Bool (0,1)	1	If this flag is set to true, the LTE-HSS will send Cancel Location to the old MME/SGSN upon Update Location Procedure. If this flag is not set, Cancel Location will not be sent.
AMFAdaptation Enabled	Bool (0,1)	0	If this flag is set to true, the LTE-HSS enforces the AMF separation bit to 1 upon E-UTRAN authentication.
HlrProxy SynchroneMode	Bool (0,1)	0	This flag is used for the 3G-4G mobility with legacy HLR. When the LTE-HSS receives a Location Update on the 4G network and the user was 3G registered, a Cancel Location needs to be sent. If the LTE-HSS detects that the Cancel Location needs to be sent toward a legacy HLR, the LTE-HSS will request the HLR proxy to build a MAP UL. This MAP UL will be sent to the legacy HLR by the HLR Proxy. If this flag is set to true, the LTE-HSS upon reception of a Location Update that trigger a MAP-UL toward the HLR proxy will wait the MAP-UL-Ack from the legacy HLR to send back the IDA to the MME/SGSN. If the flag is set to false, the IDA is sent in the same time the MAP-UL is triggered without waiting any answer from the legacy network.

CLI Example

```
Hss[]>display HssConfig [SlotId = 5]
```

LTE-HSS Configuration TCP Listen Address

Name

`LteHssConfigTCPListenAddress`

Description

The LTE HSS can accept incoming Diameter connections over TCP through several local IP addresses. This is done by adding new entries in the LteHssConfigTCPListenAddress entity. This configuration is static, which means that in order to commit add/modify/delete changes performed on entries in this entity, the LteHss service must be restarted.

CLI Navigation

```
LteHss[]> LteHssConfig[]> LteHssConfigTCPListenAddress[]
```

CLI Inherited Attributes

`SlotId`

CLI Command Syntax

```
LteHss[]>LteHssConfig[SlotId = 5]>display LteHssConfigTCPListenAddress
[SlotId = integer; Address = IPAddress; Netmask=string]
```

Operations Permitted

`Add, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 266: LteHssConfigTCPListenAddress Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 4294976295	N/A	Read only. The HSS SlotId on which the IP address needs to be configured.
`Address`	String (100) IPAddress or DNS resolvable name	N/A	The IP address for the TCP connections. If this address is not already created on the SlotId, it will get created on the fly when the LTE-HSS is started.
`Netmask`	String(15)	N/A	Netmask used by the IP address that is being configured.

CLI Example

```
LteHss[]> LteHssConfig[SlotId = 5]>display LteHssConfigTCPListenAddress
[Address = 192.168.30.67; Netmask= 255.255.255.0]
```

LTE-HSS Configuration SCTP Listen Address

Name

`LteHssConfigSCTPListenAddress`

Description

The LTE HSS can accept incoming Diameter connections over SCTP thru several local IP addresses. This is done by adding new entries in the LteHssConfigSCTPListenAddress entity. This configuration is static. In order to commit add/modify/delete changes performed on entries in this entity, the LteHss service must be restarted.

CLI Navigation

```
LteHss[]> LteHssConfig[]> LteHssConfigSCTPListenAddress
```

CLI Inherited Attributes

`SlotId`

CLI Command Syntax

```
LteHss[]> LteHssConfig[SlotId = 5]>display LteHssConfigSCTPListenAddress
[SlotId = integer; Address = IPAddress; Netmask=string]
```

Operations Permitted

`Add, Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 267: LteHssConfigSCTPListenAddress Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 4294976295	N/A	Read only. The HSS SlotId on which the IP address needs to be configured.
`Address`	String (100) IPAddress or DNS resolvable name	N/A	The IP address for the STCP connections. If this address is not already created on the SlotId, it will get created on the fly when the LTE-HSS is started.

Attribute	Value Range	Default	Description
Netmask	String(15)	N/A	Netmask used by the IP address that is being configured.

CLI Example

```
LteHss[]:LteHssConfig[SlotId = 5]>display LteHssConfigSCTPListenAddress
[Address = 192.168.30.68; Netmask=255.255.255.0]
```

LTE-HSS Configuration Destination Realm

Name

LteHssConfigDestinationRealm

Description

To provision the domains only from which the connections are accepted. The LTE HSS can restrict Diameter Realm that will be authorized to connect with it. One way of restricting Realms is to define a list of authorized diameter realms by adding new entries in the LteHssConfigDestinationRealm entity. This entity can be modified dynamically, which means that the LteHss service doesn't need to be restarted when adding/removing/updating entries in this entity.

CLI Navigation

```
LteHss[]>LteHssConfig[]> LteHssConfigDestinationRealm
```

CLI Inherited Attributes

SlotId

CLI Command Syntax

```
LteHss[]> LteHssConfig[SlotId = 5]>display LteHssConfigDestinationRealm
[LocalRealm = FQDN; CLREnabled=0,1]
```

CLI Operations Permitted

Add, display, delete

Note: Not all users (User Groups) are allowed to perform these operations.

CLI Attributes and Values

Table 268: LteHssConfigDestinationRealm Mandatory Attributes

Attribute	Value Range	Default	Description
LocalRealm	FQDN (ex:ims.blueslice.com)	N/A	Name of the Domain to which the LTE-HSS belongs to.

Table 269: LteHssConfigDestinationRealm Optional Attributes

Attribute	Value Range	Default	Description
CLREnabled	Bool (0,1)	1	If this flag is set to true ('1'), the LTE-HSS will send Cancel Location to the old MME/SGSN upon Update Location Procedure. If this flag is set to false ('0'), Cancel Location will not be sent.

CLI Example

```
LteHss[]> LteHssConfig[SlotId = 5]>display LteHssConfigDestinationRealm
[LocalRealm = ims.blueslice.com]
```

LTE-HSS Configuration Destination Hosts

Name

LteHssConfigDestinationHosts

Description

To provision the hosts only from which the connections are accepted. The LTE HSS can restrict the Diameter Peers that will be authorized to connect with it. One way of restricting the Peer is to define a list of authorized diameter hosts by adding new entries in the LteHssConfigDestinationHosts entity. This entity can be modified dynamically, which means that the LteHss service doesn't need to be restarted when adding/removing/updating entries in this entity.

Note: If this list is empty, the LTE-HSS will accept incoming Diameter Connection from any Diameter Host. As soon as one entry is added in this list, the LTE-HSS will check each incoming CER against this list and reject it if needed.

CLI Navigation

```
LteHss[]> LteHssConfig []> LteHssConfigDestinationHosts
```

CLI Inherited Attributes

SlotId

CLI Command Syntax

```
LteHss[]> LteHssConfig[SlotId = 5]>display LteHssConfigDestinationHosts
[LocalFQDN = FQDN; CLREnabled=0,1]
```

Operations Permitted Display, Delete, Add

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 270: LteHssConfigDestinationHosts Mandatory Attributes

Attribute	Value Range	Default	Description
LocalFQDN	FQDN (ex: hss.ims.blueslice.com)	N/A	The diameter host authorized to establish a new Diameter Connection with the HSS. This value needs to be set to the value in the originating host AVP of the CER message that will be received during the Diameter connection set up.

Table 271: LteHssConfigDestinationHosts Optional Attributes

Attribute	Value Range	Default	Description
CLREnabled	0 (Off) ,1 (On)	0 (Off)	This value overloads the CLREnabled value in the HSSConfig entity. This is used to manage CLR per diameter host and not system wide. If this value is set to false, each time a CLR needs to be sent to this host, the CLR will be dropped by the HSS and the host won't receive any CLR.

CLI Example

```
LteHss[]> LteHssConfig[SlotId = 5]>display LteHssConfigDestinationHosts
[LocalFQDN = hss.ims.blueslice.com]
```

HSS PLMN

Name

HSSPLMN

Description

This entity allows to configure IMSI ranges for MCC and MNC. This defines the Mobile Country Code and the Mobile Network Code for a range of IMSIs. This will be used in case of roaming in order to check depending where the user is located if it is allowed to roam or not. This is done by adding new entries in the HSSPLMN entity. This entity can be modified dynamically, which means that the LTE-HSS doesn't need to be restarted when adding/removing/updating entries in this entity.

CLI Navigation

```
LteHss[]> HSSPLMN
```

CLI Inherited Attributes

None

CLI Command Syntax

```
LteHss[]> HSSPLMN[ImsiRange = string; ImsiMcc= uint; ImsiMnc= uint]
```

Operations Permitted

```
Add, display, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 272: HSSPLMN Mandatory Attributes

Attribute	Value Range	Default	Description
ImsiRange	String	N/A	The Range of IMSI for which the MCC and MNC apply.
ImsiMcc	Unsigned int 32	N/A	The Mobile Country Code for the IMSI range.
ImsiMnc	Unsigned int 32	N/A	The Mobile Network Code for the IMSI range

CLI Example

```
LteHss[]> HSSPLMN[ImsiRange = 3109104; ImsiMcc=123; ImsiMnc=654]
```

GMLC Node List

Name

```
GMLCNodeList
```

Description

This entity allows the operator to configure a list of valid network nodes. These nodes are used to validate the Gateway Mobile Location Center (GMLC) number contained in the RIR (Routing Information Request) to ensure it belongs to a network authorized to request User Equipment (UE) information.

This entity can be modified dynamically.

CLI Navigation

```
LteHss[]> GMLCNodeList
```

CLI Inherited Attributes

None

CLI Command Syntax

```
LteHss[]> GMLCNodeList[NodeNumber = integer]
```

Operations Permitted

```
Add, display, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 273: GMLCNodeList Mandatory Attributes

Attribute	Value Range	Default	Description
NodeNumber	Integer (up to 15 digits)	None	A valid GMLC node number.

CLI Example

```
LteHss[]> GMLCNodeList[NodeNumber =1]
```

LTE HSS Realms

Name

```
LteHssRealms
```

Description

This entity allows the operator to configure a host, an IMSI range and a realm. Each IMSI range is associated with a specific host and realm value. It is used when the LTE-HSS receives a diameter request message from a node in another network and needs to determine the host and realm values to send in the response. It is also used when the LTE-HSS initiates a request message.

This entity can be modified dynamically, which means the LTE-HSS does not need to be restarted when adding or deleting entries in this entity.

CLI Navigation

```
LteHss[ ]> LteHssRealms[ ]
```

CLI Inherited Attributes

None

CLI Command Syntax

```
LteHss[ ]> LteHssRealms[Host=string, ImsiRange=string, Realm=string]
```

Operations Permitted

```
Add, display, delete
```

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 274: LteHssRealms Mandatory Attributes

Attribute	Value Range	Default	Description
ImsiRange	String	N/A	The range of IMSIs fthat define an operator.
Realm	String	N/A	A diameter realm associated with an IMSI range.

Table 275: LteHssRealms Optional Attributes

Attribute	Value Range	Default	Description
Host	String (Fully Qualified Domain Name)	N/A	A diameter host associated with an IMSI range.

CLI Example

```
LteHss[ ] > LteHssRealms[Host=hss320.lte.blueslice.com, ImsiRange=320910,
Realm=lte.blueslice.com]
```

LTE-HSS System Features

LTE-HSS System Options

Name

`LteHssOptions`

Description

This entity allows the operator to activate or deactivate LTE-HSS logging. It can be modified dynamically without the need for a system restart.

Before modifying the CaleaLogDir, CaleaLogName and CaleaMaxLogFile attributes the LTE-HSS service must be stopped. Make the modifications and restart the LTE-HSS service.

This entity also allows the operator to activate or deactivate the "Support for multiple realm" feature dynamically.

CLI Navigation

`LteHss[]> LteHssOptions[]`

CLI Inherited Attributes

None

CLI Command Syntax

```
LteHss[] > LteHssOptions [CaleaLogging = 0,1; CaleaLogDir = string;
CaleaLogName = string ;CaleaMaxLogFile = integer; SupportMultiRealm = 0,1]
```

Operations Permitted

Display, modify.

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 276: LteHssOptions Optional Attributes

Attribute	Value Range	Default	Description
`CaleaLogging`	0 or 1	0	This flag indicates the activation status of LTE-HSS Logging for the following diameter message types: Location Update Request, Authentication Information Request, Notify Request, Purge UE Request and Cancel Location Request. **0 (Deactivated)** = The LTE-HSS logging mechanism is deactivated. No LTE-HSS logging takes place. **1 (Activated)** = The LTE-HSS logging mechanism is activated. Lines are added to the LTE-HSS log file when certain diameter message types are received. This parameter is dynamically activated
`CaleaLogDir`	string	/blue/var/log/csv	The location of the LTE-HSS log directory. When modifying this attribute the LTE-HSS service must be stopped, the changes made and the LTE service restarted.
`CaleaLogName`	string	lteHSSCaleaLogs	The name of the LTE-HSS log file. When modifying this attribute the LTE-HSS service must be stopped, the changes made and the LTE service restarted.
`CaleaMaxLogFile`	Unsigned Integer (32)	50000	The maximum number of lines in the LTE-HSS log file.

Attribute	Value Range	Default	Description
			When modifying this attribute the LTE-HSS service must be stopped, the changes made and the LTE service restarted.
SupportMultiRealm	0 or 1	0	This flag indicates the activation status of multiple realm support. **0 (Deactivated)** = The multi realm support is deactivated.. **1 (Activated)** = The multi realm support is activated. This parameter is dynamically activated

CLI Example

```
LteHss[]> LteHssOptions [CaleaLogging = 0, CaleaLogDir = /blue/var/log/csv,
CaleaLogName = lteHSSCaleaLogs, CaleaMaxLogFile= 500000, SupportMultiRealm
= 1]
```

LTE-HSS Operations

This section describes the LTE-HSS operations available from the CLI.

LTE MAP Options

This option is linked with the 3G-4G mobility feature using a legacy HLR. When a user roams from a 3G to a 4G network, the LTE-HSS needs to send a MAP-UL to the legacy HLR upon the reception of the Diameter ULR message. If the MAP-UL is lost or not sent, the legacy HLR thinks that the user is still registered in a "real" 3G network. If the user roams from MME to MME, the LTE-HSS doesn't send again a MAP-UL, since the user remains within a 4G network. Now, if the user roams back to 3G, the legacy HLR doesn't send any MAP-CL to the LTE-HSS (the HLR Proxy functionality), since no MAP-UL has been previously received from the SDM ngHLR's HLR Proxy functionality. The user is then registered in both 3G and 4G networks. In order to resynchronize the network, the LTE-HSS offers to the Network Operator the ability to perform the following operation: **ProxyLteUpLocToLegacyHlr()**.

This operation is under the **LteMapOptions entity.**

When this operation is invoked, the LTE HSS sends a MAP-UL message on each ULR received from the MME/SGSN. This resynchronizes the legacy HLR if one MAP-UL has been lost between the SDM ngHLR's HLR Proxy and the legacy HLR.

Note: Enabling this feature will trigger overhead on the network especially upon MME/MME roaming.

Command syntax:

```
LteHss[]:> LteMapOptions[]> ProxyLteUpLocToLegacyHlr()
```

LTE Peer Statistics

The **LtePeersStatistics** entity provides operations to retrieve the list of connected diameter peers.

From this entity, the two available operations are available:

GetPeerList()

This operation returns the full list of Diameter Peers (MME,SGSN, ect…) that are or have been connected to the LTE-HSS. It gives the Diameter Identities of the Peers, the type of connection used, the connection status and the number of time the Peer has been disconnected.

Example:

```
13 :LteHss[]:LtePeersStatistics[]>
OriginLteHost           |  OriginLteRealm     |  ConnectionStatus  |
PeerTransportType  |  DisconnectTime
-------------------------------------------------------------------------------------------------------
mme1.lte.blueslice.com  |  lte.blueslice.com  |  DISCONNECTED      |  TCP
       |  1
sgsn1.lte.blueslice.com |  lte.blueslice.com  |  DISCONNECTED     |  TCP
      |  1
gw.lte.blueslice.com    |  lte.blueslice.com  |  DISCONNECTED      |  TCP
       |  1
```

Note: DisconnectTime is the number of time the corresponding peer has connected to the LTE-HSS.

GetConnectedPeers()

This operation returns the list of Diameter Peers that are currently connected to the LTE-HSS.

Example:

```
16 :LteHss[]:LtePeersStatistics[]> GetConnectedPeers()
OriginLteHost           |  OriginLteRealm     |
-----------------------------------------------
mme1.lte.blueslice.com  |  lte.blueslice.com  |
sgsn1.lte.blueslice.com |  lte.blueslice.com  |
gw.lte.blueslice.com    |  lte.blueslice.com  |
```

LTE Statistics

The **LteStatistics** entity provides all the operations that allow to retrieve the result of each LTE-HSS counter (PM).

The operations are listed in alphabetical order:

- `GetNumberOfAIA()`
- `GetNumberOfAIR_INVALID_PARAMETER()`
- `GetNumberOfAIR_MISSING_MANDATORY_PARAMETER()`
- `GetNumberOfAIA_MISSING_AVP()`
- `GetNumberOfAIA_UNABLE_TO_COMPLY()`
- `GetNumberOfAIA_AUTHORIZATION_REJECTED()`
- `GetNumberOfAIA_FEATURE_UNSUPPORTED()`
- `GetNumberOfAIA_SUCCESS()`
- `GetNumberOfAIA_UNKNOWN_EPS_SUBSCRIPTION()`

- GetNumberOfAIA_USER_UNKNOWN()
- GetNumberOfAIR()
- GetNumberOfAIR_OK()
- GetNumberOfAuthInfoAckRemoteRcvd()
- GetNumberOfBlackListIMSIMatch()
- GetNumberOfBlackListIMSIMisMatch()
- GetNumberOfBlackListReturned()
- GetNumberOfBlackListReturnedGlobalResp()
- GetNumberOfCancelLocationAckRemoteRcvd()
- GetNumberOfCancelLocationReqRemoteRcvd()
- GetNumberOfCLR()
- GetNumberOfCLA()
- GetNumberOfCLR_MME_UPDATE_PROCEDURE()
- GetNumberOfCLRRemoteSent()
- GetNumberOfCLR_SGSN_UPDATE_PROCEDURE()
- GetNumberOfCLR_SUBSCRIPTION_WITHDRAWAL()
- GetNumberOfCLR_UPDATE_PROCEDURE_IWF()
- GetNumberOfCLR_INITIAL_ATTACH_PROCEDURE()
- GetNumberOfCLA_OK()
- GetNumberOfCLA_INVALID_PARAMETER()
- GetNumberOfCLA_MISSING_MANDATORY_PARAMETER()
- GetNumberOfDSA()
- GetNumberOfDSA_OK()
- GetNumberOfDSA_INVALID_PARAMETER()
- GetNumberOfDSA_MISSING_MANDATORY_PARAMETER()
- GetNumberOfDSR()
- GetNumberOfDSRRemoteSent()
- GetNumberOfDynamicIMSIRecording()
- GetNumberOfGreyListReturned()
- GetNumberOfGreyListReturnedGlobalResp()
- GetNumberOfIDA()
- GetNumberOfIDA_OK()
- GetNumberOfIDA_INVALID_PARAMETER()
- GetNumberOfIDA_MISSING_MANDATORY_PARAMETER()
- GetNumberOfIDR()
- GetNumberOfIDRRemoteSent()
- GetNumberOfMapUlAckRemoteRcvd()
- GetNumberOfMapUlRemoteSent()
- GetNumberOfMEIdentityCheckRcvd()
- GetNumberOfNOA()
- GetNumberOfNOA_SUCCESS()
- GetNumberOfNOA_MISSING_AVP()
- GetNumberOfNOA_UNABLE_TO_COMPLY()
- GetNumberOfNOA_USER_UNKNOWN()
- GetNumberOfNOR()

- GetNumberOfNOR_OK()
- GetNumberOfNOR_INVALID_PARAMETER()
- GetNumberOfNOR_MISSING_MANDATORY_PARAMETER()
- GetNumberOfPUA()
- GetNumberOfPUA_SUCCESS()
- GetNumberOfPUA_MISSING_AVP()
- GetNumberOfPUA_UNABLE_TO_COMPLY()
- GetNumberOfPUA_USER_UNKNOWN()
- GetNumberOfPUR()
- GetNumberOfPUR_OK()
- GetNumberOfPUR_INVALID_PARAMETER()
- GetNumberOfPUR_MISSING_MANDATORY_PARAMETER()
- GetNumberOfRIA()
- GetNumberOfRIA_ABSENT_USER()
- GetNumberOfRIA_MISSING_AVP()
- GetNumberOfRIA_SUCCESS()
- GetNumberOfRIA_UNABLE_TO_COMPLY()
- GetNumberOfRIA_UNAUTHORIZED_REQUESTING_NETWORK()
- GetNumberOfRIA_USER_UNKNOWN()
- GetNumberOfRIR()
- GetNumberOfRIR_INVALID_PARAMETER()
- GetNumberOfRIR_MISSING_MANDATORY_PARAMETER()
- GetNumberOfRIR_OK()
- GetNumberOfRSA()
- GetNumberOfRSA_OK()
- GetNumberOfRSA_INVALID_PARAMETER()
- GetNumberOfRSA_MISSING_MANDATORY_PARAMETER()
- GetNumberOfRSR()
- GetNumberOfULA()
- GetNumberOfULA_SUCCESS()
- GetNumberOfULA_MISSING_AVP()
- GetNumberOfULA_UNABLE_TO_COMPLY()
- GetNumberOfULA_RAT_NOT_ALLOWED()
- GetNumberOfULA_ROAMING_NOT_ALLOWED()
- GetNumberOfULA_UNKNOWN_EPS_SUBSCRIPTION()
- GetNumberOfULA_USER_UNKNOWN()
- GetNumberOfULA_FEATURE_UNSUPPORTED()
- GetNumberOfULR()
- GetNumberOfULR_OK()
- GetNumberOfULR_INVALID_PARAMETER()
- GetNumberOfULR_MISSING_MANDATORY_PARAMETER()
- GetNumberOfUnknownIMEIStatus
- GetNumberOfUnknownIMEIStatusGlobalResp()
- GetNumberOfWhiteListReturned()
- GetNumberOfWhiteListReturnedGlobalResp()

This table lists the counters that can be retrieved by the respective operation:

Table 277: Operations to retrieve counter values

Counter	Operation
NumberOfAIA_AUTHORIZATION_REJECTED	GetNumberOfAIR_OK()
NumberOfAIA_MISSING_AVP	GetNumberOfAIR_INVALID_PARAMETER()
NumberOfAIA_SUCCESS	GetNumberOfAIR_MISSING_MANDATORY_PARAMETER()
NumberOfAIA_UNABLE_TO_COMPLY	GetNumberOfAIA_MISSING_AVP()
NumberOfAIA_UNKNOWN_EPS_SUBSCRIPTION	GetNumberOfAIA_UNABLE_TO_COMPLY()
NumberOfAIA_USER_UNKNOWN	GetNumberOfAIA_AUTHORIZATION_REJECTED()
NumberOfAIR_INVALID_PARAMETER	GetNumberOfAIA_SUCCESS()
NumberOfAIR_MISSING_MANDATORY_PARAMETER	GetNumberOfAIA_USER_UNKNOWN()
NumberOfAIR_OK	GetNumberOfAIA_UNKNOWN_EPS_SUBSCRIPTION()
NumberOfAuthInfoAckRemoteRcvd	GetNumberOfAuthInfoAckRemoteRcvd()
NumberOfBlackListIMSIMatch	GetNumberOfBlackListIMSIMatch()
NumberOfBlackListIMSIMismatch	GetNumberOfBlackListIMSIMisMatch()
NumberOfBlackListReturned	GetNumberOfBlackListReturned()
NumberOfBlackListReturnedGlobalResp	GetNumberOfBlackListReturnedGlobalResp()
NumberOfCancelLocationAckRemoteRcvd	GetNumberOfCancelLocationAckRemoteRcvd()
NumberOfCancelLocationReqRemoteRcvd	GetNumberOfCancelLocationReqRemoteRcvd()
NumberOfCLA_INVALID_PARAMETER	GetNumberOfCLA_INVALID_PARAMETER()
NumberOfCLA_MISSING_MANDATORY_PARAMETER	GetNumberOfCLA_MISSING_MANDATORY_PARAMETER()
NumberOfCLA_OK	GetNumberOfCLA_OK()
NumberOfCLR_INITIAL_ATTACH_PROCEDURE	GetNumberOfCLR_INITIAL_ATTACH_PROCEDURE()
NumberOfCLR_MME_UPDATE_PROCEDURE	GetNumberOfCLR_MME_UPDATE_PROCEDURE()
NumberOfCLR_SGSN_UPDATE_PROCEDURE	GetNumberOfCLR_SGSN_UPDATE_PROCEDURE()
NumberOfCLR_SUBSCRIPTION_WITHDRAWAL	GetNumberOfCLR_SUBSCRIPTION_WITHDRAWAL()
numberOfCLR_UPDATE_PROCEDURE_IWF	GetNumberOfCLR_UPDATE_PROCEDURE_IWF()
NumberOfCLRRemoteSent	GetNumberOfCLRRemoteSent()
NumberOfDSA_INVALID_PARAMETER	GetNumberOfDSA_INVALID_PARAMETER()
NumberOfDSA_MISSING_MANDATORY_PARAMETER	GetNumberOfDSA_MISSING_MANDATORY_PARAMETER()
NumberOfDSA_OK	GetNumberOfDSA_OK()
NumberOfDSRRemoteSent	GetNumberOfDSRRemoteSent()

Counter	Operation
NumberOfDynamicIMSIRecording	GetNumberOfDynamicIMSIRecording()
NumberOfGreyListReturned	GetNumberOfGreyListReturned()
NumberOfGreyListReturned GlobalResp	GetNumberOfGreyListReturnedGlobalResp()
NumberOfIDA_INVALID_PARAMETER	GetNumberOfIDA_INVALID_PARAMETER()
NumberOfIDA_MISSING_MANDATORY_PARAMETER	GetNumberOfIDA_MISSING_MANDATORY_PARAMETER()
NumberOfIDA_OK	GetNumberOfIDA_OK()
NumberOfIDRRemoteSent	GetNumberOfIDRRemoteSent()
NumberOfMapSaiRemoteSent	GetNumberOfMapSaiRemoteSent()
NumberOfMapUlAckRemoteRcvd	GetNumberOfMapUlAckRemoteRcvd()
NumberOfMapUlRemoteSent	GetNumberOfMapUlRemoteSent()
NumberOfMEIdentityCheckRcvd	GetNumberOfMEIdentityCheckRcvd()
NumberOfNOA_MISSING_AVP	GetNumberOfNOA_MISSING_AVP()
NumberOfNOA_SUCCESS	GetNumberOfNOA_SUCCESS()
NumberOfNOA_UNABLE_TO_COMPLY	GetNumberOfNOA_UNABLE_TO_COMPLY()
NumberOfNOA_USER_UNKNOWN	GetNumberOfNOA_USER_UNKNOWN()
NumberOfNOR_INVALID_PARAMETER	GetNumberOfNOR_INVALID_PARAMETER()
NumberOfNOR_MISSING_MANDATORY_PARAMETER	GetNumberOfNOR_MISSING_MANDATORY_PARAMETER()
NumberOfNOR_OK	GetNumberOfNOR_OK()
NumberOfPUA_MISSING_AVP	GetNumberOfPUA_MISSING_AVP()
NumberOfPUA_SUCCESS	GetNumberOfPUA_SUCCESS()
NumberOfPUA_UNABLE_TO_COMPLY	GetNumberOfPUA_UNABLE_TO_COMPLY()
NumberOfPUA_USER_UNKNOWN	GetNumberOfPUA_USER_UNKNOWN()
NumberOfPUR_INVALID_PARAMETER	GetNumberOfPUR_INVALID_PARAMETER()
NumberOfPUR_MISSING_MANDATORY_PARAMETER	GetNumberOfPUR_MISSING_MANDATORY_PARAMETER()
NumberOfPUR_OK	GetNumberOfPUR_OK()
NumberofRIA	GetNumberOfRIA()
NumberofRIA_ABSENT_USER	GetNumberofRIA_ABSENT_USER()
NumberofRIA_MISSING_AVP	GetNumberofRIA_MISSING_AVP()
NumberofRIA_SUCCESS	GetNumberofRIA_SUCCESS()
NumberofRIA_UNAUTHORIZED_ REQUESTING_NETWORK	NumberofRIA_UNAUTHORIZED_REQUESTING_NETWORK()

Counter	Operation
NumberofRIA_UNABLE_TO_COMPLY	GetNumberofRIA_UNABLE_TO_COMPLY()
NumberofRIA_USER_UNKNOWN	GetNumberofRIA_USER_UNKNOWN()
NumberofRIR	GetNumberOfRIR()
NumberofRIR_OK	GetNumberofRIR_OK()
NumberofRIR_INVALID_PARAMETER	Get_NumberofRIR_INVALID_PARAMETER()
NumberofRIR_MISSING_MANDATORY_PARAMETER	GetNumberofRIR_MISSING_MANDATORY_PARAMETER()
NumberOfRSA_INVALID_PARAMETER	GetNumberOfRSA_INVALID_PARAMETER()
NumberOfRSA_MISSING_MANDATORY_PARAMETER	GetNumberOfRSA_MISSING_MANDATORY_PARAMETER()
NumberOfRSA_OK	GetNumberOfRSA_OK()
NumberOfULA_FEATURE_UNSUPPORTED	GetNumberOfULA_FEATURE_UNSUPPORTED()
NumberOfULA_MISSING_AVP	GetNumberOfULA_MISSING_AVP()
NumberOfULA_RAT_NOT_ALLOWED	GetNumberOfULA_RAT_NOT_ALLOWED()
NumberOfULA_ROAMING_NOT_ALLOWED	GetNumberOfULA_ROAMING_NOT_ALLOWED()
NumberOfULA_SUCCESS	GetNumberOfULA_SUCCESS()
NumberOfULA_UNABLE_TO_COMPLY	GetNumberOfULA_UNABLE_TO_COMPLY()
NumberOfULA_UNKNOWN_EPS_SUBSCRIPTION	GetNumberOfULA_UNKNOWN_EPS_SUBSCRIPTION()
NumberOfULA_USER_UNKNOWN	GetNumberOfULA_USER_UNKNOWN()
NumberOfULR_INVALID_PARAMETER	GetNumberOfULR_INVALID_PARAMETER()
NumberOfULR_MISSING_MANDATORY_PARAMETER	GetNumberOfULR_MISSING_MANDATORY_PARAMETER()
NumberOfULR_OK	GetNumberOfULR_OK()
NumberOfUnknownIMEIStatus	GetNumberOfUnknownIMEIStatus
NumberOfUnknownIMEIStatusGlobalResp	GetNumberOfUnknownIMEIStatusGlobalResp()
NumberOfWhiteListReturned	GetNumberOfWhiteListReturned()
NumberOfWhiteListReturnedGlobalResp	GetNumberOfWhiteListReturnedGlobalResp()

Table 278: Operations to retrieve counter values

Counter	Operation
NumberOfAIR_OK	GetNumberOfAIR_OK()
NumberOfAIR_INVALID_PARAMETER	GetNumberOfAIR_INVALID_PARAMETER()
NumberOfAIR_MISSING_MANDATORY_PARAMETER	GetNumberOfAIR_MISSING_MANDATORY_PARAMETER()
NumberOfAIA_MISSING_AVP	GetNumberOfAIA_MISSING_AVP()

Counter	Operation
NumberOfAIA_UNABLE_TO_COMPLY	GetNumberOfAIA_UNABLE_TO_COMPLY()
NumberOfAIA_AUTHORIZATION_REJECTED	GetNumberOfAIA_AUTHORIZATION_REJECTED()
NumberOfAIA_SUCCESS	GetNumberOfAIA_SUCCESS()
NumberOfAIA_USER_UNKNOWN	GetNumberOfAIA_USER_UNKNOWN()
NumberOfAIA_UNKNOWN_EPS_SUBSCRIPTION	GetNumberOfAIA_UNKNOWN_EPS_SUBSCRIPTION()
NumberOfCLA_OK	GetNumberOfCLA_OK()
NumberOfCLA_INVALID_PARAMETER	GetNumberOfCLA_INVALID_PARAMETER()
NumberOfCLA_MISSING_MANDATORY_PARAMETER	GetNumberOfCLA_MISSING_MANDATORY_PARAMETER()
NumberOfCLR_MME_UPDATE_PROCEDURE	GetNumberOfCLR_MME_UPDATE_PROCEDURE()
NumberOfCLR_SGSN_UPDATE_PROCEDURE	GetNumberOfCLR_SGSN_UPDATE_PROCEDURE()
NumberOfCLR_SUBSCRIPTION_WITHDRAWAL	GetNumberOfCLR_SUBSCRIPTION_WITHDRAWAL()
numberOfCLR_UPDATE_PROCEDURE_IWF	GetNumberOfCLR_UPDATE_PROCEDURE_IWF()
NumberOfCLR_INITIAL_ATTACH_PROCEDURE	GetNumberOfCLR_INITIAL_ATTACH_PROCEDURE()
NumberOfULR_OK	GetNumberOfULR_OK()
NumberOfULR_INVALID_PARAMETER	GetNumberOfULR_INVALID_PARAMETER()
NumberOfULR_MISSING_MANDATORY_PARAMETER	GetNumberOfULR_MISSING_MANDATORY_PARAMETER()
NumberOfULA_SUCCESS	GetNumberOfULA_SUCCESS()
NumberOfULA_MISSING_AVP	GetNumberOfULA_MISSING_AVP()
NumberOfULA_UNABLE_TO_COMPLY	GetNumberOfULA_UNABLE_TO_COMPLY()
NumberOfULA_RAT_NOT_ALLOWED	GetNumberOfULA_RAT_NOT_ALLOWED()
NumberOfULA_ROAMING_NOT_ALLOWED	GetNumberOfULA_ROAMING_NOT_ALLOWED()
NumberOfULA_UNKNOWN_EPS_SUBSCRIPTION	GetNumberOfULA_UNKNOWN_EPS_SUBSCRIPTION()
NumberOfULA_USER_UNKNOWN	GetNumberOfULA_USER_UNKNOWN()
NumberOfULA_FEATURE_UNSUPPORTED	GetNumberOfULA_FEATURE_UNSUPPORTED()
NumberOfNOR_OK	GetNumberOfNOR_OK()
NumberOfNOR_INVALID_PARAMETER	GetNumberOfNOR_INVALID_PARAMETER()
NumberOfNOR_MISSING_MANDATORY_PARAMETER	GetNumberOfNOR_MISSING_MANDATORY_PARAMETER()
NumberOfNOA_SUCCESS	GetNumberOfNOA_SUCCESS()
NumberOfNOA_MISSING_AVP	GetNumberOfNOA_MISSING_AVP()
NumberOfNOA_UNABLE_TO_COMPLY	GetNumberOfNOA_UNABLE_TO_COMPLY()
NumberOfNOA_USER_UNKNOWN	GetNumberOfNOA_USER_UNKNOWN()

Counter	Operation
NumberOfPUR_OK	GetNumberOfPUR_OK()
NumberOfPUR_INVALID_PARAMETER	GetNumberOfPUR_INVALID_PARAMETER()
NumberOfPUR_MISSING_MANDATORY_PARAMETER	GetNumberOfPUR_MISSING_MANDATORY_PARAMETER()
NumberOfPUA_SUCCESS	GetNumberOfPUA_SUCCESS()
NumberOfPUA_MISSING_AVP	GetNumberOfPUA_MISSING_AVP()
NumberOfPUA_UNABLE_TO_COMPLY	GetNumberOfPUA_UNABLE_TO_COMPLY()
NumberOfPUA_USER_UNKNOWN	GetNumberOfPUA_USER_UNKNOWN()
NumberOfIDA_OK	GetNumberOfIDA_OK()
NumberOfIDA_INVALID_PARAMETER	GetNumberOfIDA_INVALID_PARAMETER()
NumberOfIDA_MISSING_MANDATORY_PARAMETER	GetNumberOfIDA_MISSING_MANDATORY_PARAMETER()
NumberOfDSA_OK	GetNumberOfDSA_OK()
NumberOfDSA_INVALID_PARAMETER	GetNumberOfDSA_INVALID_PARAMETER()
NumberOfDSA_MISSING_MANDATORY_PARAMETER	GetNumberOfDSA_MISSING_MANDATORY_PARAMETER()
NumberOfRSA_OK	GetNumberOfRSA_OK()
NumberOfRSA_INVALID_PARAMETER	GetNumberOfRSA_INVALID_PARAMETER()
NumberOfRSA_MISSING_MANDATORY_PARAMETER	GetNumberOfRSA_MISSING_MANDATORY_PARAMETER()
NumberOfCancelLocationAckRemoteRcvd	GetNumberOfCancelLocationAckRemoteRcvd()
NumberOfCancelLocationReqRemoteRcvd	GetNumberOfCancelLocationReqRemoteRcvd()
NumberOfAuthInfoAckRemoteRcvd	GetNumberOfAuthInfoAckRemoteRcvd()
NumberOfDSRRemoteSent	GetNumberOfDSRRemoteSent()
NumberOfIDRRemoteSent/	GetNumberOfIDRRemoteSent()
NumberOfCLRRemoteSent	GetNumberOfCLRRemoteSent()
NumberOfMapSaiRemoteSent	GetNumberOfMapSaiRemoteSent()
NumberOfMapUlAckRemoteRcvd	GetNumberOfMapUlAckRemoteRcvd()
NumberOfMapUlRemoteSent	GetNumberOfMapUlRemoteSent()

Refer to the "LTE-HSS Application" section of the *SDM Performance Measurements* document for details on these counters.

Command syntax (example):

```
LteHss[]:> LteStatistics[]> GetNumberOfMapUlRemoteSent()
```

Chapter 10

Subscription Locator Function (SLF)

Topics:

- *SLF Configuration.....477*

SLF Configuration

HSS SLF Configuration

Name

`HssSlfConfig`

Description

To provision the Subscription Locator Function (SLF) configuration parameters used at system startup.

CLI Navigation
`Hss[]> HssSlfConfig`

CLI Inherited Attributes

None

CLI Command Syntax

```
Hss[]>display HssSlfConfig [SlotId = integer; OriginatingRealm = string;
LocalFQDN = string; TCPTransport = 0,1; LocalTCPPort = integer; SCTPTransport
= 0,1; LocalSCTPPort = integer; AutomaticPeerReconnect = 0,1;
MaxSlfEntriesPerSub = 0-65 535]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values:

Table 279: HssSlfConfig Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 4294976295	N/A	Read only. Numerical identification of slot on shelf. Identifies the slot that could be related to this alarm.

Table 280: HssSlfConfig Optional Attributes

Attribute	Value Range	Default	Description
`Originating Realm`	String(100) (ex: blueslice.org)	originrealm.com	The Realm to which the HSS is belonging. Read-only attribute

Attribute	Value Range	Default	Description
LocalFQDN	FQDN (ex: oneHSS.blueslice.org)	localfdqn.com	Value used to uniquely identify the HSS node for purposes of duplicate connection and routing loop detection. Read-only attribute
TCPTransport	0 or 1	1	Enables or disables TCP transport. Read-only attribute 0 = disabled 1 = enabled
LocalTCPPort	Unsigned Integer (32)	3868	The TCP port on which the HSS will accept connections from diameter node on TCP transport. Read-only attribute.
SCTPTransport	0 or 1	1	Enables or disables SCTP transport. 0 = Disables SCTP transport. 1 = Enables SCTP transport.
LocalSCTPPort	Unsigned Integer (32)	3869	The SCTP port on which the HSS will accept connections from diameter node on SCTP transport. Read-only attribute.
Automatic PeerReconnect	0 or 1	0	If the HSS has accepted a connection from the CSCF but there is a failure of the connection on the CSCF's side, the HSS will either try to reconnect with the CSCF automatically or not. 0 = No automatic reconnection 1 = Automatic reconnection
FeatureEnabled	0,1	0	To indicate if the SLF application is enabled or not. 0: SLF application is not enabled. 1: SLF application is enabled.
MaxSlfEntries PerSub	Integer (0-65 535)	65 535	Maximum number of SLF entries (Public Identity-HssName pairs) that can be provisioned in the 'HssSlfPublic2HssName' entity for one single subscriber (SubscriptionID).

CLI Example

```
Hss[]>display HssSlfConfig [SlotId = 5]
```

HSS SLF Configuration TCP Listen Address

Name

`HssSlfConfigTCPListenAddress`

Description

To view the TCP IP address that accepts the connections to the SLF.

CLI Navigation

```
Hss[]> HssSlfConfig []> HssSlfConfigTCPListenAddress
```

CLI Inherited Attributes

`SlotId`

CLI Command Syntax

```
Hss[]>HssSlfConfig[SlotId = 5]>display HssSlfConfigTCPListenAddress [SlotId
= integer; Address = IPAddress; Netmask=string]
```

Operations permitted

`Add, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 281: HssSlfConfigTCPListenAddress Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 4294976295	N/A	Read only. Numerical identification of slot on shelf. Identifies the slot that could be related to this alarm.
`Address`	String (100) IPAddress or DNS resolvable name	N/A	Configured TCP address on which connection will be accepted. All local interfaces are configured to accept incoming connections.
`Netmask`	String(15)	N/A	Netmask used with slot IP address.

CLI Example

```
Hss[]> HssSlfConfig[SlotId = 5]>display HssSlfConfigTCPListenAddress [Address
= 192.168.30.67]
```

HSS SLF Configuration SCTP Listen Address

Name

`HssSlfConfigSCTPListenAddress`

Description

To view the SCTP IP address that accepts the connections for the SLF.

CLI Navigation

```
Hss[]> HssSlfConfig []> HssSlfConfigSCTPListenAddress
```

CLI Inherited Attributes

`SlotId`

CLI Command Syntax

```
Hss[]>HssSlfConfig[SlotId = 5]>display HssSlfConfigSCTPListenAddress [SlotId
= integer; Address = string; Netmask=string]
```

Operations Permitted

`Add, display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 282: HssSlfConfigSCTPListenAddress Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 4294976295	N/A	Read only. Numerical identification of slot on shelf. Identifies the slot that could be related to this alarm.
`Address`	String (100) IPAddress or DNS resolvable name	N/A	Configured SCTP address on which connection will be accepted. All local interfaces are configured to accept incoming connections.
`Netmask`	String(15)	N/A	Netmask used with slot IP address.

CLI Example

```
Hss[]:HssSlfConfig[SlotId = 5]>display HssSlfConfigSCTPListenAddress [Address
= 192.168.30.68]
```

HSS SLF Configuration Destination Realm

Name

`HssSlfConfigDestinationRealm`

Description

To provision the domains only from which the connections are accepted by the SLF.

CLI Navigation

```
Hss[]> HssSlfConfig []> HssSlfConfigDestinationRealm
```

CLI Inherited Attributes

`SlotId`

CLI Command Syntax

```
Hss[]>HssSlfConfig[SlotId = 5]>display HssSlfConfigDestinationRealm
[LocalRealm = FQDN ]
```

Operations Permitted

`Add, display, delete`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 283: HssSlfConfigDestinationRealm Mandatory Attributes

Attribute	Value Range	Default	Description
LocalRealm	FQDN (ex:ims.blueslice.com)	N/A	Name of the Domain to which the HSS belongs to.

CLI Example

```
Hss[]>HssSlfConfig[SlotId = 5]>display HssSlfConfigDestinationRealm
[LocalRealm = ims.blueslice.com]
```

Chapter 11

Equipment Identity Register (EIR)

Topics:

- *EIR configuration.....483*

This chapter provides details of EIR entities using WebCI. EIR entities configure global EIR settings, EIR response types, EIR-IMEI equipment status, associations, and ranges, as well as bind IMEIs to a subscription.

EIR configuration

EIR entities include:

- EirImeiEquipStatus – defines new IMEIs and associates them with their equipment status
- EirImeiImsiAssociation – associates unbound IMEIs with one or more IMSIs
- EirBoundImeiEquipStatus – Defines new bound IMEIs and associates them with their equipment status
- EirBoundImeiImsiAssociation – associates bound IMEIs with one or more IMSIs
- EirIMEIRange – defines the IMEI range with the associated equipment status for the range
- EirResponseConfig – Defines which equipment status to be returned in the ME-Check-Identity answer if an IMEI has been configured in several lists (White/Grey/Black)
- EirGlobalConfig – Defines the common EIR configuration that will be used by all EIR applications belonging to the same platform.

EIR IMEI Equipment Status

Notes:

- Before updating this table, the IMEI and Equipment Status must be specified. The IMEI value cannot be modified.
- Changes to this table do not require a restart.
- The IMEIs in this table are not bound to any particular subscriber.

Name

EirImeiEquipStatus

Description

This table defines new IMEIs and associates them with their equipment status.

CLI Navigation

`Eir>`

WebCI Navigation

`EIR>EIR Configuration>Add EirImeiEquipStatus`

Inherited Attributes

`IMEI, EquipmentStatus`

Permitted Operations

`Add, Modify, Delete`

Attributes and Values

Table 284: IMEI Equipment Status Mandatory Attributes

Attribute	Value Range	Default	Description
IMEI	string size(14)	N/A	The IMEI of the handset
EquipmentStatus	Set • NO_LIST (000) • WHITE_LIST (001) • GREY_LIST (010) • BLACK_LIST (100) • WHITE_GREY_LIST (011) • WHITE_BLACK_LIST (101) • GREY_BLACK_LIST(110) • WHITE_GREY_BLACK_LIST (111)	NO_LIST	This is the configured equipment status for the handset and is defined as a set.

EIR IMEI-IMSI Association

Name

EirImeiImsiAssociation

Description

This entity associates unbound IMEIs (from the EirImeiEquipStatus table) with one or more IMSIs. The table also allows to link several IMEIs to the same IMSI, and several IMSIs to the same IMEI.

CLI Navigation

`Eir>EirImeiEquipStatus`

WebCI Navigation

`EIR>EIR Configuration>Add EirImeiImsiAssociation`

Inherited Attributes

`IMEI, EquipmentStatus`

Permitted Operations

`Add, Delete`

Attributes and Values

Table 285: IMEI-IMSI Association Entity Mandatory Attributes

Attribute	Value Range	Default	Description
IMEI	string size(14)	N/A	The IMEI of the handset
IMSI	string size(15)		The IMSI to be linked to the IMEI

Table 286: IMEI-IMSI Association Entity Optional Attributes

Attribute	Value Range	Default	Description
DynamicallyProvisioned	Boolean		Indicates if the entry was dynamically created due to the "IMSI Dynamic Recording" feature

EIR Bound IMEI Equipment Status

Note: If a SubscriptionID is removed from the SDM Subscription table, a cascade operation will result in the deletion of all EirBoundImeiEquipStatus entries which specify that SubscriptionID.

Name

EirBoundImeiEquipStatus

Description

This table defines new IMEI and associates them with their equipment status. The IMEIs in this table are bound to a specific subscriber.

CLI Navigation

```
ubscriptions>Subscription
```

WebCI Navigation

```
SubscriptionID>EIR>display/modify>Add EirBoundImeiEquipStatus
```

Permitted Operations

```
Add, Modify, Delete
```

Attributes and Values

Table 287: Bound IMEI Equipment Status Mandatory Attributes

Attribute	Value Range	Default	Description
SubscriptionID	string size(128)		The Subscription ID associated with the IMEI
IMEI	string size(14)	N/A	The IMEI of the handset
EquipmentStatus	Set • NO_LIST (000) • WHITE_LIST (001) • GREY_LIST (010) • BLACK_LIST (100) • WHITE_GREY_LIST (011) • WHITE_BLACK_LIST (101) • GREY_BLACK_LIST(110) • WHITE_GREY_BLACK_LIST (111)	Not set	This is the configured equipment status for the handset and is defined as a set.

EIR Bound IMEI-IMSI Association

Name

EirBoundImeiImsiAssociation

Description

This entity associates bound IMEIs (from the EirBoundImeiEquipStatus table) with one or more IMSIs. The table also allows to link several IMEIs to the same IMSI, and several IMSIs to the same IMEI.

CLI Navigation

`Subscriptions>Subscription`

WebCI Navigation

`SubscriptionID>EIR>display/modify>Add EirBoundImeiEquipStatus`

Permitted Operations

`Add, Delete`

Attributes and Values

Table 288: Bound IMEI IMSI Association Mandatory Attributes

Attribute	Value Range	Default	Description
IMEI	string size(14)		The IMEI of the handset
IMSI	string size(15)		The IMSI to be linked to the IMEI

Table 289: Bound IMEI IMSI Association Optional Attributes

Attribute	Value Range	Default	Description
DynamicallyProvisioned	Boolean		Indicates if the entry was dynamically created due to the "IMSI Dynamic Recording" feature

EIR IMEI Range

Name

EirIMEIRange

Description

This entity defines the IMEI range with the associated equipment status for the range. This will White/Grey/Black list a range of IMEI in case of multiple handset having consecutive IMEI need to be targeted. This table allows overlapping of IMEI range, each range having its own equipment status configuration which can be : WHITE/GREY/BLACK List.

WebCI Navigation

`EIR>EIR Configuration>EirImeiRange`

Permitted Operations

`Add, Modify, Delete`

Attributes and Values

Table 290: IMEI Range Entity Mandatory Attributes

Attribute	Value Range	Default	Description
BeginIMEI	string size(14)		It is the start of the range for IMEI

Attribute	Value Range	Default	Description
EndIMEI	string size(14)		It is the end of the range for IMEI.
EquipmentStatus	Set • WHITE_LIST (001) • GREY_LIST (010) • BLACK_LIST (100)	WHITE_LIST (001)	It is the status of the range

EIR Response Configuration

Name

EirResponseConfig

Description

The table defines three response types. The global response type to be used is defined in system wide level. This table is predefined to contain exactly 8 entries, one per equipment status combination (defined see EquipmentStatus value set). This table is read at the process startup. If the EIR feature is turned on and this table doesnt contain the 8 entries, the EIR will not start and the startup will fail. This table can be modified dynamically while the system is running. A new configuration of this table is applied on the fly to the LTE EIR application.

CLI Navigation

`Eir>`

WebCI Navigation

`EIR>EIR Configuration>EirImeiEquipmentStatus`

Permitted Operations

`Add, Modify`

Attributes and Values

Table 291: ME-Check-Identity Response Type Mandatory Attributes

Attribute	Value Range	Default	Description
EquipmentStatus	Set • NO_LIST (000) • WHITE_LIST (001) • GREY_LIST (010) • BLACK_LIST (100) • WHITE_GREY_LIST (011)		It is the equipment status that has been configured for the searched IMEI. This is defined as a set of values.

Attribute	Value Range	Default	Description
	• WHITE_BLACK_LIST (101) • GREY_BLACK_LIST(110) • WHITE_GREY_BLACK_LIST (111)		
Type 1	• NO_LIST (000) • WHITE_LIST (001) • GREY_LIST (010)		The equipment status that will be returned in the ME-Check-Identity answer in case the global response type has been defined as Type1
Type 2	• NO_LIST (000) • WHITE_LIST (001) • GREY_LIST (010) • BLACK_LIST (100)		The equipment status that will be returned in the ME-Check-Identity answer in case the global response type has been defined as Type2. This is defined as a set and the following values are valid
Type 3	• NO_LIST (000) • WHITE_LIST (001) • GREY_LIST (010) • BLACK_LIST (100)		The equipment status that will be returned in the ME-Check-Identity answer in case the global response type has been defined as Type3

EIR Global Configuration

Name

EirGlobalConfig

Description

This entity defines the common EIR configuration that will be used by all EIR applications belonging to the same platform. This table is predefined to contain exactly one row, and is read at startup by each EIR application. If there is not exactly one row, the LTE EIR will not start. This table can be modified on the fly while the LTE-EIR is running and the new configuration is taken into account right after the modification.

CLI Navigation

```
Eir>
```

WebCI Navigation

```
EEIR>EIR Configuration> Modify EirGlobalConfig
```

Permitted Operations

`Modify`

Attributes and Values

Table 292: EIR Global Configuration Mandatory Attributes

Attribute	Value Range	Default	Description
EirResponseType	Set • Type1 • Type2 • Type3	Type1	It is the system wide parameter that will be applied in case an IMEI is defined with several list in order to find the corresponding equipment status to be sent in the ME-Check-Identity answer.
GlobalResponseOption	Boolean • Example : • GlobalResponseOption = ON • EirResponseType = Type2 in EirGlobalConfig • In EirResponseConfig for EquipmentStatus = NO_LIST and Type2=BLACK_LIST(100). The equipment status in the ME-Check-Identity answer will be set to BLACK_LIST.	Off	It is the global Response option that turns off or on the search of IMEI into the database upon the receipt of MECheck-Identity request. If this option is set to OFF, normal processing takes place (i.e. the algorithm described above is executed). If this option is set to ON, the algorithm is not executed and instead the ME-Check-Identity answer will contain the equipment status set to the value corresponding to the EirResponseType value for the EquipmentStatus : NO_LIST.
ImsiCheckFlag	Boolean	Off	It is the option that turns off or on the "IMSI Check" feature of the EIR, i.e. determines whether or not the IMSI should be considered when formulating the response.
ImsiDynamicRecordingFlag	Boolean		It is the option that turns off or on the "IMSI Dynamic Recording" feature of the EIR, i.e. determines whether or not an unknown IMSI associated with a non-blacklisted IMEI results in the dynamic creation of that IMSI. If the IMSI is to be dynamically created, an entry will be in the appropriate

Attribute	Value Range	Default	Description
			table (EirImeiImsiAssocation if the IMEI is unbound; EirBoundImeiImsiAssociation if the IMEI is bound), with the given IMEI/IMSI and a DynamicallyProvisioned flag value of true.

Table 293: EIR Global Configuration Optional Attributes

Attribute	Value Range	Default	Description
DefaultMNC	string size(3)		The system-wide Default MNC
DefaultMCC	string size(3)		The system-wide Default MCC

Chapter 12

LTE-EIR

Topics:

- *LTE-EIR configuration.....493*

This chapter provides details on LTE-EIR entities configured through the WebCI. LTE-EIR entities configure the LTE Diameter host name and realm, the IP addresses for TCP/SCTP, as well as the destination host and realm.

LTE-EIR configuration

LTE-EIR requires Diameter provisioning through these new tables:

- LteEirConfig –defines Diameter Host Name and Diameter Realm of the EIR for LTE.
- LteEirConfigTcpListenAddress - configures the IP address for a TCP connection.
- LteEirConfigSctpListenAddress – Configures the IP address for an SCTP connection.
- LteEirConfigDestinationHosts – Defines the Diameter host authorized to establish a new Diameter connection with the EIR application.
- LteEirConfigDestinationRealm – Defines a list of authorized diameter realm

For each of these tables, the global schema representation exactly matches the database table definition.

LTE-EIR Configuration

Note: The LTE process has to be stopped before modifying this entity; a restart commits the configuration.

Name

LteEirConfig

Description

This table defines the Diameter Host Name and Diameter Realm of the LTE-EIR application.

CLI Navigation

LteEir>LteEirConfig

WebCI Navigation

LTEEIR>LTEEIR Configuration

Permitted Operations

Add, Modify, Delete

Attributes and Values

Table 294: LTE-EIR Configuration Mandatory Attributes

Attribute	Value Range	Default	Description
SlotId	unsigned int32		The slot id for which the following configuration will apply for EIR

Table 295: LTE-EIR Configuration Optional Attributes

Attribute	Value Range	Default	Description
FeatureEnabled	bool	0	Define if the EIR application is turned on within the LTE process
OriginatingRealm	string		The Diameter Origin Host of the Diameter EIR application. This value will be the one sent in each Diameter message in the OriginHost AVP
LocalFQDN	string		The Diameter OriginRealm of the Diameter EIR application. This value will be the one sent in each Diameter message in the OriginRealm AVP
TCPTransport	bool	1	Define if the TCP transport needs to be activated or not. If not, the EIR won't be able to accept any incoming Diameter connection over TCP transport
LocalTCPPort	unsigned int32	3868	The default TCP port on which incoming Diameter connection will be listened.
SCTPTransport	bool	0	Define if the SCTP transport needs to be activated or not. If not, the EIR won't be able to accept any incoming Diameter connection over SCTP transport.
LocalSCTPPort	unsigned int32	3869	The default SCTP port on which incoming Diameter connection will be listened.
AutomaticPeerReconnect	bool	0	When EIR application has accepted connection with remote Diameter Peer, if some of those connections are lost, the EIR will try to reconnect itself to the failed remote Diameter peers. (DNS server needs to be configured in order to allow the EIR application to find the IP address of the Diameter Peer based on the Diameter DestinationHost AVP).

LTE-EIR Configuration TCP Listen Address

The LTE EIR application can accept incoming Diameter connections over TCP through several local IP addresses. These addresses are configured in this table. The configuration is static. To add/modify/remove entries in this entity, the LTE process needs to be restarted.

Name

LteEirConfigTcpListenAddress

Description

This table configures the IP address for a TCP connection.

CLI Navigation

LteEir>LteEirConfig

WebCI Navigation

LTEEIR>LTEEIR Configuration>Add LteEirConfigTcpListenAddress

Permitted Operations

Add, Modify, Delete

Attributes and Values

Table 296: LTE EIR TCP Listen Addresses Mandatory Attributes

Attribute	Value Range	Default	Description
Netmask	string		The netmask that will be used by the IP address that is being configured
SlotId	unsigned int32		The slot id for which the following configuration will apply for EIR

Table 297: LTE EIR TCP Listen Addresses Attributes

Attribute	Value Range	Default	Description
Address	string		The IP address to be configured for TCP connections. If this address is not already created on the SlotId, it will get created on the fly when the EIR application will be started.

LTE-EIR Configuration SCTP Listen Address

The LTE EIR application can accept incoming Diameter connections over SCTP through several local IP addresses. These addresses are configured in this table. The configuration is static. To add/modify/remove entries in this entity, the LTE process needs to be restarted.

Name

LteEirConfigSctpListenAddress

Description

This table configures the IP address for a SCTP connection.

CLI Navigation

LteEir>LteEirConfig

WebCI Navigation

LTEEIR>LTEEIR Configuration>Add LteEirConfigSctpListenAddress

Permitted Operations

Add, Modify, Delete

Attributes and Values

Table 298: LTE EIR SCTP Listen Addresses Mandatory Attributes

Attribute	Value Range	Default	Description
Netmask	string		The netmask that will be used by the IP address that is being configured
SlotId	unsigned int32		The slot id for which the following configuration will apply for EIR

Table 299: LTE EIR SCTP Listen Addresses Optional Attributes

Attribute	Value Range	Default	Description
Address	string		The IP address to be configured for SCTP connections. If this address is not already created on the SlotId, it will get created on the fly when the EIR application will be started.

LTE-EIR Destination Host

The LTE EIR application can restrict the Diameter Peers that will be authorized to connect with it. One way of restricting the Peer is to define a list of authorized diameter hosts. This is done by new adding entries in this entity. This entity can be modified dynamically. LTE process doesn't need to be restarted when adding/removing/updating entries in this entity.

Name

LteEirConfigDestinationHosts

Description

This table defines the Diameter host authorized to establish a new Diameter connection with the EIR application.

CLI Navigation

LteEir>LteEirConfig

WebCI Navigation

LTEEIR>LTEEIR Configuration>Add LteEirConfigDestinationHosts

Permitted Operations

Add, Modify, Delete

Attributes and Values

Table 300: LTE EIR Destination Host Mandatory Attributes

Attribute	Value Range	Default	Description
LocalFQDN	string		The diameter host authorized to establish a new Diameter Connection with the EIR application. This value needs to be set to the value in the originating host AVP of the CER message that will be received during the Diameter connection set up.

LTE-EIR Destination Realm

The LTE EIR application can restrict the Diameter Realm that will be authorized to connect with it. One way of restricting the Peer is to define a list of authorized diameter realm. This table configures the destination realm. This entity can be modified dynamically. LTE process doesn't need to be restarted when adding/removing/updating entries in this entity.

Name

LteEirConfigDestinationRealm

Description

This table configures the destination realm.

CLI Navigation

LteEir>LteEirConfig

WebCI Navigation

LTEEIR>LTEEIR Configuration> Add LteEirConfigDestinationRealm

Permitted Operations

Add, Modify, Delete

Attributes and Values

Table 301: LTE EIR Destination Realm Mandatory Attributes

Attribute	Value Range	Default	Description
LocalRealm	string		The diameter host authorized to establish a new Diameter Connection with the EIR application. This value needs to be set to the value in the originating host AVP of the CER message that will be received during the Diameter connection set up.

Note: If this list is empty, the LTE EIR application will accept incoming Diameter Connection from any Diameter Realm. As soon as one entry is added in this list, the EIR will check each incoming CER and reject it if needed.

Chapter 13

Diameter

Topics:

- *DRA Configuration.....500*

DRA Configuration

Diameter Relay Agent Configuration

Name

`DraConfig`

Description

This entity allows the configuration of the Support for Diameter Relay Agent feature.

WebCI Navigation
Diameter ➤ DRA Configuration ➤ DraConfig

CLI Navigation
`Diameter[]`

CLI Inherited Attributes

None

CLI Command Syntax

```
2:Diameter[]> add DraConfig[DraHost = abc.com; DraRealm =
def.com];2:Diameter[]> delete DraConfig[DraHost = abc.com; DraRealm =
def.com]
```

Operations Permitted

`Add, Delete`

Attributes and Values

Table 302: HssSystemOptions Optional Attributes

Attribute	Value Range	Default	Description
`DraHost`	FQDN format	N/A	The diameter host name of the Diameter Relay Agent that will connect to the HSS
`DraRealm`	DraHost	N/A	The diameter host name of the Diameter Relay Agent that will connect to the HSS

Chapter 14

System

Topics:

- *System hierarchy.....502*
- *Shelf.....503*
- *SNMP Trap Configuration.....507*
- *VIP.....508*
- *Slot.....509*
- *Geo-Cluster Configuration.....512*
- *Geo-Redundancy Operations.....514*
- *Module Type.....515*
- *Identity.....518*
- *Service.....519*
- *Service Option.....522*
- *Service Instance.....524*
- *Service Instance Option.....529*
- *SmModule.....532*
- *Alarm.....537*
- *Alarm History.....541*
- *Alarm Operations.....545*
- *Background Task.....546*
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- *Self Healing (Database Replication Monitoring).....552*

This chapter provides an overview of the system hierarchy and describes the entities that retrieve alarms and provision system features.

System hierarchy

The following figure provides a hierarchical view of the System entities.

Note: Lower level entities inherit key attributes from higher level entities. Attributes are shown in brackets.

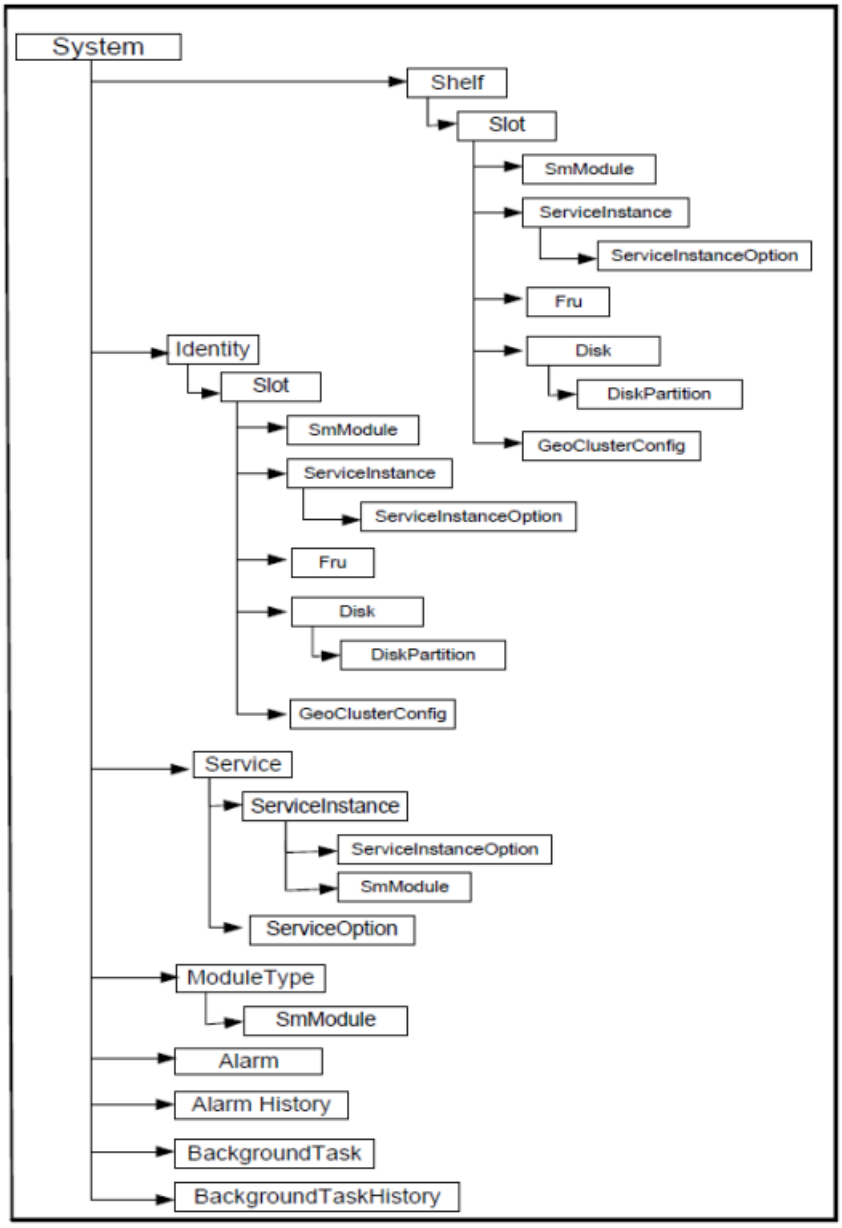

Figure 13: Hierarchy Of System CLI Commands

Shelf

Name

Shelf

Description

This represents the physical shelf.

CLI Navigation

System[]->Shelf

CLI Inherited Attributes

None

CLI Command Syntax

```
System[]> display Shelf[ShelfId = integer; Name = text; Description = text;
Location = text; Contact = text; PrivateOampVip=IP Address;
SnmpRWCommunity=string; SnmpAgentPort=0-65535; SnmpHeartbeatEnabled=0,1;
SnmpHeartbeatTime=30-240]
```

Operations Permitted

```
Display
```

Attributes and Values

Table 303: Shelf Mandatory Attributes

Attribute	Value Range	Default	Description
ShelfId	1 to 4294976295	N/A	Read only. The Shelf Id number assigned by system.
Name	Up to 65535 digits and/or letters	SDM	User defined name for the shelf.
Description	Up to 65535 digits and/or letters	Shelf	User defined description of application for the shelf.
Location	Up to 65535 digits and/or letters	Null	User defined location description for the shelf.
Contact	Up to 65535 digits and/or letters	info@blueslice.com	User defined contact name for the shelf. Shelf support contact info.

Table 304: Shelf Optional Attributes

Attribute	Value Range	Default	Description
PrivateOampVip	IP address		Internal IP address used by Tekelec applications to reach the Oamp.
SnmpRWCommunity	String	Blue	This parameter indicates the community for get/set.
SnmpAgentPort	0 to 65 535	161*	This parameter indicates the UDP port for the SNMP agent. **Warning:** The TPD SNMP Agent uses the "161" port, so for a SDM deployment running the TPD (Tekelec Software Platform), this parameter must be set to any value other than "161". We recommend using port "62008" instead of "161" on TPD installations.
SnmpHeartbeatEnabled	Bool 0 or 1	0	This parameter enables or disables the heartbeat notifications sent by the Tekelec SDM's SNMP Agent to the external Network Manager. 0: The SNMP Heartbeat Notification trap is disabled. 1: The SNMP Heartbeat Notification trap is enabled.
SnmpHeartbeatTime	30 to 240	30	Heartbeat frequency. Frequency in seconds at which the heartbeat notification traps are sent out to the Network Manager (NM). The SNMP heartbeat notification trap is sent to the NM on each

Attribute	Value Range	Default	Description
			heartbeat internal notification.

CLI Example

1 :System[]:Shelf[ShelfId = 1]> display

Shelf Operations

The following section provides a description of the operations that can be performed with the Shelf entity in the system.

AcknowledgeAllAlarms()

The operator can use this to acknowledge all the alarms on the system. An acknowledge notification with a date and time stamp will be recorded in the AlarmHistory for all the alarms. The acknowledge operation does not clear the alarms.

CLI Command Syntax:

System[]> AcknowledgeAllAlarms()

ClearAllAlarms()

CAUTION: The operator must be careful with this operation. This operation will remove all the alarms from the active alarm list. Updated alarm entries will appear in the AlarmHistory list. Even though the alarms have been cleared from the active alarm list, the conditions that caused the alarms still exist but will NOT be reported when these conditions no longer prevail. The AcknowledgeAllAlarms operation must be run first before running the ClearAllAlarms operation.

CLI Command Syntax:

System[]>ClearAllAlarms()

AddVip

The operator can use this operation to configure the public OAMP VIP(s) of the system. For a system using one IP connection to communicate with a single network, only the VIP of type OAMP needs to be configured. On the other hand, for a system using more than one IP connection to communicate with multiple networks (using the IP Subnet Separation feature), a VIP address of type OAMP must be configured on the ACCESS network as well as a VIP address per network. In this case, each network is organized per traffic type and a VIP must be configured per type. This operation can be used to bind one or more Vips to the shelf of the system. Note that only one VIP address can be bind at a time and only one VIP can be created per VipType. The Netmask and the VIP address as well as the VIP Type must be specified to run this operation. (as an example: Netmask: 255.255.255.0, Vip: *192.168.130.201* and *VipType: Oamp*)

Values VipType can have:

0 Default

1 Oamp

2 GeoReplication

3 Provisioning

CLI Command Syntax:

System[]>Shelf[ShelfId=1]> AddVip() Netmask=255.255.255.0; Vip=192.168.130.201; VipType=1

Note: Only one Vip per VipType can be bind to the system.

RemoveVip()

The operator can use this operation to remove a public VIP already configured in the system. Note that only one VIP can be removed at a time.

Warning: Removing a VIP will terminate all communication to this VIP. The VIP address must be specified to run this operation. (as an example: Vip:*192.168.130.201*)

CLI Command Syntax:

System[]>Shelf[ShelfId=1]> RemoveVip() Vip=192.168.130.201

AddVip

By default, no trap hosts are configured in the system. This operation allows the Network Operator to configure one SNMP trap host at a time. Multiple trap hosts can be configured in the system, simply by executing this operation for each trap host to be configured. The SnmpTrapHost parameter is the only mandatory parameter when executing this operation. The default values of the SnmpTrapPort and SnmpTrapCommunity are "162" and "public" respectively.

CLI Command Syntax:

System[]>Shelf[ShelfId=1]> AddSnmpTrapConfig() SnmpTrapHost=localhost

RemoveSnmpTrapConfig

This operation allows the Network Operator to remove one SNMP trap host at a time. The mandatory parameters are: SnmpTrapHost, SnmpTrapCommunity, SnmpTrapPort.

CLI Command Syntax:

System[]>Shelf[ShelfId=1]> RemoveSnmpTrapConfig() SnmpTrapHost=localhost; SnmpTrapPort=163; SnmpTrapCommunity=public

RefreshHaState()

The operator can use this operation to refresh the High-availability state of each service running on the shelf.

CLI Command Syntax:

System[]>Shelf[ShelfId=1]> RefreshHaState()

SNMP Trap Configuration

Name

`SnmpTrapConfig`

Description

The SnmpTrapConfig table allows you to view the SNMP trap(s) configured in the system through the AddSnmpTrapConfig() operation.

CLI Navigation

`System[]>Shelf[]>SnmpTrapConfig`

CLI Inherited Attributes

`ShelfId`

CLI Command Syntax

```
System[]:Shelf[ShelfId =ShelfId]> display SnmpTrapConfig[SnmpTrapHost=
string; SnmpTrapCommunity= string; SnmpTrapPort= string]
```

WebCI Navigation:

System ➤ Shelf View ➤ SNMP Config

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 305: SNMP Trap Configuration Mandatory Attributes

Attribute	Value Range	Default	Description
`SnmpTrapHost`	String (maximum size 255) ex: x.x.x.x or FQDN (Fully Qualified Domain Name)	N/A	This parameter indicates the host to which traps are sent.

Table 306: SNMP Trap Configuration Optional Attributes

Attribute	Value Range	Default	Description
SnmpTrapPort	String (maximum size 16)	162	This parameter indicates the port used by the remote host to receive traps
SnmpTrapCommunity	String (maximum size 255)	public	This parameter indicates the community string used to send traps.

CLI Example

```
1 :System[]:Shelf[Shelf[ShelfId = 1]>display SnmpTrapConfig[]
```

VIP

Name

Vip

Description

The Vip table allows you to view the OAMP VIP addresses configured in the system. This table acts as a repository to store the VIPs that are bind to the system.

CLI Navigation

System[]>Shelf[]>Vip

CLI Inherited Attributes

ShelfId

CLI Command Syntax

```
System[]:Shelf[ShelfId =ShelfId]>display Vip[Netmask= string; Vip= Virtual
IP address; VipType=0,1,2,3,4]
```

Operations Permitted

Display

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 307: VIP Optional Attributes

Attribute	Value Range	Default	Description
`Vip`	Virtual IP address (xxx.xxx.xxx.xxx)	N/A	Slot external IP Address.

`VipType`	`0 Default`
	`1 Oamp`
	`2 GeoReplication`
	`3 Provisioning`
	`4 Ldap`
		0	Defines the purpose of the Vip.

`Netmask`	String(15)	N/A	Netmask used with slot IP address.

CLI Example

```
1 :System[]:Shelf[Shelf[ShelfId = 1]>display Vip[]
```

Slot

Name

`Slot`

Description

The Slot Entity represents one of the slots on the shelf. Slots numbered 1 through 15 represent their physical counterpart on the shelf.

CLI Navigation

You can have access to the SmModule entity by following one of these navigation paths:

- To access the Slot knowing the ShelfId it belongs to:`System[]>Shelf>Slot`
- To access the Slot knowing the Identity bound to it:`System[]>Identity>Slot`

CLI Inherited Attributes

- When accessing Slot through Shelf:`ShelfId.`
- When accessing Slot through Identity:`IdentityId`

CLI Command Syntax

- `System[]:Shelf[ShelfId = ShelfId#]> display Slot[SlotId = integer; IsLocked=0,1; GeoClusterId=int; Hostname=string; IpAddress= IP address; AccessVip=string; IdentityId=integer]`
- `System[]:Identity[IdentityId = IdentityId#]> display Slot[SlotId = integer; IdentityId=uint; GeoClusterId=int; IsLocked=0,1; Hostname=string; IpAddress= IP address; AccessVip=string]`

Operations Permitted Display

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 308: Slot Mandatory Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 4294976295	N/A	Read only. Numerical slot Identification assigned by the system. For cards, this corresponds to the physical slot on the shelf. Values are unique for the shelf.
`GeoClusterId`	0	0	Identifier of the Geo-redundant cluster.
`IsLocked`	0 or 1	0	Read only. Indicates the Locked state of the FRU in this slot. 0=Unlocked 1=Locked
`IdentityId`	0 Default 1 SystemController 7 FrontEnd	N/A	Identification of the Identity bound to the slot.

Table 309: Slot Optional Attributes

Attribute	Value Range	Default	Description
`IpAddress`	String (15)	N/A	Slot IP Address.
`Hostname`	String	N/A	Slot hostname.
`AccessVip`	String (15)	N/A	Slot external access IP address.

CLI Example

```
1 :System[]:Shelf[Shelf[ShelfId = 1]>display Slot[SlotId = 5] IsLocked
```

Slot Operations

Add Service()

The operator can use this operation to bind a service to a slot. Only user service can be added by the operator. Binding a service to a slot will populate the system model with required module instances and deploy software process on the blade. When adding a service to a slot, the operator is actually defining the set of modules that will start on that slot. This is achieved using the Module Type.

Command syntax:

```
:System[]:Shelf[ShelfId = #]:Slot[SlotId = #]> addService()
```

Remove Service()

The operator can use this operation to remove a service from this slot. Only user service can be removed by the operator. This operation will remove affected module instances from the system model and shutdown affected processes.

Command syntax:

```
:System[]:Shelf[ShelfId = #]:Slot[SlotId = #]> RemoveService()
```

Start Services()

The operator can use this operation to start all services bound to this slot. All service processes will be launched if an SBC is assigned to this slot.

Warning: If the StopServices() operation was executed previously, a delay of 30 seconds must be taken into account before being able to execute the StartServices() operation.

Command syntax:

```
:System[]:Shelf[ShelfId = #]:Slot[SlotId = #]> StartServices()
```

Stop Services()

The operator can use this operation to stop all services bound to this slot.

When stopping the services on a blade, you can choose to stop or not the database with the **Stopdb** parameter. This parameter can take the following values: 0: the database won't be stopped. The database will continue running on the blade.

1: the database is stopped at the same time as the services.

If you choose not to stop the database, the services on the blade will stop, but the database will continue running and the volatile data won't be lost.

Command syntax:

```
:System[]:Shelf[ShelfId = #]:Slot[SlotId = #]> StopServices() Stopdb=0
```

Restart Services()

The operator can use this operation to restart all services running on a slot. When executing this operation, the system will stop all the services running on the slot selected and then automatically restart them. This operation should only be executed during down time for troubleshooting, as it could affect the traffic.

Command syntax:

```
:System[] :Shelf[ShelfId = #]:Slot[SlotId = #]> RestartServices()
```

Start Trace()

WARNING: This operation cannot under any circumstances be executed by the operator without the permission of Tekelec's Customer Care Center. When troubleshooting, the Tekelec Customer Care Center must be contacted in order to activate the necessary traces. When a Tekelec technician performs this operation, traces for all modules running on the specified slot will be enabled.

Stop Trace()

WARNING: This operation cannot under any circumstances be executed by the operator without the permission of Tekelec's Customer Care Center. When troubleshooting, the Tekelec Customer Care Center must be contacted and if needed will deactivate some traces by performing this operation and disabling the traces for all modules running on the specified slot.

Geo-Cluster Configuration

Name

```
GeoClusterConfig
```

Description

The GeoClusterConfig table allows you to configure the system for a Geo-Redundancy deployment.

CLI Navigation

```
System[]>Shelf[]>GeoClusterConfig
```

CLI Inherited Attributes

```
ShelfId
```

CLI Command Syntax

```
System[]:Shelf[ShelfId = ShelfId]>display GeoClusterConfig[GeoClusterId=int;
GeoLocalSiteIp= IP address; GeoLocalSiteNetmask= string; GeoRemoteSiteIp=
```

```
IP address; GeoRedundancyEnabled= 0,1; GeoRemotePort= string; GeoLocalPort=
string]
```

WebCI Navigation:

System ➤ Geo Redundancy View

Operations Permitted

`Display, modify`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 310: Geo Cluster Configuration Mandatory Attributes

Attribute	Value Range	Default	Description
`GeoClusterId`	0	0	Id of the Geo cluster.
`GeoLocalSiteIp`	IP Address	N/A	Local virtual IP address of a site of type GeoReplication that works in a Geo-redundancy deployment.
`GeoLocalSiteNetmask`	String(15)	N/A	Netmask of the geo-redundant local site.
`GeoRemoteSiteIp`	IP Address	N/A	Virtual IP address of the peer site of type GeoReplication and with which it works with in a Geo-redundancy deployment.
`GeoRedundancyEnabled`	bool 0,1	0	Attribute that indicates if the Geo-Redundancy feature is enabled or not. 0=Disabled 1=Enabled

Table 311: Geo Cluster Configuration Optional Attributes

Attribute	Value Range	Default	Description
`GeoRemotePort`	0 to 65 535	62002	This parameter indicates the remote port on the geo-redundant peer site.
`GeoLocalPort`	0 to 65 535	62002	This parameter indicates the local listening port on the geo-redundant site.

CLI Example

```
System[]:Shelf[Shelf[ShelfId = 1]>display GeoClusterConfig[]
```

Geo-Redundancy Operations

DisableGeoRedundancy()

The operator can use this operation to disable the geo-redundancy feature. When disabling this feature, the parameter GeoRedundancy in the System entity will take the value of 0. Once you have executed this operation, you can verify the result by displaying the System entity and if the GeoRedundancy parameter has a value of 0, the feature has been disabled.

Command syntax:

```
System[]:Shelf[ShelfId = 1]> GeoClusterConfig[GeoClusterId=0]>
DisableGeoRedundancy()
```

EnableGeoRedundancy()

This operation is mostly useful at installation of the system in a geo-redundancy deployment to enable the geo-redundancy feature. When enabling this feature, the parameter GeoRedundancy in the System entity will take the value of 1. For a system with the geo-redundancy feature enabled, the GeoRedundancy parameter will have a value of 1 in the System entity.

Command syntax:

```
System[]:Shelf[ShelfId = 1]> GeoClusterConfig[GeoClusterId=0]>
EnableGeoRedundancy()
```

ForceGeoReference()

In the case where the system's database is the replica of the database of its reference peer in the remote site and where the connection between the two sites is lost, the operator can judge the situation and wait until the connection is re-established, in which case the system will eventually go back into the replica state. However, if the operator knows the connection will not be re-established soon, he can use the ForceGeoReference operation to force the database to become in a Reference state and therefore force the system to become the reference peer. Using this operation will force the system into becoming the reference for its remote site when the connection is re-established.

Command syntax:

```
System[]:Shelf[ShelfId = 1]> GeoClusterConfig[GeoClusterId=0]>
ForceGeoReference()
```

Note: When the ForceGeoReference() operation is executed on the former Replica HLR, it goes into database Reference immediately. When the Geo-Redundancy link is recovered, a replication negotiation won't start between two reference HLRs. So once this operation has been successfully completed, it is necessary to manually execute the following operations on the former Reference HLR to trigger replication negotiation and to complete the Geo 'switch-over':

ResumeGeoRedundancy()

In the case where the connection is lost between the geo-redundant sites and where it is later reestablished but then where the system could not detect which peer serves as the reference and which one is the replica (i.e, due to configuration changes), the system becomes in an unassignedEnabled state. When the system is in this unassigned state, the operator can execute the ResumeGeoRedundancy operation to bring the system back into the negotiating state at which point it goes into a detection process to determine which peer is the replica and which one is the reference.

Note: To view in which state the system's database is, display the GeoDatabaseState entity, part of the Database entity. For more information on the GeoDatabaseState entity and its parameters, please refer to the "Database Operations" chapter of the *SDM Monitoring, Maintaining, Troubleshooting – Reference Manual*. For the step-by-steps instructions on how to display the GeoDatabaseState entity, please refer to the "Viewing/Modifying the information for a Geo-Redundant System" in the "Troubleshooting the system" chapter in the *SDM Monitoring, Maintaining, Troubleshooting - User Guide*.

Command syntax:

```
System[]:Shelf[ShelfId = 1]> GeoClusterConfig[GeoClusterId=0]>
ResumeGeoRedundancy()
```

Module Type

Name

`ModuleType`

Description

A ModuleType is a kind of Module (i.e., or a kind of process) associated to a Service. This table contains the different Module Types already pre-configured in the system.

CLI Navigation

`System[]>ModuleType`

CLI Inherited Attributes

None.

CLI Command Syntax

```
System[]>display ModuleType[ModuleType = 0-37; Name = string; Description
= string; TraceEnable=0,1; MasterName = string; MasterInstance = string]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 312: Module Type Mandatory Attributes

Attribute	Value Range	Default	Description
ModuleType	0 Unknown 1 Framework 2 SchemaManager 4 SystemManager 5 DataProvider 6 DpController 7 OampEventViewer 8 OampEventMgr 9 OampManager 10 Oamp Performance Manager 11 HlrServer 12 HlrProvManager 13 HlrWgs 14 AucServer 15 SS7Manager 16 SipServer 17 SipProvManager 19 NodeManager 20 TestModuleType 21 DpReplicator 22 BlueCli 23 WebCI 24 SOAP 25 CmdFileLoader 26 SNMP 27 HssServer 28 HssProvManager 29 SipUa 30 XmlDataServer	N/A	Module type: kind of Module associated to a service.

Attribute	Value Range	Default	Description
	31 DpProxy 32 SubscriberManager 33 LdapDataServer 34 LteHssServer 35 LteHssProvManager 36 Drm 37 DataAccessServer 38 ExternalService		
`Name`	Up to 65535 digits and/or letters		Module type name.
`Description`	Up to 65535 digits and/or letters		Module type description.
`TraceEnable`	0,1	0	Enables/Disables the traces per module.

Table 313: Module Type Optional Attributes

Attribute	Value Range	Default	Description
`MasterName`	Up to 65535 digits and/or letters		This field indicates the name of the module that has been elected as master. This field is used for master election load dispatching. Read-Only attribute.
`MasterInstance`	Up to 65535 digits and/or letters		If the load dispatching is master election, this field indicates the instance number of the module that has been elected as master. Read-Only attribute.

CLI Example

```
1 :System[]:ModuleType[ModuleType = NodeManager]>display
```

Identity

Name

`Identity`

Description

Represents the identities bound to slots, which define the basic set of services that run on that specific slot. All identities with their associated services are statically defined and loaded at installation time.

CLI Navigation

`System[]>Identity`

CLI Inherited Attributes

None.

CLI Command Syntax

```
System[]> add Identity[IdentityId = 0,1,7; Name = string; Description =
string]
```

Operations Permitted

`Display`

Attributes and Values

Table 314: Identity Mandatory Attributes

Attribute	Value Range	Default	Description
`IdentityId`	0 Default 1 SystemController 7 FrontEnd	0	Identity ID.
`Name`	Up to 65535 digits and/or letters	N/A	Identity name.
`Description`	Up to 65535 digits and/or letters	N/A	Identity description

CLI Example

```
1 :System[]:add Identity[IdentityId = 1; Name=SystemController;
Description=System Controller]
```

Service

Name

`Service`

Description

Represents the services and their type that are already statically defined and loaded at installation time.

CLI Navigation

`System[]>Service`

CLI Inherited Attributes

None.

CLI Command Syntax

```
System[]> add Service[ServiceId = 0,1,2,3,5,6,8; Name = string; Description
= string; ServiceType=0,1; Leader=0-26; ProtMode=0,1,2; MaxNbOfInstance=uint]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 315: Service Mandatory Attributes

Attribute	Value Range	Default	Description
`ServiceId`	1 CoreSystemController 2 CoreServiceNode 3 Hlr 5 Hss 7 Database 8 ChassisManagement 11 DataAccess 12 LteHss 14 Ldap	0	Service ID.

Attribute	Value Range	Default	Description
Name	Up to 65535 digits and/or letters	N/A	Service name.
Description	Up to 65535 digits and/or letters	N/A	Service description
ServiceType	0 Core 1 User 2 Fw 3 Backend	N/A	Set if it is a core service, user service, Framework service or backend service. Refer to the "Services running on the system" section in the*SDM Product Description* for a detailed description of these types of services.
Leader	0 Unknown 1 Framework 2 SchemaManager 3 ChassisManager 4 SystemManager 5 DataProvider 6 DpController 7 OampEventViewer 8 OampEventMgr 9 OampManager 10 Oamp Performance Manager 11 HlrServer 12 HlrProvManager 13 HlrWgs 14 AucServer 15 SS7Manager 16 SipServer 17 SipProvManager 19 NodeManager 20 TestModuleType 21 DpReplicator 22 BlueCli 23 WebCI		ModuleType of service leader.

Attribute	Value Range	Default	Description
	24 SOAP 25 CmdFileLoader 26 SNMP 27 HssServer 28 HssProvManager 29 SipUa 30 XmlDataServer 31 DpProxy 32 SubscriberManager 33 LdapDataServer 34 LteHssServer 35 LteHssProvManager 36 Drm 37 DataAccessServer 38 ExternalService		
`ProtMode`	0 NoProt 1 PureFT 2 PureDistributed		Service group protection mode. **0 (NoProt):** This means that the service group is not protected. If it fails, no other instance of this service group takes over. **1(PureFT):** This means that the service group is protected in a 1+1 mode (active/standby). One instance provides service and is active while the other one is standby and ready to provide service and take over upon failure of the active instance. **2 (PureDistributed):** This means that the service group is protected in a 1+N or 1+1+N mode (see the "Services running on the system" section in the*SDM*

Attribute	Value Range	Default	Description
			Product Description for a detailed description of these modes) and upon failure of an instance the other enabled instances take over the load of the failed instance in addition to their already assigned load. In the Protection modes 1 and 2, there is no loss of service upon failure of an instance.
`MaxNbOfInstance`	Uint32		Maximum number of instances of this service.

CLI Example

```
1 :System[]:add Service[ServiceId =
1;Name=CoreSystemController;Description=Core System
Controller;MaxNbOfInstance=2;ProtMode=PureFT;ServiceType=Core;Leader=NodeManager]
```

Service Option

Name

`ServiceOption`

Description

The ServiceOption entity is used to define an option bound to a specific service. A ServiceOption is bound to all instances of a service.

CLI Navigation

`System[]>Service>ServiceOption`

CLI Inherited Attributes

`ServiceId`

CLI Command Syntax

```
System[]> Service[ServiceId=0,1,2,3,5,6,8,11,12,14,15]> display
ServiceOption[OptionId = WebServiceSecurity, HlrInterfaceType,
HlrSctpSackTimeout, PublicIdentityBase, HttpsCertFile, HttpsKeyFile, Port,
RequireAuth, WebSecurity; OptionValue = string]
```

Operations Permitted

`Display, Modify**.`

Note: The service options must be configured/modified at installation/reboot of the system. They cannot be changed during running-time of the system, the services must be stopped and the system must be rebooted afterwards. Contact the *Customer Care Center* to request changes to be made to the service options.

Attributes and Values

Table 316: ServiceOption mandatory attributes

Attribute	Value Range	Default	Description
OptionValue	See *Table 317: OptionValue Value Range*		Values of OptionId attribute
OptionId	See *Table 318: OptionID Value Range*	N/A	See *Table 318: OptionID Value Range*
ServiceId	1 CoreSystem Controller 2 CoreService Node 3 Hlr 5 Hss 7 Database 8 Chassis Management 11 DataAccess 12 LteHss 14 Ldap	0	Service ID

Table 317: OptionValue Value Range

ServiceID	OptionID	Option Value	Default
1 (CoreSystem controller)	WebServiceSecurity	Enable or Disable	Disable
3 (Hlr)	HlrInterfaceType **OR**	E1 or T1	E1
	HlrSctpSackTimeout	Integer (milliseconds)	200
11 (DataAccess)	PublicIdentityBase **OR**	MSISDN, NAI, IMSI	MSISDN

Table 318: OptionID Value Range

ServiceID	OptionID	OptionID Description
1 (CoreSystem controller)	WebServiceSecurity	Attribute that allows to enable/disable the Web Service's security (http/https).
3 (Hlr)	HlrInterfaceType **OR**	Type of broadband telecommunication connection used (E1 or T1)
	HlrSctpSackTimeout	Kernel SCTP's SACK Timeout value.

CLI Example

```
System[]:Service[ServiceId = 1]>display ServiceOption[OptionId =
WebServiceSecurity]
```

Service Instance

Name

`ServiceInstance`

Description

The ServiceInstance entity is used to define the binding of a service to a slot. The Slot Entity represents one of the slots on the shelf. Slots numbered 1 through 15 represent their physical counterpart on the shelf.

CLI Navigation

You can have access to the ServiceInstance entity by following one of these navigation paths:

- Any ServiceInstance of a specific service in the system:

  `System[]>Service[]>ServiceInstance`
- Individual ServiceInstance bind to a specific slot on the shelf:

  `System[]>Shelf>Slot>ServiceInstance`
- Individual ServiceInstance bind to a specific slot to which is bind a specific identity:

  `System[]>Identity[]>Slot[]>ServiceInstance`

CLI Inherited Attributes

- For any ServiceInstance of a specific service in the system: ServiceId
- For individual ServiceInstance bound to a specific slot on the shelf: ShelfId, SlotId
- Individual ServiceInstance bound to a specific slot to which is bound a specific identity: IdentityId, SlotId

CLI Command Syntax

- Any ServiceInstance of a specific service in the system

```
System[]> Service[ServiceId=0,1,2,3,5,6,8,11,12,14]> display
ServiceInstance[ShelfId = uint; SlotId = 1-16;
IdentityId=0,1,7;ServiceState=0,1]
```

- Individual ServiceInstance bound to a specific slot on the shelf:

```
System[]:Shelf[ShelfId = ShelfId#]: Slot[SlotId = SlotId#]> display
ServiceInstance[ServiceId=0,1,2,3,5,6,8,11,12,14;ServiceState=0,1]
```

- Individual ServiceInstance bound to a specific slot to which is bound a specific identity:

```
System[]:Identity[IdentityId =0,1,7]: Slot[SlotId = SlotId#]> display
ServiceInstance[ServiceId=0,1,2,3,5,6,8,11,12,14; ServiceState=0,1]
```

Operations Permitted

`Display`

Attributes and Values

Table 319: Service Instance Mandatory Attributes

Attribute	Value Range	Default	Description
`ShelfId`	1 to 4294976295	N/A	Read only. The Shelf Id number assigned by system.
`SlotId`	1 to 16	N/A	Read only. Numerical slot Identification assigned by the system. For cards, this corresponds to the physical slot on the shelf. Values are unique for the shelf.
`IdentityId`	0 Default 1 System Controller 7 FrontEnd	0	Read only. Identity ID.
`ServiceState`	0 Stopped 1 Started	0	Read only. Service state. It can be Started or Stopped.
`ServiceId`	0 Default 1 CoreSystem Controller 2 CoreService Node 3 Hlr 5 Hss	0	Read only. Service ID.

Attribute	Value Range	Default	Description
	7 Database 11 DataAccess 12 LteHss 14 Ldap		

Table 320: Service Instance Optional Attributes

Optional Attributes			
Attribute	**Value Range**	**Default**	**Description**
`HaRole`	0 Unassigned, 1 Standby, 2 Active	0	Read only. Indicates the High Availability role of modules running on this slot. 0 = Unassigned. Does not participate in providing service. 1 = Standby. Ready to take over service if active fails. 2 = Active. Actively providing service.
`OpState`	0 Disabled, 1 Troubled, 2 Initializing, 3 Enabled	0	Read only. Indicates the Operational state of the modules in this slot.
`ResourceState`	NoResource PoweredOff Uninitialized Healthy ShuttingDown ShuttingDownDone Failed	0	Read only. Resource state of the service's modules reported by the system. Indicates whether the process's resources are ready to be functional or not. Generally, for a process that has started, the Resource state appears as "healthy" and for a process that has stopped, the Resource state appears as "NoResource".
`AdminState`	0 Unlocked 1 Locked	0 Unlocked	Read only. Administrative state of the service instance.

CLI Example

```
Any ServiceInstance of a specific service in the
system:System[]:Service[ServiceId = 1]>display ServiceInstance[]
```

Service Instance Operations

Start Trace()

WARNING: This operation cannot under any circumstances be executed by the operator without the permission of Tekelec's Customer Care Center. When troubleshooting, the Tekelec Customer Care Center must be contacted in order to activate the necessary traces. When a Tekelec technician performs this operation, traces for all modules running on the specified slot will be enabled.

Stop Trace()

WARNING: This operation cannot under any circumstances be executed by the operator without the permission of Tekelec's Customer Care Center. When troubleshooting, the Tekelec Customer Care Center must be contacted and if needed will deactivate some traces by performing this operation and disabling the traces for all modules running on the specified slot.

Start Service()

The operator can use this operation to start service. This will launch the processes of all SmModule contained in this service instance. In order to start a service, each of the processes of all SmModules contained in this service must be started.

Warning: If the StopService() operation was executed previously, a delay of 30 seconds must be taken into account before being able to execute the StartServices() operation.

CLI Command syntax

- `:System[]:Service[ServiceId = #]> ServiceInstance[ShelfId=#;SlotId=#]> StartService()`

Or

- `:System[]:Shelf[ShelfId = #]:Slot[SlotId = #]:ServiceInstance[ServiceId=#]> StartService()`

Or

- `:System[]:Identity[IdentityId = #]:Slot[SlotId = #]> ServiceInstance[ServiceId=#;ShelfId=#]> StartService()`

Stop Service()

The operator can use this operation to stop service. This will kill the processes of all SmModule contained in this service instance.

CLI Command syntax

- `:System[]:Service[ServiceId = #]> ServiceInstance[ShelfId=#;SlotId=#]>StopService()`

Or

- `:System[]:Shelf[ShelfId = #]:Slot[SlotId = #]:ServiceInstance[ServiceId=#]>StopService()`

Or

- `:System[]:Identity[IdentityId = #]:Slot[SlotId = #]> ServiceInstance[ServiceId=#;ShelfId=#]> StopService()`

Switch Over()

The operator can use this operation to order a switch over for this service.

Command syntax:

- `:System[]:Service[ServiceId = #]> ServiceInstance[ShelfId=#;SlotId=#;IdentityId=#]>SwitchOver()`

Or

- `:System[]:Shelf[ShelfId = #]:Slot[SlotId = #]:ServiceInstance[ServiceId=#;IdentityId=#]>SwitchOver()`

Or

- `:System[]:Identity[IdentityId = #]:Slot[SlotId = #]> ServiceInstance[ServiceId=#;ShelfId=#]>SwitchOver()`

LockService()

The operator can use this operation to lock a service. This can be useful during maintenance in order to minimize the traffic impact when stopping a service. To achieve this, the service should be locked prior to being stopped.

CLI Command syntax

- `:System[]:Service[ServiceId = #]> ServiceInstance[ShelfId=#;SlotId=#;IdentityId=#]>LockService()`

Or

- `:System[]:Shelf[ShelfId = #]:Slot[SlotId = #]:ServiceInstance[ServiceId=#;IdentityId=#]>LockService()`

Or

- `:System[]:Identity[IdentityId = #]:Slot[SlotId = #]> ServiceInstance[ServiceId=#;ShelfId=#]>LockService()`

UnlockService()

The operator can use this operation to unlock a service.

CLI Command syntax

- `:System[]:Service[ServiceId = #]> ServiceInstance[ShelfId=#;SlotId=#;IdentityId=#]>UnlockService()`

Or

- `:System[]:Shelf[ShelfId = #]:Slot[SlotId = #]:ServiceInstance[ServiceId=#;IdentityId=#]>UnlockService()`

Or

- `:System[]:Identity[IdentityId = #]:Slot[SlotId = #]> ServiceInstance[ServiceId=#;ShelfId=#]>UnlockService()`

Service Instance Option

Name

`ServiceInstanceOption`

Description

When a service is added to a slot, an option (ServiceInstanceOption) is automatically created. A ServiceInstanceOption is bound to a specific service instance. This entity can be configured by modifying the OptionValue attribute. With the ServiceInstanceOption, you can view the identification of the service and of the slot and shelf on which it runs. Moreover, you can view which protocol is used with SS7 (MTP2, SAAL, SIGTRAN).

CLI Navigation

You can have access to the ServiceInstanceOption entity by following one of these navigation paths:

- Any ServiceInstanceOption of a specific service instance of a service in the system:

  `System[]>Service[]>ServiceInstance[]>ServiceInstanceOption`
- Individual ServiceInstanceOption of a service instance bind to a specific slot on the shelf:

  `System[]>Shelf>Slot>ServiceInstance>ServiceInstanceOption`
- Individual ServiceInstanceOption of a service instance bind to a specific slot to which is bind a specific identity:

  `System[]>Identity[]>Slot[]>ServiceInstance>ServiceInstanceOption`

CLI Inherited Attributes

`ServiceId, IdentityId, SlotId, ShelfId`

CLI Command Syntax

- Any ServiceInstance of a specific service in the system:

```
System[]>Service[ServiceId=0,1,2,3,5,6,8,11,12,14]> ServiceInstance[ShelfId
= uint; SlotId = 1-16; IdentityId=0,1,6]> display
ServiceInstanceOption[OptionId=OptionId#; OptionValue=string]
```

- Individual ServiceInstance bound to a specific slot on the shelf:

```
System[]:Shelf[ShelfId = ShelfId#]: Slot[SlotId =
SlotId#]>ServiceInstance[ServiceId=0,1,2,3,5,6,8,11,12,14; IdentityId=
0,1,6]> display ServiceInstanceOption[OptionId=OptionId#;
OptionValue=string]
```

- Individual ServiceInstance bound to a specific slot to which is bound a specific identity:

```
System[]:Identity[IdentityId = 0,1,6]: Slot[SlotId =
SlotId#]>ServiceInstance[ShelfId=ShelfId#; ServiceId=
0,1,2,3,5,6,8,11,12,14]> display ServiceInstanceOption[OptionId=OptionId#;
OptionValue=string]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 321: Service Instance Option Mandatory Attributes

Attribute	Value Range	Default	Description
`ShelfId`	1 to 4294976295	N/A	Read only. The Shelf Id number assigned by system.
`SlotId`	1 to 16	N/A	Read only. Numerical slot Identification assigned by the system. For cards, this corresponds to the physical slot on the shelf. Values are unique for the shelf.
`IdentityId`	0 Default 1 SystemController 7 FrontEnd	0	Identity ID.
`ServiceId`	0 Default 1 CoreSystem Controller 2 CoreServiceNode 3 Hlr 5 Hss	0	Service ID.

Attribute	Value Range	Default	Description
	7 Database 11 DataAccess 12 LteHss 14 Ldap		
OptionId	SipIpAddress SS7Mtp2Layer SS7SaalLayer SS7Sigtran	N/A	Option Id. For the Hlr service, the SIP functionalities can or cannot be provisioned and all or either one of the MTP2, SAAL or SIGTRAN protocols can be used in the first few layers of the SS7 Stack.
OptionValue	For SipIpAddress: Provisioned or NotProvisioned For the SS7Mtp2Layer, SS7SallLayer and SS7Sigtran: Enable or Disable		Option value for the Option Id. For the OptionId: SipIpAddress, two values exist. Provisioned: the SIP functionalities are provisioned for the Hlr service. NotProvisioned: The SIP functionalities are not provisioned for the Hlr service. The values of the SS7Mtp2Layer are as follows: Enable: The SS7 Stack uses the MTP2 Layer protocol. Disable: The SS7 Stack does not use the MTP2 Layer protocol. The values of the SS7SaalLayer are as follows: Enable: The SS7 Stack uses the SAAL protocol. Disable: The SS7 Stack does not use the SAAL protocol. The values of the SS7Sigtran are as follows: Enable: The SS7 Stack uses the SIGTRAN protocol for layers

Attribute	Value Range	Default	Description
			1-2-3. (TUCL, SCTP and M3UA protocols) Disable: The SS7 Stack does not use the SIGTRAN protocol.

CLI Examples:

- Any ServiceInstanceOption of a specific service instance of a service in the system:

```
1 :System[]:Service[ServiceId = 1]> ServiceInstance[SlotId =
5;ShelfId=1;IdentityId=SystemController]>display ServiceInstanceOption[]
```

- Individual ServiceInstanceOption of a service instance bound to a specific slot on the shelf:

```
1 : System[]:Shelf[ShelfId = 1]: Slot[SlotId = 5]>
ServiceInstance[ServiceId=1; IdentityId=1] >display ServiceInstanceOption[]
```

- Individual ServiceInstanceOption of a service instance bound to a specific slot to which is bound a specific identity:

```
1 : System []:Identity[IdentityId =1]: Slot[SlotId = 5]>
ServiceInstance[ShelfId=1; ServiceId=1] >display ServiceInstanceOption[]
```

SmModule

Name

`SmModule`

Description

This entity represents the modules running on the blades of the system. The modules are configured based on the identities bound to a given slot.

CLI Navigation

You can have access to the SmModule entity by following one of these navigation paths:

- Individual SmModule of a specific slot on the shelf:

```
System[] >Shelf>Slot>SmModule
```

- Individual SmModule of a specific slot to which is bind a specific identity:

```
System[]>Identity[]>Slot[]>SmModule
```

- Individual SmModule of a specific service instance of a service in the system:

```
System[]>Service[]>ServiceInstance[]>SmModule
```

- Individual SmModule of a service instance bind to a specific slot on the shelf:

```
System[]>Shelf>Slot>ServiceInstance>SmModule
```

- Individual SmModule of a service instance bind to a specific slot to which is bind a specific identity:

```
System[] >Identity[]>Slot[]>ServiceInstance>SmModule
```

- Individual SmModule of a specific ModuleType:

```
System[] >ModuleType[]>SmModule
```

CLI Inherited Attributes

- For individual SmModule of a specific slot on the shelf: ShelfId, SlotId
- For individual SmModule of a specific slot to which is bound a specific identity:IdentityId,SlotId
- For individual SmModule of a specific service instance of a service in the system: ServiceId, ShelfId, SlotId, IdentityId
- Individual SmModule of a service instance bound to a specific slot on the shelf: ServiceId, ShelfId, SlotId, IdentityId
- Individual SmModule of a service instance bound to a specific slot to which is bound a specific identity: ServiceId, ShelfId, SlotId, IdentityId
- Individual SmModule of a specific ModuleType:ModuleType

CLI Command Syntax

```
System[]: ModuleType[ModuleType = 0-37] >display SmModule [Orl= string;
Cgname= string; ShelfId=uint; SlotId= uint; IdentityId=uint; ServiceId=uint;
HaRole= 0,1,2; Description= string ; Instance= string; TraceEnable=0,1]
```

Operations Permitted

```
Display
```

Note: Not all users (User Groups) are allowed to perform these operations.

Table 322: SmModule Mandatory Attributes

Attribute	Value Range	Default	Description
`Orl`	Up to 255 digits and/or letters	N/A	Read only. Module Identification used internally by the system. An ORL is a name structure separated by slashes. For example, the Node Manager has the following ORL:"/NodeManager5". This is the NodeManager running on blade 5.
`ModuleType`	0 Unknown 1 Framework 2 SchemaManager	0	ModuleType of this module.

Attribute	Value Range	Default	Description
	4 SystemManager 5 DataProvider 6 DpController 7 OampEventViewer 8 OampEventMgr 9 OampManager 10 Oamp PerformanceManager 11 HlrServer 12 HlrProvManager 13 HlrWgs 14 AucServer 15 SS7Manager 16 SipServer 17 SipProvManager 19 NodeManager 20 TestModuleType 21 DpReplicator 22 BlueCli 23 WebCI 24 SOAP 25 CmdFileLoader 26 SNMP 27 HssServer 28 HssProvManager 29 SipUa 30 XmlDataServer 31 DpProxy 32 SubscriberManager 33 LdapDataServer 34 LteHssServer 35 LteHssProvManager 36 Drm		

Attribute	Value Range	Default	Description
	37 DataAccessServer 38 ExternalService		
Cgname	String	N/A	Name of cluster group that this module takes part.
ShelfId	1 to 4294976295	N/A	ID of the shelf where this module stands.
SlotId	1 to 16	N/A	ID of the slot where this module stands.
IdentityId	0 Default 1 SystemController 7 FrontEnd	0	Identity ID of the slot where this module is deployed.
ServiceId	0 Default 1 CoreSystemController 2 CoreServiceNode 3 Hlr 5 Hss 7 Database 8 ChassisManagement 11 DataAccess 12 LteHss 14 Ldap	0	Service Id of the service that contains this module.
HaRole	0 unassigned 1 standby 2 active	0	Module HA role.
Description	String	N/A	Module description.
Instance	Uint32	N/A	Module Instance number.
TraceEnable	0,1	0	To enable or disable the Trace for this module. 0=disable 1=enable

Table 323: SmModule Optional Attributes

Attribute	Value Range	Default	Description
AdminState	0 Unlocked 1 Locked	0 Unlocked	Read only. Administrative state of the module established by the system.
ResourceState	NoResource PoweredOff Uninitialized Healthy ShuttingDown ShuttingDownDone Failed	0	Read only. Resource state of the module reported by the system. Indicates whether the process's resources are ready to be functional or not. Generally, for a process that has started, the Resource state appears as "healthy" and for a process that has stopped, the Resource state appears as "NoResource".
OpState	0 Disabled, 1 Troubled, 2 Initializing, 3 Enabled	0	Read only. Indicates the Operational state of the modules in this slot.

CLI Example

```
1 : System[]:ModuleType[ModuleType=6]>display SmModule[Orl = /NodeManager3]
```

SmModule Operations

Start Trace

WARNING: This operation cannot under any circumstances be executed by the operator without the permission of Tekelec's Customer Care Center. When troubleshooting, the Tekelec Customer Care Center must be contacted in order to activate the necessary traces. When a Tekelec technician performs this operation, traces for all modules running on the specified slot will be enabled.

Stop Trace

WARNING: This operation cannot under any circumstances be executed by the operator without the permission of Tekelec's Customer Care Center. When troubleshooting, the Tekelec Customer Care Center must be contacted and if needed will deactivate some traces by performing this operation and disabling the traces for all modules running on the specified slot.

Add Filter Component

WARNING: This operation cannot under any circumstances be executed by the operator unless given the permission and instructions by Tekelec's Customer Care Center. When troubleshooting, the Tekelec Customer Care Center must be contacted and if necessary may reduce the number of traces produced by filtering on components for a given module's traces.

Remove Filter Component

WARNING: This operation cannot under any circumstances be executed by the operator unless given the permission and instructions by Tekelec's Customer Care Center. When troubleshooting, the Tekelec Customer Care Center must be contacted and if needed will remove the necessary filters that were previously added on components for a given module's traces.

Alarm

Name

`Alarm`

Description

This is used to retrieve the alarms that are currently active on the system.

CLI Navigation

`System[]>Alarm`

CLI Inherited Attributes

None

CLI Command Syntax

```
System[]>display Alarm[SequenceId = integer; SlotId = integer; Description
= text; ShelfId = integer; AlarmId = integer; ModuleId = 4,6,8-12,14,15,19;
ModuleInstance = integer; ComponentId = 0-9; SetTimestamp = timestamp;
AckTimestamp = timestamp; IsAcknowledge = 0,1; ComponentInstanceContext =
text; Severity = AlarmSeverity; SetBy = text; AckBy= text]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 324: Alarm Mandatory Attributes

Attribute	Value Range	Default	Description
SequenceId	1 to 4294976295	N/A	Read only. Numerical identifier uniquely identifies this specific alarm occurrence.

Table 325: Alarm Optional Attributes

Attribute	Value Range	Default	Description
SlotId	1 to 4294976295	N/A	Read only. Numerical identification of slot on shelf. Identifies the slot that could be related to this alarm.
Description	Up to 65535 digits and/or letters	Null	Text description of alarm condition.
ShelfId	1 to 4294976295	N/A	Read only. Identifies the shelf.
AlarmId	1 to 4294976295	N/A	Read only. Identifier which represents a specific type of alarm.
ModuleId	0 Unknown 1 Framework 2 SchemaManager 3 ChassisManager 4 SystemManager 5 DataProvider 6 DpController 7 OampEventViewer 8 OampEventMgr 9 OampManager 10 Oamp Performance Manager 11 HlrServer 12 HlrProvManager 13 HlrWgs 14 AucServer	N/A	Read only. Identifier of software module related to the alarm.

Attribute	Value Range	Default	Description
	15 SS7Manager 16 SipServer 17 SipProvManager 19 NodeManager 20 TestModuleType 21 DpReplicator 22 BlueCli 23 WebCI 24 SOAP 25 CmdFileLoader 26 SNMP 27 HssServer 28 HssProvManager 29 SipUa 30 XmlDataServer 31 DpProxy 32 SubscriberManager 33 LdapDataServer 34 LteHssServer 35 LteHssProvManager 36 Drm 37 DataAccessServer 38 ExternalService		
`ModuleInstance`	1 to 4294976295	N/A	Read only. Instance number of software module.
`ComponentId`	0 (Unknown), 1 (Framework), 2 (SystemProv), 3 (SystemManager), 4 (OampManager), 5 (HlrProvManager), 6 (HlrServer),	N/A	Read only. The component which generated the alarm.

Attribute	Value Range	Default	Description
	7 (SS7), 8 (AucServer), 9 (SystemHardware)		
SetTimestamp	Timestamp in format: day MMM DD hh:mm:ss YYYY	N/A	Read only. The date and time the alarm was generated, where: MMM = month DD = date hh = hour mm = minute ss = second YYYY = year
AckTimestamp	Timestamp in format: day MMM DD hh:mm:ss YYYY	Null	Read only. The date and time the alarm was acknowledged, where: MMM = month DD = date hh = hour mm = minute ss = second YYYY = year
IsAcknowledge	0 or 1	0	Read only. 0 = alarm not acknowledged 1 = alarm has been acknowledged.
Component-Instance-Context	Up to 255 digits and/or letters	Null	Read only. Represents the specific instance of the module and/or component which generated the alarm condition.
Severity	AlarmCritical AlarmMajor AlarmMinor AlarmWarning	N/A	Read only. The severity of the alarm (see table below for severity definition).

Attribute	Value Range	Default	Description
SetBy	text	'null'	Read only. Name of the system's process (ModuleType, i.e. OampManager, HlrServer, etc.) that set the alarm. The value of this parameter is generated by the system.
AckBy	text	'null'	Read only. Username of the user that acknowledged the alarm. The value of this parameter is generated by the system.

CLI Example

```
1 : System[]>display Alarm[SequenceId = 1]
```

Table 326: Alarm Severity Definition

Alarm Severity	Definition
Critical	Service affecting. A serious problem has occurred. This alarm should be cleared immediately. Resource is completely disabled.
Major	Service affecting. This alarm should be cleared immediately. Resource is partially disabled.
Minor	Non-service affecting. Problem exists. This alarm should be cleared as soon as possible. Resource is partially disabled.
Warning	Non-service affecting. Potential problem exists, resource is operational.

Alarm History

Name

AlarmHistory

Description

This represents the history of all alarms generated. This includes active alarms and cleared alarms. Additionally, alarm acknowledgements are also recorded in the alarm history.

CLI Navigation

System[]>AlarmHistory

CLI Inherited Attributes

None.

CLI Command Syntax

```
System[]>display AlarmHistory[SequenceId = integer; SlotId = integer;
Description = text; ShelfId = integer; AlarmId = integer; ModuleId =
4,6,8-12,14,15,19; ModuleInstance = integer; ComponentId = 0-9; Timestamp
= Timestamp; AckTimestamp = Timestamp; IsAcknowledge = 0,1;
ComponentInstanceContext = text; Severity = AlarmSeverity; IsCleared = 0,1;
SetBy = text; AckBy = text; ClearBy = text]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 327: Alarm History Mandatory Attributes

Attribute	Value Range	Default	Description
`SequenceId`	1 to 4294976295	N/A	Read only. Numerical identifier uniquely identifies this specific alarm occurrence.

Table 328: Alarm History Optional Attributes

Attribute	Value Range	Default	Description
`SlotId`	1 to 4294976295	N/A	Read only. Numerical identification of slot on shelf. Identifies the slot to which this alarm is related, if appropriate.
`Description`	Up to 65535 digits and/or letters	Null	Text description of alarm condition.
`ShelfId`	1 to 4294976295	N/A	Read only. Identifies the shelf.
`AlarmId`	1 to 4294976295	N/A	Read only. Identifier which represents a specific alarm code.
`ModuleId`	4 (SystemManager), 6 (DPController), 8 (OampEventMgr), 9 (Oamp Manager),	N/A	Read only.

Attribute	Value Range	Default	Description
	10 (Oamp Performance Manager), 11 (HlrServer), 12 (HlrProvManager), 14 (AucServer), 15 (SS7Manager), 19 (NodeManager)		
`ModuleInstance`	1 to 4294976295	N/A	Read only.Instance number of application.
`ComponentId`	0 (Unknown), 1 (Framework), 2 (SystemProv), 3 (SystemManager), 4 (OampManager), 5 (HlrProvManager), 6 (HlrServer), 7 (SS7), 8 (AucServer), 9 (SystemHardware)	N/A	Read only. The component which generated the alarm.
`Timestamp`	Timestamp in format: day MMM DD hh:mm:ss YYYY	N/A	Read only. The date and time the alarm was generated where: MMM = month DD = date hh = hour mm = minute ss = second YYYY = year
`AckTimestamp`	Timestamp in format: day MMM DD hh:mm:ss YYYY	Null	Read only. The date and time the alarm was acknowledged. where: MMM = month DD = date

Attribute	Value Range	Default	Description
			hh = hour mm = minute ss = second YYYY = year
IsAcknowledge	0 or 1	0	Read only. 0 = alarm not acknowledged 1 = alarm has been acknowledged.
Component- Instance- Context	Up to 255 digits and/or letters	Null	Read only. Represents the specific instance of the module and/or component which generated the alarm condition.
Severity	AlarmCritical AlarmMajor AlarmMinor AlarmWarning	N/A	Read only. The severity of the alarm.
IsCleared	0 or 1	0	Type of alarm. 0 = set alarm. An alarm occurred on the system. 1 = cleared alarm.
SetBy	Text	'null'	Read only. Name of the system's process (ModuleType, i.e. OampManager, HlrServer, etc.) that set the alarm. The value of this parameter is generated by the system.
AckBy	Text	'null'	Read only. Username of the user that acknowledged the alarm. The value of this parameter is generated by the system.
ClearBy	Text	'null'	Read only. Name of the system's process (ModuleType, i.e. OampManager, HlrServer,

Attribute	Value Range	Default	Description
			etc.) that cleared the alarm. The value of this parameter is generated by the system. When the alarm is cleared by the system, the latter creates a new entry in the AlarmHistory to represent the cleared alarm and it generates the value for this parameter. **Note:** The SetBy and AckBy parameters are set to 'null' for the cleared alarm entry.

CLI Example

```
: System[]>display AlarmHistory[SequenceId = 1]
```

Alarm Operations

The following section describes the operations that can be done with alarms.

Acknowledge()

The operator can use this to acknowledge a specific alarm. An acknowledge notification with a date and time stamp will be recorded in the AlarmHistory. The acknowledge operation does not clear the alarm. An alarm SequenceId will need to be specified to run this operation.

CLI Command syntax

```
System[]:Alarm[SequenceId = #]> Acknowledge()
```

Clear()

CAUTION: the operator must be careful with this operation.

This operation will remove the alarm from the active alarm list. An updated alarm entry appears in the AlarmHistory list. From the CLI, an alarm can be cleared even if the conditions that caused the alarm to be raised remain. In this scenario, take note that even though the alarm is no longer part of the active alarm list, the conditions that caused the alarm still exist and will NOT be reported when these conditions no longer prevail. It is strongly recommended to only clear alarms for which the conditions have not been rectified.

An Alarm SequenceId will need to be specified to run this operation. The Acknowledge operation must be run first before running the Clear operation.

CLI Command syntax

```
System[]:Alarm[SequenceId = #]> Clear()
```

Background Task

Name

`BackgroundTask`

Description

This entity allows to view all the operations (tasks) that are currently being performed by the system in the background.

CLI Navigation

`System[]>BackgroundTask`

CLI Inherited Attributes

None

CLI Command Syntax

```
System[]>display BackgroundTask[OperationId = integer; ModuleId = integer;
SequenceId = int; TaskContext = text; TaskStatus = 0,1; Timestamp = time]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 329: Background Task Mandatory Attributes and Values

Attribute	Value Range	Default	Description
`SequenceId`	1 to 4294976295	N/A	Read only. Numerical identifier that uniquely identifies a background task. The system generates the numerical ID in a sequential order in which the background tasks are performed.
`ModuleId`	0 Unknown 1 Framework 2 SchemaManager 3 ChassisManager	N/A	Read only. Identifier of the software module affected by the task performed.

Attribute	Value Range	Default	Description
	4 SystemManager 5 DataProvider 6 DpController 7 OampEventViewer 8 OampEventMgr 9 OampManager 10 Oamp PerformanceManager 11 HlrServer 12 HlrProvManager 13 HlrWgs 14 AucServer 15 SS7Manager 16 SipServer 17 SipProvManager 19 NodeManager 20 TestModuleType 21 DpReplicator 22 BlueCli 23 WebCI 24 SOAP 25 CmdFileLoader 26 SNMP 27 HssServer 28 HssProvManager 29 SipUa 30 XmlDataServer 31 DpProxy 32 SubscriberManager 33 LdapDataServer 34 LteHssServer 35 LteHssProvManager 36 Drm		

Attribute	Value Range	Default	Description
	37 DataAccessServer 38 ExternalService		

Table 330: Background Task Optional Attributes and Values

Optional Attributes			
Attribute	**Value Range**	**Default**	**Description**
`OperationId`	string	N/A	Read only. String identifying the type of operation being performed in the background. Most performed operations: StartService, StopService, StartServices, StopServices, RestartService, SwitchOver.
`TaskContext`	string	Null	Read only. This parameter identifies the context of the operation: the type of operation, the module affected, the instance and slot on which runs that module,etc.
`TaskStatus`	1 (InProgress)	N/A	Read only. Status of the task. The entries in this entity display the tasks currently being performed in the background, therefore, these tasks are always in progress.
`Timestamp`	Timestamp in format: day MMM DD hh:mm:ss YYYY	Null	Read only. The date and time at which the background task was performed, where: MMM = month DD = date hh = hour mm = minute ss = second YYYY = year

CLI Example

```
1 : System[]>display BackgroundTask[]
```

Background Task History

Name

`BackgroundTaskHistory`

Description

This entity allows to view all the operations (tasks) that have been performed by the system in the background. The tasks stored in this entity are no longer in progress.

CLI Navigation

`System[]>BackgroundTaskHistory`

CLI Inherited Attributes

None

CLI Command Syntax

```
System[]>display BackgroundTaskHistory[OperationId = integer; ModuleId =
integer; SequenceId = int; TaskContext = text; TaskStatus = 0,1; Timestamp
= time]
```

Operations Permitted

`Display`

Note: Not all users (User Groups) are allowed to perform these operations.

Attributes and Values

Table 331: Background Task History Mandatory Attributes

Attribute	Value Range	Default	Description
`SequenceId`	1 to 4294976295	N/A	Read only. Numerical identifier that uniquely identifies a background task. The system generates the numerical ID in a sequential order in which the background tasks have been performed.
`ModuleId`	0 Unknown 1 Framework 2 SchemaManager	N/A	Read only. Identifier of the software module affected by the task performed.

Attribute	Value Range	Default	Description
	3 ChassisManager 4 SystemManager 5 DataProvider 6 DpController 7 OampEventViewer 8 OampEventMgr 9 OampManager 10 OampPerformance Manager 11 HlrServer 12 HlrProvManager 13 HlrWgs 14 AucServer 15 SS7Manager 16 SipServer 17 SipProvManager 19 NodeManager 20 TestModuleType 21 DpReplicator 22 BlueCli 23 WebCI 24 SOAP 25 CmdFileLoader 26 SNMP 27 HssServer 28 HssProvManager 29 SipUa 30 XmlDataServer 31 DpProxy 32 SubscriberManager 33 LdapDataServer 34 LteHssServer 35 LteHssProvManager		

Attribute	Value Range	Default	Description
	36 Drm 37 DataAccessServer 38 ExternalService		

Table 332: Background Task History Optional Attributes and Values

Attribute	Value Range	Default	Description
`OperationId`	string	N/A	Read only. String identifying the type of operation that has been performed in the background. Most performed operations: StartService, StopService, StartServices, StopServices, RestartService, SwitchOver.
`TaskContext`	string	Null	Read only. This parameter identifies the context of the operation: the type of operation, the module affected, the instance and slot on which runs that module,etc.
`TaskStatus`	0 Default 2 Done 3 Cancelled 4 Timeout 5 Failed	N/A	Read only. Status of the task. The tasks stored in this entity are no longer in progress.
`Timestamp`	Timestamp in format: day MMM DD hh:mm:ss YYYY	Null	Read only. The date and time at which the background task was performed, where: MMM = month DD = date hh = hour mm = minute ss = second YYYY = year

CLI Example

```
1 : System[]>display BackgroundTaskHistory[]
```

Self Healing (Database Replication Monitoring)

Name
`DrmConfig`

Description

This entity is used to configure/control the Database Replication Monitoring (DRM) process, which monitors the data replication between the system's different servers and which produces report files. The DRM can be configured/controlled during running time and will have the impacts on the DRM process thereafter.

CLI Navigation
`Database[]>DrmConfig`

CLI Inherited Attributes

None

CLI Command Syntax

```
Database[]>display DrmConfig[DrmState = 0,1; DrmRunMode = Once, Repeatedly;
DrmRunTime = integer; DrmScanPeriod = integer; DrmScanMethod = AllDatabase;
DrmSite=LocalSite,LocalSiteAndGeo;DrmAction =SyncData,PrintDiff]
```

Operations Permitted

`Display, modify`

Note: Not all users (User Groups) are allowed to perform these operations. Please see *Security Access Privileges* to know which ones have access to this entity and which operations they have permission to do.

Attributes and Values

Table 333: Operations Permitted Attributes and Values

Attribute	Value Range	Default	Description
`DrmState`	Bool (0,1)	0 (disabled)	This parameter allows the Network Operator to control the DRM functionality's activation status by enabling/disabling it. By default it's disabled.

Attribute	Value Range	Default	Description
			The Network Operator can disable and re-enable it as required. 0 (disabled): The DRM process will never run. 1 (enabled): The DRM process runs as configured in the DrmConfig [ ] entity.
DrmRunMode	Once Repeatedly	repeatedly	This parameter allows the Network Operator to set the monitoring mode of the DRM: Once or repeatedly. If the DRM needs to run only once, the monitoring will scan all databases (refer to point 'Action' field described below) and the operator has the choice to configure a start time or now.
DrmRunTime	Time (hour) 00:00	01:00 (1 AM)	This parameter allows the Network Operator to monitor the start time (on an hourly basis) at which the DRM must start to run.
DrmScanPeriod	Time (in days) 1 to 30	7 (the DRM runs and produces a report once a week)	This parameter allows the Network Operator to monitor the period of time (in days) that must elapse before the DRM can run again and produce the report. In other words, it is the frequency at which the DRM can run on a regular basis.
DrmScanMethod	Alldatabase	Alldatabase	This parameter allows the Network Operator to monitor the method of monitoring that must be done by the In this current release, the only DRM scanning method

Attribute	Value Range	Default	Description
			supported is: All database.
DrmSite	LocalSite LocalSiteAndGeo	LocalSite	The DRM module can perform schema or data validation either on single chassis system or Geo-Redundant systems. This parameter allows the Network Operator to monitor either only the Local Site or the Local Site and its Geo-Redundant Site. For Geo-Redundant systems, the DRM module should be enabled on both active SystemControllers and DrmSite should be configured as LocalSite on one system and LocalSiteAndGeo on another system. The DRM module that monitors local site should be scheduled to be ran first (by controlling the monitoring start time), at least 1 hour before the DRM module that monitors local and Geo-Redundant sites.
DrmAction	SyncData PrintDiff	SyncData	This parameter allows the Network Operator to configure the action to be taken by the DRM process after its monitoring session: Print out the differences into the report file or re-synchronize the databases. **Note:** Even if the Sync option is chosen, it may

Attribute	Value Range	Default	Description
			happen that some discrepancies can't be corrected and requires manual intervention.

CLI Example

```
1 : Database[]>display DrmConfig[]
```

Glossary

#

3GPP	3rd Generation Partnership Project. The standards body for wireless communications.

A

AC	Application Context
APN	Access Point Name The name identifying a general packet radio service (GPRS) bearer service in a GSM mobile network. See also GSM.
ASP	Application Server Process A process instance of an Application Server. An Application Server Process serves as an active or standby process of an Application Server (e.g., part of a distributed virtual switch or database). Examples of ASPs are processes (or process instances of) MGCs, IP SCPs or IP HLRs. An ASP contains an SCTP end-point, and may be configured to process signaling traffic within more than one Application Server.
AuC	Authentication Center

C

CC	Country Code
CER	Capabilities-Exchange-Request A Diameter message that the Mobile Originated application

C

	sends to a prepaid rating engine to perform a capability exchange. The CER (indicated by the Command-Code set to 257 and the Command Flags' 'R' bit set) is sent to exchange local capabilities.The prepaid rating engine responds with a Capability-Exchange-Answer (CEA) message.
CLI	Command-line interface
CSCF	Call Session Control Function
CSV	Comma-separated values The comma-separated value file format is a delimited data format that has fields separated by the comma character and records separated by newlines (a newline is a special character or sequence of characters signifying the end of a line of text).
CUG	Closed User Group

D

Diameter	Protocol that provides an Authentication, Authorization, and Accounting (AAA) framework for applications such as network access or IP mobility. Diameter works in both local and roaming AAA situations. Diameter can also be used as a signaling protocol for mobility management which is typically associated with an IMS or wireless type of environment. Diameter is the successor to the RADIUS protocol. The MPE device supports a range of

D

	Diameter interfaces, including Rx, Gx, Gy, and Ty.
DN	Directory number A DN can refer to any mobile or wireline subscriber number, and can include MSISDN, MDN, MIN, or the wireline Dialed Number.
DNS	Domain Name System A system for converting Internet host and domain names into IP addresses.
DPC	Destination Point Code DPC refers to the scheme in SS7 signaling to identify the receiving signaling point. In the SS7 network, the point codes are numeric addresses which uniquely identify each signaling point. This point code can be adjacent to the EAGLE 5 ISS, but does not have to be.
DRA	Destination Routing Address

E

EIR	Equipment Identity Register A network entity used in GSM networks, as defined in the 3GPP Specifications for mobile networks. The entity stores lists of International Mobile Equipment Identity (IMEI) numbers, which correspond to physical handsets (not subscribers). Use of the EIR can prevent the use of stolen handsets because the network operator can enter the IMEI of these handsets into a 'blacklist' and prevent them from being registered on the network, thus making them useless.

E

ENUM	T**E**lephone **NU**mber **M**apping

F

FMC	Fixed-Mobile Convergence

G

GGSN	Gateway GPRS Support Node An edge router that acts as a gateway between a GPRS wireless data network and other networks. The MPE supports GGSN nodes as network elements. See also GPRS, PGW, and SGW.
GPRS	General Packet Radio Service A mobile data service for users of GSM mobile phones.
GSM	Global System for Mobile Communications
GTT	Global Title Translation A feature of the signaling connection control part (SCCP) of the SS7 protocol that the EAGLE 5 ISS uses to determine which service database to send the query message when an MSU enters the EAGLE 5 ISS and more information is needed to route the MSU. These service databases also verify calling card numbers and credit card numbers. The service databases are identified in the SS7 network by a point code and a subsystem number.
GUI	Graphical User Interface The term given to that set of items and facilities which provide the user with a graphic means for

G

	manipulating screen data rather than being limited to character based commands.

H

HA	High Availability High Availability refers to a system or component that operates on a continuous basis by utilizing redundant connectivity, thereby circumventing unplanned outages.
HSL	High-Speed Link

I

IMEI	International Mobile Equipment Identifier
IMPI	IP Multimedia Private Identity
IMSI	International Mobile Subscriber Identity

L

LOC	The primary function of the LOC server is to locate subscribers on GSM and IS-41 networks.
LPO	Link Processor Outage
LSL	Low-speed Link

M

M3UA	SS7 MTP3-User Adaptation Layer M3UA enables an MTP3 User Part to be connected to a remote MTP3 via a reliable IP transport.

M

MAP	Mobile Application Part
MSISDN	Mobile Station International Subscriber Directory Number The MSISDN is the network specific subscriber number of a mobile communications subscriber. This is normally the phone number that is used to reach the subscriber.
MTP2	Message Transfer Part, Level 2
MTP3	Message Transfer Part, Level 3

N

NAI	Network Access Identifier The user identity submitted by the client during network authentication.
NDC	Network destination code
NE	Network Element An independent and identifiable piece of equipment closely associated with at least one processor, and within a single location.

O

OAM&P	Operations – Monitoring the environment, detecting and determining faults, and alerting administrators. Administration – Typically involves collecting performance statistics, accounting data for the purpose of billing, capacity planning, using usage data, and maintaining system reliability.

O

	Maintenance – Provides such functions as upgrades, fixes, new feature enablement, backup and restore tasks, and monitoring media health (for example, diagnostics). Provisioning – Setting up user accounts, devices, and services.
OPC	Originating Point Code
OS	Operations Systems

P

PC	Point Code The identifier of a signaling point or service control point in a network. The format of the point code can be one of the following types: • ANSI point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**). • Non-ANSI domestic point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**). • Cluster point codes in the format network indicator-network cluster-* or network indicator-*-*. • ITU international point codes in the format **zone-area-id**. • ITU national point codes in the format of a 5-digit number (**nnnnn**), or 2, 3, or 4 numbers (members) separated by dashes (**m1-m2-m3-m4**) as defined by the Flexible Point Code system option. A group code is required (**m1-m2-m3-m4-gc**) when the ITUDUPPC feature is turned on.

P

- 24-bit ITU national point codes in the format main signaling area-subsignaling area-service point (**msa-ssa-sp**).

PDN — Packet Data Network

A digital network technology that divides a message into packets for transmission.

PLMN — Public Land Mobile Network

R

RSC — Reset Confirmation

RSR — Reset Request

S

SAAL — Signaling ATM Adaptation Layer

SAP — Service Access Point

SBC — Session Border Controller

Device used in some VoIP networks to exert control over the signaling and usually also the media streams involved in setting up, conducting, and tearing down calls.

SCCP — Signaling Connection Control Part

S-CSCF — Serving - Call Session Control Function

Provides user and service authentication and authorization, client registration, SIP-routing capabilities, service integration,

S

	data management, FW/NAT traversal, multi-network integration and an interface to third-party applications.
SCTP	Stream Control Transmission Protocol An IETF transport layer protocol, similar to TCP that sends a message in one operation. The transport layer for all standard IETF-SIGTRAN protocols. SCTP is a reliable transport protocol that operates on top of a connectionless packet network such as IP and is functionally equivalent to TCP. It establishes a connection between two endpoints (called an association; in TCP, these are sockets) for transmission of user messages.
SDM	Subscriber Data Management
SIF	Signaling Information Field
SIF	Service Information Field MTP Service Information Field is the payload field of an SS7 MSU header. The first byte of the SIF is the start of the MTP3 routing label. For MTP3-variant networks, the maximum SIF size is 272 bytes. For MTP3b-variant networks, the maximum SIF size is 4095 bytes.
SIGTRAN	The name given to an IETF working group that produced specifications for a family of protocols that provide reliable datagram service and user layer adaptations for SS7 and ISDN

S

	communications protocols. The most significant protocol defined by the SIGTRAN group was the Stream Control Transmission Protocol (SCTP), which is used to carry PSTN signalling over IP. The SIGTRAN group was significantly influenced by telecommunications engineers intent on using the new protocols for adapting VoIP networks to the PSTN with special regard to signaling applications. Recently, SCTP is finding applications beyond its original purpose wherever reliable datagram service is desired.
SIO	Service Information Octet. The network indicator code (NIC), priority (PRI), and service indicator (SI) in the SIO field in the message signaling unit (MSU). This information identifies the type of MSU (ISUP, TCAP, and so forth) that is allowed in the network where the EAGLE 5 ISS is located.
SIP	Session Initiation Protocol
SLF	Subscription Locator Function
SLS	Signaling Link Selector
SLTA	Signaling Link Test Acknowledgment
SLTM	Signal Link Test Message
SM	Short Message

S

SNMP	Simple Network Management Protocol. An industry-wide standard protocol used for network management. The SNMP agent maintains data variables that represent aspects of the network. These variables are called managed objects and are stored in a management information base (MIB). The SNMP protocol arranges managed objects into groups.
SOAP	Simple Object Access Protocol
SP	Signaling Point A set of signaling equipment represented by a unique point code within an SS7 domain.
SPR	Subscriber Profile Repository A logical entity that may be a standalone database or integrated into an existing subscriber database such as a Home Subscriber Server (HSS). It includes information such as entitlements, rate plans, etc. The PCRF and SPR functionality is provided through an ecosystem of partnerships.
SS7	Signaling System #7
SSR	SIP Signaling Router Function responsible for querying a redirection server and proxying requests to other SSR servers, redirect servers, SSR Service Points, and Gateways. It helps in evolving a Flat NGN network into a hierarchical network.

S

Subscriber Data Management	See SDM.

T

TCAP	Transaction Capabilities Application Part
TCP	Transfer Control Protocol
TPD	Tekelec Platform Distribution TPD is a standard Linux-based operating system packaged and distributed by Tekelec. TPD provides value-added features for managing installations and upgrades, diagnostics, integration of 3rd party software (open and closed source), build tools, and server management tools.
TRA	Traffic Restarting Allowed
TRW	Traffic Restarting Waiting

U

UL	Underwriters Laboratories
USM	User Security Management
USSD	Unstructured Supplementary Service Data

V

VLR	Visitor Location Register A component of the switching subsystem, within a GSM network. The switching subsystem includes various databases which store individual subscriber data. One of

V

	these databases is the HLR database or Home Location Register; and the VLR is another.

W

WebCI	Web Craft Interface

X

XML	eXtensible Markup Language A version of the Standard Generalized Markup Language (SGML) that allows Web developers to create customized tags for additional functionality.