

Subscriber Data Management

Performance Measurements

910-6540-001 Revision A

October 2012



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Chapter 1

Introduction

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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 how traffic data is collected from the system and represented to the user for analysis of system performance. Counters represent a predefined system behavior, where each counter has its own identification number and name. The counters are grouped into counter areas such as the operating system or applications.

Use this manual to understand performance management, how to locate available counters, and how to read or view system performance measurements.

Scope and audience

This document provides an overview of counter management, lists available SDM counters by operating system and application, describes how to view counters and edit thresholds, and provides the related entity information to make changes.

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, how to contact the Tekelec [Customer Care Center](#), and [Locate Product Documentation on the Customer Support Site](#).
- *Performance Management* describes counter management and list all available counters by operating system or application.
- *Statistics* describes how to obtain active HLR subscriber statistics.
- *View XML Performance Measurement Reports* describes how to view counters, edit their threshold, or view historical performance measurement reports.

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

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

General:

- Locate the referenced section in the Table of Content of the referenced document.
- If not otherwise indicated in the reference, determine the section name that contains the reference and 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 the 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.

Documentation Admonishments

Admonishments are icons and text throughout this manual that alert the reader to assure personal safety, to minimize possible service interruptions, and to warn of the potential for equipment damage.

Table 1: Admonishments

	<p>DANGER: (This icon and text indicate the possibility of <i>personal injury</i>.)</p>
	<p>WARNING: (This icon and text indicate the possibility of <i>equipment damage</i>.)</p>
	<p>CAUTION: (This icon and text indicate the possibility of <i>service interruption</i>.)</p>

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:

USA access code +1-800-658-5454, then 1-888-FOR-TKLC or 1-888-367-8552 (toll-free)

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:

- +91 124 436 8552 or +91 124 436 8553

- 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**.

Performance Management

Topics:

- [Counter Management Using the XML Format.....14](#)
- [Performance Measurement Counters.....17](#)

Traffic data can be gathered from the system to allow an operator to analyze system behavior. The role of the counters in the SDM is to report the number of messages that have been processed successfully or unsuccessfully by the system during its runtime. This measurement is very useful to determine how an application service behaves among the other applications running on the network.

The SDM generates Performance Measurement reports (PM reports) using the XML format.

The following sections describe each method and its characteristics and also lists the counters managed using each method.

Counter Management Using the XML Format

The SDM manages counters using XML format. This includes Operating System (OS) level information, as well as applications such as the HLR, SIP, HSS, SLF, AAA, and ENUM.

Daily Performance Measurement Report Filenames

Different applications increment the values of the counters at different time intervals. The Network Operator can view these values in the PM report that is generated each day at 00:00 and stored in a XML file in the hard disk's `/blue/var/pm` directory. The system keeps the latest 1000 files created. The filenames are in the following format:

```
<Type><StartDate>.<StartTime>-<EndTime>_<UniqueID>_ <JobName>.xml
```

For example:

```
A20110321.000000-240000_BluesliceNetworks_HLR-Subscriber-Counters-15min.xml
```

- **Type** - Indicates the Network Element (NE) and granularity period based on the 3GPP specifications. Currently, the only supported type is "A" (single NE, single granularity period) since all the cards are located on the same shelf and the sampling rate is the same.
- **StartDate** Represents the date when the measurement job began. The StartDate is in the following format: YYYYMMDD.
 - YYYY - Year in four-digit notation
 - MM - Month in two-digit notation (e.g., 01-12)
 - DD - Day in two digit notation (e.g., 01-31)
- **StartTime** Indicates the time when the measurement job began. The StartTime is in the following format: HHMMSS
 - HH - The two-digit hour of the day (local time), based on a 24 hour clock (e.g., 00 - 23).
 - MM - The two-digit minute of the hour (local time) in 5 minute intervals (e.g., 00, 05,...55).
 - SS - The two-digit seconds of the minute (local time).
- **EndTime** Indicates the time when the measurement job ended. Its format corresponds to the StartTime field, however, if the EndTime is 240000 it represents the end of the current day.
- **UniqueID**
 - Name of the NE, EM, or domain. In this case, it is "BluesliceNetworks"
- **JobName**
 - Name of the PM counter

Table 2: Counter Job Names and IDs

Job ID	Job Name	Description
--------	----------	-------------

1	OS-Critical-Resource	Counts five types of operating system messages. See the OS Resource Counters table.
2	DP-Request-Stats	Counts the number of queries made to the database per request type. See the DP Request Statistics Counters table.
3	HLR-MNP-60min	Counts HLR MNP messages. See the MAP Interface Counters table.
5	LTE-Message-Counters	Counts the LTE-HSS Diameter counters. See the LTE-HSS Counters table.
6	HSS-Message-Counters	Counts the number of messages the HSS receives. See the HSS/SLF Counters table.
7	AAA-Message-Counters	Counts the RADIUS messages. See the AAA Counters table.
8	DNS-Message-Counters	Counts the DNS NAPTR queries and answers. See the DNS ENUM Counters table.
9	HLR-Subscriber-Counters-24h	Counts specific HLR subscriber counters (Counter ID 12008-12012). See the MAP Interface Counters table.
10	HLR-Subscriber-Counters-15min	Counts HLR subscriber and IMS router (HLR only) counters (Counter IDs 12000-12007, 12013-12014, and 12185-12189). See the MAP Interface Counters table.
11	HLR-Subscriber-Counters-5min	Counts the remaining HLR subscriber counters (except MNP) that are not in the HLR-Subscriber-Counter-24h and HLR-Subscriber-Counters-15min reports. See the MAP Interface Counters table.
12	SIP-REGISTRAR-10min	Counts the SIP registrar messages at 10 minute intervals. See the SIP Counters table.
13	SIP-REDIRECT-10min	Counts the SIP redirect messages at 10 minute intervals. See the SIP Counters table.
14	SIP-REGCLIENT-10min	Counts the SIP register client messages at 10 minute intervals. See the SIP Counters table.
15	Eir-Message-Counters	Counts the Eir messages (Counter IDs 42000-42013). See the LTE-HSS Counters table.

Contents of a Performance Measurement Report

The following is an example of the content of a performance measurement report.

Note: Values of 0 (zero) are not recorded and therefore do not show up in the reports.

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type='text/xsl' href='MeasDataCollection.xslt'?>
<measCollecFile
xmlns="http://www.3gpp.org/ftp/specs/archive/32_series/32.435#measCollec">
  <fileHeader fileFormatVersion="32.435. v6.1" vendorName="BluesliceNetworks"
dnPrefix="ngHlr">
```

```

        <measCollec beginTime="20110321T000000"/>
</fileHeader>
<measData>
  <measInfo>
    <job jobId="10"/>
    <granPeriod duration="PT900S" endTime="20110321T15:15:00"/>
    <measType p="1">SriRoutingSriReceived/1/2</measType>
    <measType p="2">SriRoutingSriReceived/1/3</measType>
    <measType p="3">SriRoutingSriReceived/1/4</measType>
    <measType p="4">SriRoutingSriReceived/1/10</measType>
    <measType p="5">SriRoutingSriReceived/1/11</measType>
    <measType p="6">SriRoutingSriReceived/1/12</measType>
    <measType p="7">SriRoutingSriRegistered/1/2</measType>
    <measType p="8">SriRoutingSriRegistered/1/3</measType>
    <measType p="9">SriRoutingSriRegistered/1/4</measType>
    <measType p="10">SriRoutingSriRegistered/1/10</measType>
    <measType p="11">SriRoutingSriRegistered/1/11</measType>
    <measType p="12">SriRoutingSriRegistered/1/12</measType>
    <measValue>
      <r p="1">48747</r>
      <r p="2">41989</r>
      <r p="3">48936</r>
      <r p="4">48593</r>
      <r p="5">48470</r>
      <r p="6">41946</r>
      <r p="7">48747</r>
      <r p="8">41989</r>
      <r p="9">48936</r>
      <r p="10">48593</r>
      <r p="11">48470</r>
      <r p="12">41946</r>
    </measValue>
  </measInfo>
</measData>
<fileFooter>
  <measCollec endTime="20110321T240000"/>
</fileFooter>
</measCollecFile>

```

Table 3: Description of PM Report

Content	Description
<measCollec beginTime="20110321T000000"/>	20110321 = Start date of the counter report (YYYYMMDD) T000000 = Start time of the counter report (HHMMSS)
<job jobId="10"/>	jobId="10" = References the counter job name. In this example it is "HLR-Subscriber-Counters-15min". Refer to the Counter Job Names and IDs table for a list of Job IDs and names.
<granPeriod duration="PT900S" endTime="20110321T15:15:00"/>	PT900S = Length of period of the counter. In this example, 900s equals 15 minutes. 20110321 = End date of the counter (YYYYMMDD) T15:15:00 = End time when the counter completed the count (HH:MM:SS)
<measType p="1">SriRoutingSriReceived/1/2</measType>	p="1" = Reference number of the counter used to correlate the counter and the value.

	SriRoutingSriReceived = Counter name. 1 = Shelf number 2 = Slot number NOTE: There is an optional number that can appear after the blade number if the same counter counts different values on the same blade.
<r p="1">48747</r>	p="1" = Reference number of the counter. 48747 = Value of the counter.
<measCollec endTime="20110321T240000" />	20110321 = End date of the counter report (YYYYMMDD). T240000 = End time of the counter report (HHMMSS).

Performance Measurement Exception Reports

The SDM generates a performance measurement exception report in the scenario where the system is out of service (i.e., both System Controller blades are down, such as in the case of power failure) at 0 0:00 (12 am) , the report generation time. In this scenario, the PM exception report is generated by the first SystemController service that becomes active at system restart. This exceptional report is stored in the same directory as the other normal reports generated daily (directory: /blue/var/pm), however to differentiate them from the normal reports, the exceptional report is stored with the following name:

<Type><Startdate>.<Starttime>-<Endtime>_<UniqueId>_<JobId>_Exception.xml

Note: The date used in the PM exception report is always the date of the day prior to system restart.

Viewing the Performance Measurement Reports

The WebCI displays these counters in the PMCounterValue window of the Oamp folder. Through this window, the operator can view, for the current day, each of the counter's count value as they are dynamically incremented. For instructions on how to view the day's current counter values using XML format, refer to [View XML Performance Measurement Reports](#)

Moreover, the Network Operator can edit the thresholds for the OS Resource counters, see [Edit the Thresholds for the OS Resource Counters from the WebCI](#).

Performance Measurement Counters

The following sections list the counters that are managed using the XML format.

Operating System Counters

With the Performance Management Improvement feature, counters have been implemented in the following five counter areas:

- CPU load
- process information
- memory usage
- disk IO operations

- IP network interface utilization

These counters monitor the above information for all of the processes running on each blade. These counters are identified by a unique name and counter ID. The current value of each of these counters can be viewed from the WebCI's PM Counter Value window. Refer to the [View XML Performance Measurement Reports](#) section of this document for step-by-step instructions on how to view the current counter value from the WebCI.

Hereunder is the list of these counters and their description.

OS Resource Counters (CPU, process, memory, disk and IP network interface utilization counters):

Table 4: OS Resource Counters

Counter ID	Counter Name	Description
CPU		
1	CpuUserLoad	Counts the CPU user load.
2	CpuNiceLoad	CPU nice load
3	CpuSystemLoad	CPU system load
4	CpuIdleLoad	CPU idle load
5	CpuOverallLoad	CPU overall load
Process		
10	LoadAverage1Min	Load average value in 1 minute
11	LoadAverage5Min	Load average value in 5 minutes
12	LoadAverage15Min	Load average value in 15 minutes
13	ProcessListSize	Process list size
14	ProcessListSizeDelta	Process list size delta
15	ProcessRateOfChange	Process list rate of change
Memory		
20	MemoryTotal	Total physical memory
21	MemoryFree	Free physical memory
22	MemoryUsed	Used physical memory
23	MemoryPercentFree	Percentage free physical memory
24	MemoryPercentUsed	Percentage used physical memory
25	SwapMemoryTotal	Total swap memory

26	SwapMemoryFree	Free swap memory
27	SwapMemoryUsed	Used swap memory
28	SwapMemoryPercentFree	Percentage free swap memory
29	SwapMemoryPercentUsed	Percentage used swap memory
File System		
30	FileSystemSize	File system size
31	FileSystemFreeSpace	File system free space
32	FileSystemUsedSpace	File system used space
Disk I/O		
40	DiskRead	Disk read operation
41	DiskWrite	Disk write operation
IP I/F		
50	BandwidthPublicIf	Bandwidth of public interface (in %)
51	DiscardInPacketsPublicIf	Discarded inbound packets on public interface
52	DiscardOutPacketsPublicIf	Discarded outbound packets on public interface
53	ErrorInPacketsPublicIf	Error inbound packets on public interface
54	ErrorOutPacketsPublicIf	Error outbound packets on public interface

For some of these counters, alarms and thresholds are defined in the system. For each of these counters, a major and minor threshold or simply one single threshold are pre-defined in the system.

Hereunder are the counters and the alarms that can be generated depending on their thresholds:

Table 5: OS Resource Counters with Thresholds

Counter ID	Counter Name	Counter Description	Alarm (Alarm ID)	Alarm Description
	CPU			
5	CpuOverallLoad	CPU overall load	CpuLoadMinor (300)	Value has reached the threshold value (default: 80%)
			CpuLoadMajor (301)	Value has reached the threshold value (default: 95%)

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	Process			
10	LoadAverage1Min	Load average value in 1 minute	ProcessLoadAverage1MinuteMinor (302)	Value has reached the threshold value (default: 2)
			ProcessLoadAverage1MinuteMajor (303)	Value has reached the threshold value (default: 3)
11	LoadAverage5Min	Load average value in 5 minutes	ProcessLoadAverage5MinuteMinor (304)	Value has reached the threshold value (default: 2)
			ProcessLoadAverage5MinuteMajor (305)	Value has reached the threshold value (default: 3)
12	LoadAverage15Min	Load average value in 15 minutes	ProcessLoadAverage15MinuteMinor (306)	Value has reached the threshold value (default: 2)
			ProcessLoadAverage15MinuteMajor (307)	Value has reached the threshold value (default: 3)
	Memory			
24	MemoryPercentUsed	Percentage used physical memory	MemoryUsedMinor (308)	Value has reached the threshold value (default: 80%)
			MemoryUsedMajor (309)	Value has reached the threshold value (default: 95%)
29	SwapMemoryPercentUsed	Percentage used swap memory	SwapUsedMinor (310)	Value has reached the threshold value (default: 80%)
			SwapUsedMajor (311)	Value has reached the threshold value (default: 95%)
	IP I/F			
50	BandwidthPublicIf	Bandwidth of public interface	BandwidthPublicIfMinor (312)	Value has reached the threshold value (default: 60%)
			BandwidthPublicIfMajor (313)	Value has reached the threshold value (default: 80%)

51	Discarded inbound packets on public interface	Discarded inbound packets on public interface	InDiscardPublicIfMajor (314)	Value has reached the threshold value (default: 1)
52	DiscardOut PacketsPublicIf	Discarded outbound packets on public interface	OutDiscardPublicIfMajor (315)	Value has reached the threshold value (default: 1)
53	ErrorIn PacketsPublicIf	Error inbound packets on public interface	InErrorPublicIfMajor (316)	Value has reached the threshold value (default: 1)
54	ErrorOut PacketsPublicIf	Error outbound packets on public interface	NicOutErrorBound0Major (317)	Value has reached the threshold value (default: 1)

The thresholds indicate to the system when to generate and clear an alarm and can be defined with the following two values

- The Threshold value: Threshold values are already defined in the system (the threshold values set in the system for each counter are in the Alarm descriptions of the table above). If the counter value reaches or exceeds one of its corresponding threshold values, the system generates an alarm. After the alarm has already been raised, if the counter value goes back down, below this threshold value, the system clears the alarm.
- The Threshold hysteresis: By default, the threshold hysteresis is not defined, which means that only the threshold value is considered by the system to generate or clear the counter's corresponding alarms. However, threshold hysteresis can be defined in order to set a range within which the counter's corresponding alarm remains active. After the alarm has already been raised (the counter value has reached or exceeded the threshold value), if the counter value goes back down, below the threshold value, the alarm will remain active as long as the counter value is also equal or higher than the threshold hysteresis value. When the counter value goes back down, below the threshold hysteresis value, the system clears the alarm.

With the implementation of this feature, the operator can now edit the threshold value and the threshold hysteresis by accessing the PMCounterThreshold window from the Oamp folder in the WebCI. For more detailed step-by-step instructions on how to edit these thresholds, refer to the [Edit the Thresholds for the OS Resource Counters from the WebCI](#) section of this document.

Data Provider Request Statistics Counters

With the Performance Management Improvement feature, counters have been implemented to count the number of queries to the database per request type.

These counters monitor the queries processed by the database for each module (process) running on each blade individually. These counters are identified by a unique name and counter ID and the CounterContext indicates the module for which it applies for. The current value of each of these counters can be viewed from the WebCI's PMCounterValue window on a per slot basis and per module basis (identified by the CounterContext). Refer to [View the Current Day's Performance Measurements from the WebCI](#) for instructions on how to view the current counter value from the WebCI.

Table 6: Counter IDs

Counter ID	Counter Name	Description
2000	RequestSelect	Counts the number of SELECT requests queried to the database.
2001	RequestInsert	Counts the number of INSERT requests queried to the database.
2002	RequestUpdate	Counts the number of UPDATE requests queried to the database.
2003	RequestDelete	Counts the number of DELETE requests queried to the database.
2004	RequestQuery	Counts the number of QUERY requests queried to the database.
2005	RequestSql	Counts the number of SQL requests queried to the database.
2006	RequestTransaction	Counts the number of BEGIN requests queried to the database.
2007	RequestCommit	Counts the number of COMMIT requests queried to the database.
2008	RequestRollback	Counts the number of ROLLBACK requests queried to the database.
2009	RequestOperation	Counts the number of OPERATION requests queried to the database.
2010	RequestController	Counts the number of CONTROLLER requests queried to the database.
2011	RequestUndef	Counts the number of UNDEFINED requests queried to the database.
2020	TxTimeout	Counts the number of BEGIN timeouts.
2021	PreprocessFailed	Counts the number of request preprocess failure.
2022	RequestOnLocalDb	Counts the number of requests queried on the local database.
2023	RequestOnScDb	Counts the number of requests queried on the SystemController database.
2024	RequestOnLocalSs	Counts the number of requests queried on the local Subscriber Set.
2025	RequestOnRemoteSs	Counts the number of requests queried on the remote Subscriber Set.
2026	RequestOnForcedDb	Counts the number of requests queried on the forced database.
2030	RdbInUse	Number of RDB currently in use.
2031	DbConnectionInUse	Number of DB connection currently in use.

HLR Application Counters

The number of messages the HLR receives are counted for each blade with an HLR service running traffic. These counters are identified by a unique name and counter ID. The HLR counters have a Counter Id \geq 12000. The accumulative time interval is the consecutive period of time during which the counter continuously increments its value. In between these accumulative time intervals, the counter's value is reset to '0'. Depending on the counter, the accumulative time interval may be 5 minutes, 15 minutes, 1 hour, or 24 hours.

The list of counters that keep track of the type of MAP messages sent/received to or from the HLR or of some events is given below.

Table 7: MAP Interface Counters

Counter ID	Counter Name	Description	Accumulation Time Interval
12000	SubsRegistered PerImisiRange	Number of HLR subscribers registered per IMSI Range defined in HLR Config	15 min
12001	SubsRegistered CSDomain	Number of HLR subscribers registered in CS domain	15 min
12002	SubsRegistered PSDomain	Number of HLR subscribers registered in PS domain	15 min
12003	SubsRegistered PerVLRAddress	Number of HLR subscribers registered per VLR Address	15 min
12004	SubsRegistered PerSGSNAddress	Number of HLR subscribers registered per SGSN Address	15 min
12005	SubsRegistered NAMGprsOnly	Number of HLR subscribers registered for NAM GPRS Only	15 min
12006	SubsRegistered NAMNonGprsOnly	Number of HLR subscribers registered for NAM Non GPRS Only	15 min
12007	SubsRegistered NAMNonGprsAndGprs	Number of HLR subscribers registered for NAM Non GPRS And GPRS	15 min
12008	SIMProvisioned TypeSIM	Number of SIM cards provisioned of type SIM	24 h
12009	SIMProvisioned TypeUSIM	Number of SIM cards provisioned of type USIM	24 h
12010	SIMProvisioned WithoutSubsProfile	Number of SIM cards provisioned without an associated subscriber profile	24 h
12011	IMSIProvisioned PerIMSIrange	Number of IMSI provisioned per IMSI range defined in HLR Config	24 h

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12012	MSISDNProvisioned PerCC	Number of MSISDN provisioned per Country Code	24 h
12013	SubsCSNot Reachable	Number of HLR subscribers CS not reachable	15 min
12014	SubsPSNot Reachable	Number of HLR subscribers PS not reachable	15 min
12015	MnpRedirectedSri	MNP - Number of SRI - Redirected	1 h
12016	MnpRelayedSri	MNP - Number of SRI - Relayed	1 h
12017	MnpRelayedSrim	MNP - Number of SRISM - Relayed	1 h
12018	MnpRelayedSmdel	MNP - Number of SMDEL - Relayed	1 h
12019	MnpRelayedSndimsi	MNP - Number of SNDIMSI - Relayed	1 h
12020	MnpRelayedAti	MNP - Number of ATI - Relayed	1 h
12021	OpenInd	Number of Open Indications	5 min
12022	OpenReq	Number of Open Requests	5 min
12023	OpenCfm	Number of Open Confirmations	5 min
12024	DlgCfm	Number of Dialog Confirmations	5 min
12025	CloseInd	Number of Close Indications	5 min
12026	CloseReq	Number of Close Requests	5 min
12027	AbortInd	Number of Abort Indications	5 min
12028	AbortIndUserSpec	Number of Abort Indications - reason USR_SPECIFIC	5 min
12029	AbortIndResLimit	Number of Abort Indications - reason RESLIMIT	5 min
12030	AbortIndResUnavail	Number of Abort Indications - reason RESUNAVAIL	5 min
12031	AbortIndAppProCancel	Number of Abort Indications - reason APC	5 min
12032	AbortIndPrvdrMalfunction	Number of Abort Indications - reason PROV_MALFUNC	5 min
12033	AbortIndSupDialogRel	Number of Abort Indications - reason SUP_DLG_RLS	5 min
12034	AbortIndPResLimit	Number of Abort Indications - reason RSRS_LIMIT	5 min
12035	AbortIndVerIncomp	Number of Abort Indications - reason VER_INCOMP	5 min
12036	UAbtIndUnknReason	Number of UAbort Indications - reason UNKN_REASON	5 min

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12037	PAbrtIndUnknReason	Number of PAbort Indications - reason UNKN_REASON	5 min
12038	AbortReqUserSpec	Number of Abort Requests - reason USR_SPECIFIC	5 min
12039	AbortReqResLimit	Number of Abort Requests - reason RESLIMIT	5 min
12040	AbortReqResUnavailable	Number of Abort Requests - reason RESUNAVAIL	5 min
12041	AbortReqAppProcCancel	Number of Abort Requests - reason APC	5 min
12042	AbprtReqPrvdrMalfunction	Number of Abort Requests - reason PROV_MALFUNC	5 min
12043	AbprtReqSupDialogRel	Number of Abort Requests - reason SUP_DLG_RLS	5 min
12044	AbprtReqPResLimit	Number of Abort Requests - reason RSRS_LIMIT	5 min
12045	AbprtReqVerIncomp	Number of Abort Requests - reason VER_INCOMP	5 min
12046	UAbprtReqUnknReason	Number of UAbort Requests - reason UNKN_REASON	5 min
12047	PAbprtReqUnknReason	Number of PAbort Requests - reason UNKN_REASON	5 min
12048	NoticeInd	Number of Notice Indications	5 min
12049	DelimInd	Number of Delimiter Indications	5 min
12050	DelimReq	Number of Delimiter Requests	5 min
12051	AbortReq	Number of Abort Requests	5 min
12052	UpdLocInd	Number of Update Location Indications	5 min
12053	UpdLocRsp	Number of Update Location Ack Responses	5 min
12054	UpdLocNeg	Number of Update Location Nack Responses	5 min
12055	IsdReq	Number of Isd Requests	5 min
12056	IsdReq1	Number of Gsm Isd Segment 1 Requests	5 min
12057	IsdReq2	Number of Gsm Isd Segment 2 Requests	5 min

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12058	IsdReq3	Number of Gsm Isd Segment 3 Requests	5 min
12059	IsdReq4	Number of Gsm Isd Segment 4 Requests	5 min
12060	IsdReq5	Number of Gsm Isd Segment 5 Requests	5 min
12061	IsdReq6	Number of Gsm Isd Segment 6 Requests	5 min
12062	IsdReq7	Number of Gsm Isd Segment 7 Requests	5 min
12063	IsdReq8	Number of Gsm Isd Segment 8 Requests	5 min
12064	GprsIsdReq1	Number of Gprs Isd Segment 1 Requests	5 min
12065	GprsIsdReq2	Number of Gprs Isd Segment 2 Requests	5 min
12066	IsdCfm	Number of Isd Confirmations	5 min
12067	DsdReq	Number of Dsd Requests	5 min
12068	DsdCfm	Number of Dsd Confirmations	5 min
12069	CancelLocReq	Number of Cancel Location Requests	5 min
12070	CancelLocCfm	Number of Cancel Location Confirmations	5 min
12071	PurgeMsInd	Number of PurgeMs Indications	5 min
12072	PurgeMsRsp	Number of PurgeMs Ack	5 min
12073	PurgeMsNeg	Number of PurgeMs Nack	5 min
12074	GprsUpdLocInd	Number of Gprs Update Location Indications	5 min
12075	GprsUpdLocRsp	Number of Gprs Update Location Ack	5 min
12076	GprsUpdLocNeg	Number of Gprs Update Location Nack	5 min
12077	SriGprsInd	Number of Gprs SRI Indications	5 min
12078	SriGprsRsp	Number of Gprs Sri Ack	5 min
12079	SriGprsNeg	Number of Gprs Sri Nack	5 min
12080	FailRptInd	Number of Failure Report Indications	5 min
12081	FailRptRsp	Number of Failure Report Ack	5 min
12082	FailRptNeg	Number of Failure Report Nack	5 min

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12083	NoteMsPresGprsReq	Number of Gprs NoteMsPres Requests	5 min
12084	NoteMsPresGprsCfm	Number of Gprs NoteMsPres Confirmations	5 min
12085	SendAuthInfoInd	Number of Auth Info Indications	5 min
12086	SendAuthInfoRsp	Number of Auth Info Ack	5 min
12087	SendAuthInfoNeg	Number of Auth Info Nack	5 min
12088	SndParamInd	Number of Send Param Indications	5 min
12089	SndParamRsp	Number of Send Param Ack	5 min
12090	SndParamNeg	Number of Send Param Nack	5 min
12091	AuthFailRptInd	Number of Auth Fail Report Indications	5 min
12092	AuthFailRptRsp	Number of Auth Fail Report Ack	5 min
12093	AuthFailRptNeg	Number of Auth Fail Report Nack	5 min
12094	RestoreInd	Number of Restore Indications	5 min
12095	RestoreRsp	Number of Restore Ack	5 min
12096	RestoreNeg	Number of Restore Nack	5 min
12097	ResetReq	Number of Reset Requests	5 min
12098	ResetCfm	Number of Reset Confirmations	5 min
12099	SriInd	Number of Sri Indications	5 min
12100	SriRsp	Number of Sri Ack	5 min
12101	SriNeg	Number of Sri Nack	5 min
12102	PrnReq	Number of Prn Requests	5 min
12103	PrnCfm	Number of Prn Confirmations	5 min
12104	FwdCheckSSReq	Number of Forward Check SS Requests	5 min
12105	AtiInd	Number of Ati Indications	5 min
12106	AtiRsp	Number of Ati Ack	5 min
12107	AtiNeg	Number of Ati Nack	5 min
12108	PsiReq	Number of Psi Requests	5 min
12109	PsiCfm	Number of Psi Confirmations	5 min
12110	AtmInd	Number of Atm Indications	5 min
12111	AtmRsp	Number of Atm Ack	5 min
12112	AtmNeg	Number of Atm Nack	5 min

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12113	AtsiInd	Number of Atsi Indications	5 min
12114	AtsiRsp	Number of Atsi Ack	5 min
12115	AtsiNeg	Number of Atsi Nack	5 min
12116	NsdcReq	Number of Nsdc Requests	5 min
12117	NsdcCfm	Number of Nsdc Confirmations	5 min
12118	RegistSSInd	Number of RegisterSS Indications	5 min
12119	RegistSSRsp	Number of RegisterSS Ack	5 min
12120	RegistSSNeg	Number of RegisterSS Nack	5 min
12121	EraseSSInd	Number of EraseSS Indications	5 min
12122	EraseSSRsp	Number of EraseSS Ack	5 min
12123	EraseSSNeg	Number of EraseSS Nack	5 min
12124	ActiveSSInd	Number of ActivateSS Indications	5 min
12125	ActiveSSRsp	Number of ActivateSS Ack	5 min
12126	ActiveSSNeg	Number of ActivateSS Nack	5 min
12127	DeactiveSSInd	Number of DeactivateSS Indications	5 min
12128	DeactiveSSRsp	Number of DeactivateSS Ack	5 min
12129	DeactiveSSNeg	Number of DeactivateSS Nack	5 min
12130	InterrogSSInd	Number of InterrogateSS Indications	5 min
12131	InterrogSSRsp	Number of InterrogateSS Ack	5 min
12132	InterrogSSNeg	Number of InterrogateSS Nack	5 min
12133	RegistPasswdInd	Number of RegisterPasswd Indications	5 min
12134	RegistPasswdRsp	Number of RegisterPasswd Ack	5 min
12135	RegistPasswdNeg	Number of RegisterPasswd Nack	5 min
12136	GetPasswdReq	Number of GetPasswd Requests	5 min
12137	GetPasswdCfm	Number of GetPasswd Confirmations	5 min
12138	ProcUssdReqInd	Number of UssdReq Indications	5 min
12139	ProcUssdReqReq	Number of UssdReq Requests	5 min
12140	ProcUssdReqRsp	Number of UssdReq Ack	5 min
12141	ProcUssdReqNeg	Number of UssdReq Nack	5 min
12142	ProcUssdReqCfm	Number of UssdReq Confirmations	5 min
12143	ProcUssdDataInd	Number of UssdData Indications	5 min
12144	ProcUssdDataReq	Number of UssdData Requests	5 min

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12145	ProcUssdDataRsp	Number of UssdData Ack	5 min
12146	ProcUssdDataNeg	Number of UssdData Nack	5 min
12147	ProcUssdDataCfm	Number of UssdData Confirmations	5 min
12148	UssdReqInd	Number of UssdReq Indications	5 min
12149	UssdReqReq	Number of UssdReq Requests	5 min
12150	UssdReqRsp	Number of UssdReq Ack	5 min
12151	UssdReqNeg	Number of UssdReq Nack	5 min
12152	UssdReqCfm	Number of UssdReq Confirmations	5 min
12153	UssdNotifyInd	Number of UssdNotify Indications	5 min
12154	UssdNotifyReq	Number of UssdNotify Requests	5 min
12155	UssdNotifyRsp	Number of UssdNotify Ack	5 min
12156	UssdNotifyNeg	Number of UssdNotify Nack	5 min
12157	UssdNotifyCfm	Number of UssdNotify Confirmations	5 min
12158	BegSubsActivInd	Number of BeginSubscriberActivity Indications	5 min
12159	SRISMind	Number of SriSM Indications	5 min
12160	SriSMRsp	Number of SriSM Ack	5 min
12161	SriSMNeg	Number of SriSM Nack	5 min
12162	InformSvcReq	Number of InformServiceCenter Requests	5 min
12163	InformSvcCfm	Number of InformServiceCenter Confirmations	5 min
12164	AlertSvcReq	Number of AlertServiceCenter Requests	5 min
12165	AlertSvcCfm	Number of AlertServiceCenter Confirmations	5 min
12166	ReadyForSmInd	Number of ReadyForSm Indications	5 min
12167	ReadyForSmRsp	Number of ReadyForSm Ack	5 min
12168	ReadyForSmNeg	Number of ReadyForSm Nack	5 min
12169	SmDeliveryReportInd	Number of SmDeliveryReport Indications	5 min
12170	SmDeliveryReportRsp	Number of SmDeliveryReport Ack	5 min
12171	SmDeliveryReportNeg	Number of SmDeliveryReport Nack	5 min
12172	SendImsiInd	Number of SendImsi Indications	5 min

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12173	SendImsiRsp	Number of SendImsi Ack	5 min
12174	SendImsiNeg	Number of SendImsi Nack	5 min
12175	SimSwap	Number of Sim Swap	5 min
12176	RestrictedFTN	Number of Restricted FTN	5 min
12177	NumBlockedMap TxPerAcType	Number of Blocked Map Transactions per AC type	5 min
12178	NumBlockedAlrReq	Number of Blocked Blocked Alr Requests	5 min
12179	NumDenyOnUL	Number of Deny Update Location	5 min
12180	NumOdbOnUL	Number of ODB Update Location	5 min
12181	NumReqToDisabledSub	Number of Request To Disabled Subscriber	5 min
12182	NumImeiSvUpdate	Number of update in Subscriber Profile	5 min
12183	FtnNumTranslation PerRule	Number of Ftn Translations Per Rule	5 min
12184	FtnNumTranslations	Number of Ftn Translations	5 min
12185	MnpRangeRedirectedSri	MNP Number Range - Number of SRI - Redirected	1 h
12186	MnpRangeRelayedSri	MNP Number Range - Number of SRI - Relayed	1 h
12187	MnpRangeRelayedSrism	MNP Number Range - Number of SRISM - Relayed	1 h
12188	MnpRangeRelayedSmdel	MNP Number Range - Number of SMDEL - Relayed	1 h
12189	MnpRangeRelayedSndimsi	MNP Number Range - Number of SNDIMSI - Relayed	1 h
12190	MnpRangeRelayedAti	MNP Number Range - Number of ATI - Relayed	1 h
12191	MnpMismatchTypeA	MNP DB Mismatch - Type A (Number ported to another OLO)	1 h
12192	MnpMismatchTypeB	MNP DB Mismatch - Type B (Number is NOT ported in the network corresponding to the RgN)	1 h
12193	MnpMismatchTypeC	MNP DB Mismatch - Type C (Number ported to another OLO that is different from the Mobile Operator indicated by the RN)	1 h
12194	MnpAtiInfoRequest	MNP - Number of ATI Info Request	1 h

12195	SmsRedirected	SMS Routing: Number of SRI-SM redirected	5 min
12196	SmsRelayed	SMS Routing: Number of SRI-SM relayed	5 min
12197	TripletRequest	Number of Requests for Triplets	5 min
12198	TripletResponses	Number of Responses with Triplets	5 min
12199	QuintipletRequests	Number of Requests for Quintiplets	5 min
12200	Quintiplet Responses	Number of Responses with Quintiplets	5 min
12201	AuthSyncRequests	Number of Auth Requests with Synch Indication	5 min
12202	SimNotFound	Number of Auth Requests with Synch Indication	5 min
12203	SriRoutingSriReceived	Sri Routing: Number of SRI received	5 min
12204	SriRoutingSriRegistered	Sri Routing: Number of SRI for TAS-registered Subscribers	5 min
12205	SriRoutingNonSri	Sri/SMS Routing: Number of MAP operations not handled	5 min
12206	SriRoutingSri NotRegistered	Sri Routing: Number of SRI for non-TAS registered Subscribers	5 min
12207	SriRoutingSriNotFound	Sri Routing: Number of SRI for Subscribers not found in database	5 min
12208	EirNumberOfCheckIMEIRcvd	Number of CheckIMEI request received	10 min
12209	EirNumberOfULImeiEnforcementReceived	Number of Update Location IMEI Enforcement request received	10 min
12210	EirNumberOfWhiteListReturned	Number of CheckIMEI sent with EquipmentStatus = WHITELIST	10 min
12211	EirNumberOfGreyListReturned	Number of CheckIMEI sent with EquipmentStatus = GREYLIST	10 min
12212	EirNumberOfBlackListReturned	Number of CheckIMEI sent with EquipmentStatus = BLACKLIST	10 min
12213	EirNumberOfUnkownIMEIStatus	Number of Unkwown IMEI returned	10 min
12214	EirNumberOfWhiteListReturnedGlobalResp	Number of CheckIMEI answer sent with EquipmentStatus = WHITELIST due to Global Response	10 min

12215	EirNumberOfGreyListReturnedGlobalResp	Number of CheckIMEI answer sent with EquipmentStatus = GREYLIST due to Global Response	10 min
12216	EirNumberOfBlackListReturnedGlobalResp	Number of CheckIMEI answer sent with EquipmentStatus = BLACKLIST due to Global Response	10 min
12217	EirNumberOfUnknownIMEIStatusGlobalResp	Number of unknown IMEI returned due to Global Response	10 min
12218	EirNumberOfBlackListIMSIMatch	Number of black list IMEI with successfull IMSI override	10 min
12219	EirNumberOfBlackListIMSIMisMatch	Number of black list IMEI with unsuccessfull IMSI override	10 min
12220	EirNumberOfDynamicIMSIRecording	Number of Dynamic IMSI/IMEI association	10 min
12221	EirNumberOfDynamicSVRecording	Number of Dynamic IMEI SV recording	
12222	SriLcsMsisdnInd	Number of Send Routing Info for LCS Ind with MSISDN	5 min
12223	SriLcsImsiInd	Number of Send Routing Info for LCS Ind with IMSI	5 min
12224	SriLcsRsp	Number of Send Routing Info for LCS Ack	5 min
12225	SriLcsNeg	Number of Send Routing Info for LCS Nack	5 min
12226	SriRoutingSriLcsReceived	Sri Routing: Number of SRI-LCS received	5 min
12227	SriRoutingSriLcsRelayed	Sri Routing: Number of Send Routing Info for LCS Relayed	5 min
12228	SriRoutingSriLcsRedirected	Sri Routing: Number of Send Routing Info for LCS Redirected	5 min
12229	SriRoutingSriLcsRegistered	Sri Routing: Number of Send Routing Info for LCS for TAS-registered Subscribers	5 min
12230	SriRoutingSriLcsNotRegistered	Sri Routing: Number of Send Routing Info for LCS for non-TAS registered Subscribers	5 min
12231	SriRoutingSriLcsNotFound	Sri Routing: Number of Send Routing Info for LCS for Subscribers not found in database	5 min
12232	SriRoutingAtiReceived	Sri Routing: Number of Any Time Interrogation received	5 min

12233	SriRoutingAtiRelayed	Sri Routing: Number of Any Time Interrogation Relayed	5 min
12234	SriRoutingAtiRegistered	Sri Routing: Number of Any Time Interrogation for TAS-registered Subscribers	5 min
12235	SriRoutingAtiNot Registered	Sri Routing: Number of Any Time Interrogation for non-TAS registered Subscribers	5 min
12236	SriRoutingAtiNotFound	Sri Routing: Number of Any Time Interrogation for Subscribers not found in database	5 min
12237	SriRoutingSriRelayed	Sri Routing: Number of Send Routing Info Relayed	5 min
12238	SriRoutingSriRedirected	Sri Routing: Number of Send Routing Info Redirected	5 min
12239	SmsReceived	SMS Routing: Number of Send Routing Info for SM received	5 min
12240	SmsRegistered	SMS Routing: Number of Send Routing Info for SM for TAS-registered Subscribers	5 min
12241	SmsNotRegistered	SMS Routing: Number of Send Routing Info for SM for non-TAS registered Subscribers	5 min
12242	SmsNotFound	SMS Routing: Number of Send Routing Info for SM for Subscribers not found in database	5 min

The WebCI displays these counters in the PMCounterValue window of the Oamp folder. Through this window, the operator can view each of the counter's count value reported after every 5 minutes, 15 minutes, 1 hour, or 24 hour period for the current day.

HLR Subscriber Counters

Twelve types of HLR-specific subscriber counters have been implemented to count HLR subscribers. This dynamically keeps track of the number of HLR subscribers on a SDM system, which improves analysis based on HLR subscribers and provides the following to the operator:

- a better assessment of the activity level on a SDM system
- help for troubleshooting purposes
- detailed subscriber information to better identify and forecast subscriber trends

The HLR subscriber counters can be identified by a Counter ID or by a Counter Name and Counter Context, in the case where the counter type is dynamic.

Here are the 12 types of HLR-specific subscriber counters:

Table 8: HLR Subscriber Counters

Type	Counter ID	Counter Name	Counter Context	Counter Description
1	12000	Number of HLR subscribers registered per IMSI Range defined in HLR Config	<Imsi range> (example: 3109104)	This counter type is dynamic, each time a new IMSI range is added in the HLR configuration and a Subscriber is registered in this new IMSI Range, a new counter is created. There are as many counters of this type as there are IMSI ranges. They count the total number of subscribers newly registered per IMSI Range (defined in HLR configuration) during a 15 minute period, after which they are reset.
2	12001	Number of HLR subscribers registered in CS domain	None	This counter is static and counts the number of subscribers newly registered in the CS Domain (new Current VLR (Non-Gprs) in the volatile data) during a 15 minute period, after which it is reset.
3	12002	Number of HLR subscribers registered in PS domain	None	This counter is static and counts the number of subscribers newly registered in the PS Domain (new Current SGSN (GPRS) in the volatile data) during a 15 minute period, after which it is reset.
4	12003	Number of HLR subscribers registered per VLR Address	<VLR Address> (example: 15631234567)	This counter type is dynamic, each time a new VLR address is added to the volatile data, a new counter is created. There are as many counters of this type as there are VLR addresses in the ngHLR's volatile data. They count the total number of subscribers newly registered per VLR address (number) during a 15 minute period, after which they are reset.
5	12004	Number of HLR subscribers registered per SGSN Address	<SGSN Address> (example: 15631234567)	This counter type is dynamic, each time a new SGSN address is added to the volatile data, a new counter is created. There are as many counters of this type as there are SGSN addresses in the ngHLR's volatile data. They count the total number of subscribers newly registered per SGSN address (number)

Type	Counter ID	Counter Name	Counter Context	Counter Description
				during a 15 minute period, after which they are reset.
6	12005	Number of HLR subscribers registered for NAM GPRS Only	None	This counter type is static, three counters of this type are always created when the HLR starts. There is one counter per Network Access Mode (NonGprsAndGprs(0), NonGprsOnly(1) and GprsOnly(2)). They count the total number of subscribers newly registered per NAM value during a 15 minute period, after which they are reset.
	12006	Number of HLR subscribers registered for NAM Non GPRS Only		
	12007	Number of HLR subscribers registered for NAM Non GPRS And GPRS		
7	12013	Number of HLR subscribers CS not reachable	None	<p>This counter type is static, one counter of this type is always created when the HLR starts. It counts the number of HLR Subscribers becoming not reachable for Non-GPRS (CS) during a 15 minute period, after which it is reset.</p> <p>A subscriber is defined as reachable from the HLR point of view if all the Subscriber CS Reachable flags defined in the volatile data are false (for VLR Number this mean that it is not empty).</p> <p>The Non-GPRS (CS) Subscriber Reachable flags are: -MSC area restricted flag -MS purged flag -Roaming restriction due to unsupported feature flag -VLR Number is empty</p>
8	12014	Number of HLR subscribers PS not reachable	None	<p>This counter type is static, one counter of this type is always created when the HLR starts. It counts the number of HLR Subscribers becoming not reachable for GPRS (PS) during a 15 minute period, after which it is reset.</p> <p>A subscriber is defined as reachable from the HLR point of view if all the Subscriber PS Reachable flags defined in the volatile data are false (for SGSN Number this mean that it is not empty).</p>

Type	Counter ID	Counter Name	Counter Context	Counter Description
				<p>The GPRS (PS) Subscriber Reachable flags are:</p> <ul style="list-style-type: none"> • SGSN Subscriber Reachable flag • SGSN MSC area restricted flag • SGSN MS purged flag • SGSN Roaming restriction due to unsupported feature flag • SGSN Number is empty
9	12008	Number of SIM cards provisioned of type SIM	None	This counter type is static; two counters are always created when the HLR starts. They count the total number of SIM cards newly Provisioned per SimType (SIM, USIM) during a 24 hour period, after which they are reset.
	12009	Number of SIM cards provisioned of type USIM		
10	12010	Number of SIM cards provisioned without an associated subscriber profile	None	This counter type is static, one single counter is always created when the HLR starts. It counts the total number of SIM cards newly provisioned without an associated subscriber profile during a 24 hour period, after which it is reset.
11	12011	Number of IMSI provisioned per IMSI range defined in HLR Config	<IMSI Range> (example: 3109104)	<p>This counter type is dynamic, each time a new IMSI range is added and a Subscriber is added in the new IMSI range, a new counter is created. There are as many counters of this type as there are IMSI ranges. They count the total number of IMSI (including Multi-IMSI) newly provisioned per IMSI Range during a 24 hour period, after which they are reset.</p> <p>For Multi-IMSI, if a multi-IMSI is added/deleted, the counter is incremented/decremented only if the Multi-IMSI is different from any other count or Alternate (multi) IMSI.</p>
12	12012	Number of MSISDN provisioned per Country Code	<Country Code> (example: 7)	This counter type is dynamic, each time a new MSISDN is added to a subscriber profile, a new counter is created if the decoded Country Code is new.

Type	Counter ID	Counter Name	Counter Context	Counter Description
				<p>There are as many counters of this type as there are Country Codes. They count the total number of MSISDNs newly provisioned per Country Code during a 24 hour period, after which they are reset.</p> <p>For Multi-IMSI (alternate MSISDN), if an alternate MSISDN is added / deleted, the counter is incremented / decremented only if the alternate MSISDN is different from any other Primary or Alternate MSISDN.</p>
13	12226	SriRoutingSriLcsReceived	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Send Routing Info for LCS received
14	12227	SriRoutingSriLcsRelayed	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Send Routing Info for LCS Relayed
15	12228	SriRoutingSriLcsRedirected	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Send Routing Info for LCS Redirected
16	12229	SriRoutingSriLcsRegistered	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Send Routing Info for LCS for TAS-registered Subscribers
17	12230	SriRoutingSriLcsNotRegistered	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Send Routing Info for LCS for TAS-registered Subscribers
18	12231	SriRoutingSriLcsNotFound	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Send Routing Info for LCS for Subscribers not found in database
19	12232	SriRoutingAtiReceived	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Any Time Interrogation received
20	12233	SriRoutingAtiRelayed	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Any Time Interrogation Relayed
21	12234	SriRoutingAtiRegistered	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Any Time Interrogation for TAS-registered Subscribers
22	12235	SriRoutingAtiNotRegistered	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Any Time Interrogation for non-TAS registered Subscribers

Type	Counter ID	Counter Name	Counter Context	Counter Description
23	12236	SriRoutingAtiNotFound	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Any Time Interrogation for Subscribers not found in database
24	12237	SriRoutingSriRelayed	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Send Routing Info Relayed
25	12238	SriRoutingSriRedirected	11 - HLR-Subscriber - Counters-5min	Sri Routing: Number of Send Routing Info Redirected
26	12239	SmsReceived	11 - HLR-Subscriber - Counters-5min	SMS Routing: Number of Send Routing Info for SM received
27	12240	SmsRegistered	11 - HLR-Subscriber - Counters-5min	SMS Routing: Number of Send Routing Info for SM for TAS-registered Subscribers
28	12241	SmsNotRegistered	11 - HLR-Subscriber - Counters-5min	SMS Routing: Number of Send Routing Info for SM for non-TAS registered Subscribers
29	12242	SmsNotFound	11 - HLR-Subscriber - Counters-5min	SMS Routing: Number of Send Routing Info for SM for Subscribers not found in database

It is important to take note that the counters only report the total value that has been counted within the 15 minute period or 24 hour period, depending on the counter. When the counter is reset (after a 15 minute or a 24 hour period), its value is stored in the database in files created on a daily basis.

The WebCI displays these counters in the PMCounterValue window of the Oamp folder. Through this window, the operator can view each of the counter's count value reported after each 5 minute, 15 minute, 1 hour, or 24 hour period for the current day.

SIP Application Counters

The SIP messages supported by the ngHLR are counted with SIP counters. The SIP counters feature aims to provide statistics about FMC related traffic processing done by the ngHLR. The statistics are gathered using the common ngHLR performance measurement framework. Specific statistics will be kept for each of the main ngHLR SIP related processing domains: the SIP Registrar and the SIP Redirect Server.

The number of different incoming and outgoing SIP messages are counted for each blade with an HLR service (with SIP application enabled) running traffic.

The number of messages the SIP Server receives are counted for each blade with an HLR service running SIP traffic. These counters are identified by a unique name and counter ID. The SIP counters have a Counter Id \geq 10000.

The list of counters that keep track of the type of SIP messages sent/received to or from the HLR or of some events is given below.

Table 9: SIP Counters

Counter ID	SIP Registrar Counters	Description
10000	RegisterReceived	Counter incremented for each valid REGISTER message received by the SIP stack and passed to the Registrar application.
10001	RegisterSuccess	Counter incremented for each 200 OK sent by the application in response to REGISTER message received. REGISTER message processing completed successfully.
10002	RegisterError400	Counter incremented for each 400 error sent by the application in response to REGISTER message received. 'Error 400' is sent when the message has an erroneous format.
10003	RegisterError401	Counter incremented for each 401 error sent by the application in response to REGISTER message received. 'Error 401' is sent when there is an error in the user authentication.
10004	RegisterError403	Counter incremented for each 403 error sent by the application in response to REGISTER message received. 'Error 403' is sent when: - Registrar is NOT enabled (Sip Configuration::IsRegistrar Enabled) and/or - AOR found is NOT 'Service Allowed' (SipAddress OfRecord::Service Allowed) and/or - AOR found is NOT allowed to receive REGISTER (SipAddress OfRecord::isReceiveRegister Allowed)
10005	RegisterError404	Counter incremented for each 404 error sent by the application in response to REGISTER message received. 'Error 404' is sent when REGISTER request AOR is NOT found. It can also be send when URI domain does NOT match Registrar configured domain (request reaches redirect server in this case).
10006	RegisterError416	Counter incremented for each 416 error sent by the application in response to REGISTER message received. 'Error 416' is sent when REGISTER request URI contains invalid URI (request reaches redirect server in this case).
10007	RegisterError500	Counter incremented for each 500 error sent by the application in response to REGISTER message received. 'Error 500' is sent when: - There was an error when we tried to send a 200 OK. (All previous/other processing completed successfully, but error occurred when trying to

		send 200 OK). - Internal error (ex: cannot find AOR in the AOR map).
10008	RegisterError503	Counter incremented for each 503 error sent by the application in response to REGISTER message received. 'Error 503' is sent when the stack is manually disabled.
10009	RegisterError InvalidRequestReceived	Counter incremented for each INVALID REGISTER request received by SIP Stack. Message cannot be processed; stack determines appropriate SIP error code to return. Note: The counter RegisterReceived, defined above, is not incremented upon reception of an invalid REGISTER request.
10010	RegisterImsrTasNotFound	Number of IMSR REGISTER answered with 404. TAS not found.
Counter ID	SIP Redirect Server Counters	Description
10100	InviteReceived	Counter incremented for each valid INVITE message received by the SIP stack and passed to the Redirect server application.
10101	InviteProxyAttemptForLB	Counts the number of INVITE identified to be proxied (for Load Balancing purpose).
10102	InviteProxied	Counts the number of INVITE successfully proxied OUT (for Load Balancing purpose).
10103	RedirectUriSuccess300	Counter incremented for each 300 sent in response to INVITE message received IF response is redirected to multiple SIP URI. INVITE message processing completed successfully.
10104	RedirectUriSuccess302	Counter incremented for each 302 sent in response to INVITE message received IF response is redirected to a single SIP URI. INVITE message processing completed successfully.
10105	RedirectMsrnSuccess300	Counter incremented for each 300 sent in response to INVITE message received IF response is redirected to MSRN AND at least one SIP URI. INVITE message processing completed successfully.
10106	RedirectMsrnSuccess302	Counter incremented for each 302 sent in response to INVITE message received IF response is redirected to MSRN (only). INVITE message processing completed successfully.
10107	RedirectOverrideSuccess300	Counter incremented for each SIP INVITE 300 message redirected by the ngHLR's SIP Redirection Override functionality.

10108	RedirectOverrideSuccess302	Counter incremented for each SIP INVITE 302 message redirected by the ngHLR's SIP Redirection Override functionality.
10109	RedirectVoipDnUriSuccess302	Counts the number of INVITE redirected to VoIP DN AOR.
10110	RedirectNpAorUser RangePrefixSuccess302	Counts the number of INVITE redirected with NP AOR User Range Prefix contact (302).
10111	InviteError403	Counter incremented for each 403 error sent by the application in response to INVITE message received. 'Error 403' is sent when: - Redirect Server is NOT enabled (Sip Configuration::IsRedirect ServerEnabled) and/or - AOR found is NOT 'Service Allowed' (SipAddress OfRecord::Service Allowed) and/or - AOR found is NOT allowed to receive INVITE (SipAddress OfRecord::isReceiveInvite Allowed) - HLR eProvideRoaming AnswerError answer has MAT_CALL_BARRED (when imsi provisioned)
10112	InviteError404	Counter incremented for each 404 error sent by the application in response to INVITE message received. 'Error 404' is sent when: - cannot find AOR. - no IMSI and no server regbindings found for AOR. - eProvideRoamingAnswerError received from HLR (when imsi provisioned)
10113	InviteError480	Counter incremented for each 480 error sent by the application in response to an INVITE message received. 'Error 480' is sent when one of the following occurs: <ol style="list-style-type: none"> 1. NO GSM subscriber exists and NO SIP registration bindings 2. NO MSRN/CFU and NO SIP registration bindings 3. NO MSRN/CFU and NO SIP registration bindings
10114	InviteError486	Counter incremented for each 486 error sent by the application in response to an INVITE message received. 'Error 486' is sent when one of the following occurs: <ol style="list-style-type: none"> 1. INVITE map overflow (NO response form HLR) and NO SIP registration bindings 2. HLR server overload and NO SIP registration bindings
10115	InviteError500	Counter incremented for each 500 error sent by the application in response to INVITE message

		received. 'Error 500' is sent when: - Invalid answer received from HLR OR error occurred while building SIP response using data from HLR answer (MSRN data). - There was an error when we tried to send valid 300 or 302 response (All previous/other processing completed successfully, but error occurred when trying to send response). - Internal error (ex: cannot insert into invite context map, or error occurred on sendRoutingInfoRequest MSRN query, ...)
10116	InviteVoipDnError500	Counts the number of VoIP DN INVITE answered with 500.
10117	InviteError503	Counter incremented for each 503 error sent by the application in response to an INVITE message received. 'Error 503' is sent when the stack is manually disabled.
10150	OptionsReceived	Counter incremented for each valid OPTIONS message received by the application.
10151	OptionsSuccess	Counter incremented for each 200 OK sent in response to OPTIONS message received.
10152	OptionsError400	Counter incremented for each 400 error sent by the application in response to OPTIONS message received. 'Error 400' is sent when the Request-URI of OPTIONS request has an erroneous format.
10153	OptionsError403	Counter incremented for each 403 error sent by the application in response to OPTIONS message received. 'Error 403' is sent when isOptionsMethodAllowed set to false (SipConfiguration::IsOptions MethodAllowed)
10154	OptionsError404	Counter incremented for each 404 error sent by the application in response to OPTIONS message received. 'Error 404' is sent when OPTIONS request-URI does not match configured server domain.
10155	OptionsError416	Counter incremented for each 416 error sent by the application in response to OPTIONS message received. 'Error 416' is sent when OPTIONS request URI contains invalid URI.
10156	OptionsError500	Counter incremented for each 500 error sent by the application in response to OPTIONS message received. 'Error 500' is sent when there was an error when we tried to send valid 200 OK.
10157	OptionsError503	Counter incremented for each 503 error sent by the application in response to OPTIONS message

		received. 'Error 503' is sent when the stack is manually disabled.
10190	RequestErrorInvalid RequestReceived	Counter incremented for each INVALID request received by SIP Stack. Message cannot be processed; stack can determine appropriate SIP error code to return. This counter is also incremented when request cannot be read from SIP stack ('error 500' sent back in this case) OR when unknown/unsupported SIP method received ('error 403' sent back).
Counter ID	SIP Register Client Counters	Description
10200	FirstRegReceived	Counter incremented for each GsmUpdateLocationNotification received from HLR with type eSipUaRegistration (first registration) for which IMSI maps to a FMC user (AOR provisioned for received IMSI OR subscriber ID associated to IMSI received).
10201	FirstRegSuccess	Counter incremented for each REGISTER answered with 200 OK by CSCF/Registrar.
10202	FirstRegFailedNoAorFound	Counter incremented for each FMC user (SIP subscriber ID provisioned for IMSI received) that has: no AOR provisioned and/or AOR found is NOT 'Service Allowed' (SipAddressOfRecord::Service Allowed) and/or AOR found is NOT allowed to send REGISTER (SipAddressOfRecord::IsSend RegisterAllowed)
10203	FirstRegFailedToSend	Counter incremented for each REGISTER message the application could not successfully build and/or send.
10204	FirstRegFailedNetworkError	Counter incremented for each CSCF communication Error: Network Error OR timeout OR '503 Service unavailable' error received OR Redirected answer received.
10205	FirstRegFailedSIPErrorReceived	Counter incremented for each other (see previous counter) CSCF unsuccessful Error (other than 503) or Invalid answer (ex: no GSM contact in response) received.
10206	FirstRegAuthChallengeReceived	This counter counts 401 (authentication challenge) responses received in response to a REGISTER message sent for the event First Registration.
10207	RefreshFailedToSend	Counter incremented for each REGISTER message the Stack could not successfully build OR send.
10208	RefreshFailedNetworkError	Counter incremented for each CSCF communication Error: Network Error OR timeout

		OR '503 service unavailable' error received OR Redirected answer received.
10209	RefreshFailedSIPErrorReceived	Counter incremented for each other (see previous counter) CSCF unsuccessful Error or invalid answer (ex: no GSM contact in response) received. Counter is also incremented for Un-authenticated message received AND for messages with invalid credentials.
10210	RefreshAuthChallengeReceived	This counter counts 401 (authentication challenge) responses received in response to a REGISTER message sent for the Refresh event.
10211	DeRegReceived	Counter incremented for each GsmUpdateLocationNotification received from HLR with type eSipUaDeRegistration AND for which IMSI maps to active regbinding(s). This Counter is also incremented on the de-provisioning of a GSM sub which has an IMSI that maps to active regbinding(s) (in other words eSipUaTxMgroDeAssociate message received AND regbinding(s) found) since a (de)REGISTER message is also sent in this case. Note that an IMSI can map to more than one regbinding and therefore more than one REGISTER message can be sent AND more than one of the following counters can be incremented for ONE DeRegReceived incrementation...
10212	DeRegSuccess	Counter incremented for each REGISTER answered with 200OK by CSCF/Registrar (successful).
10213	DeRegFailedToSend	Counter incremented for each REGISTER message the Stack could not successfully build OR send.
10214	DeRegFailedNetworkError	Counter incremented for each CSCF communication Error: Network Error OR timeout OR 503 received OR Redirected Answer received.
10215	DeRegFailedSIPErrorReceived	Counter incremented for each other (see previous counter) CSCF unsuccessful Error or Invalid answer (ex: no GSM contact in response) received.
10216	DeRegAuthChallengeReceived	This counter counts 401 (authentication challenge) responses received in response to a REGISTER message sent for the Deregister event.

For instructions on how to view the values of these counters, refer to [View XML Performance Measurement Reports](#).

HSS/SLF Application Counters

There are two types of Diameter routing messages: Request and Answers. This means that the HSS can receive and initiate a series of messages classified as requests or answers. The HSS can support Cx/Dx and Sh/Dh messages. The Cx/Dx and Sh/Dh messages presently supported by the HSS and compliant with the 3GPP TS 29.228 [1], TS 29.229 [2] and TS 29.328 [8], TS 29.329 [9] Release 6, are the following:

Table 10: HSS Cx/Dx messages

Message	Description
User-Authorization-Request (UAR)	Request invoked during SIP registrations between the I-CSCF and the HSS over the Cx interface or SLF over the Dx interface to obtain Authorization information. It is also used to perform a first security check, determining whether the Public User Identity in the message is associated with the Private User Identity sent in the message.
Server-Assignment-Request (SAR)	This message is invoked between the S-CSCF and the HSS over the Cx interface or the SLF over the Dx interface. It is used to assign an S-CSCF to a Public Identity, or to clear the name of the S-CSCF assigned to one or more Public Identities. It is also used to download from HSS the relevant user information for the S-CSCF.
Location-Information-Request (LIR)	Location Management command used over the Cx or Dx interfaces to perform checks on multimedia access permission, roaming agreements and perform operations on User Public Identities.
Multimedia-Authentication-Request (MAR)	Authentication procedure used over the Cx interface between the S-CSCF and the HSS or over the Dx interface between the S-CSCF and the SLF functionality of the HSS to exchange information to support the authentication between the end user and the home IMS network.
Registration-Termination-Request (RTR)	Location Management command invoked by the HSS. In case of network initiated de-registration by the HSS, the HSS changes the state of the Public Identities to Not Registered and send a notification to the S-CSCF indicating the identities that shall be de-registered. This message is also exchanged between the S-CSCF and the SLF functionality over the Dx interface.
Push-Profile-Request (PPR)	Data Handling command initiated by the HSS to update user profile information and/or charging information in the S-CSCF.

Table 11: HSS Sh/Dh Messages

Message	Description
User-Data-Request (UDR)	Request invoked by the Application Server to read transparent and/or non-transparent data for a specified user from the HSS.

	It is exchanged between the AS and the HSS over the Sh interface and between the AS and SLF functionality of the HSS over the Dh interface.
Profile-Update-Request (PUR)	This message is invoked by the AS and used to allow the AS to update the transparent (repository) data stored at the HSS for a specified IMS Public User Identity or Public Service Identity in the HSS. It is also invoked to allow the AS to update the PSI Activation State of a Public Service Identity in the HSS. This message is also exchanged between the AS and the SLF functionality over the Dh interface.
Subscribe-Notification-Request (SNR)	This Subscription/Notification Command is used over the Sh interface to allow the AS to subscribe to Notifications for when particular transparent and/or non-transparent data for a specified IMS Public User Identity or Public Service Identity is updated, from the HSS. This message is also exchanged between the AS and the SLF functionality over the Dh interface.
Push-Notification-Request (PNR)	This message is invoked by the HSS and used to inform the AS of changes in transparent and/or non-transparent data to which the AS has previously subscribed to receive Notifications for, using a SNR message. This message is also exchanged between the AS and the SLF functionality over the Dh interface.

Traffic data can be gathered from the HSS in order to allow an operator to analyze the system behavior. Cx/Dx and Sh/Dh messages are counted for incoming and outgoing messages.

The goal of the HSS/SLF Counters functionality is to offer the opportunity to view instantaneously or periodically:

- How many Cx and Sh Diameter requests have been received at HSS and SLF level.
- How many Cx and Sh Diameter answers have been sent by HSS and SLF.
- How many Cx and Sh Diameter answers per ResultCode depending the Request Type have been sent by the HSS and SLF.

The HSS/SLF offers four different ways to see internal counters. They are logged by module:

- If only the HSS activated, only HSS Counters are displayed.
- If only the SLF activated, only SLF Counters are displayed.
- If only the SLF activated, only SLF Counters are displayed.

The number of messages the HSS receives are counted for each blade with an HSS service running traffic. These counters are identified by a unique name and .

The following HSS/SLF counters are available:

Table 12: HSS/SLF Counters

Counter ID	Name	Description
	LIR (Location-Information-Request)	

30013	NumberOfLIR	Counts the number of LIR messages received by the HSS (HSS/SLF module).
	LIA (Location-Information-Answer)	
30014	NumberOfLIA	Counts the total number of LIA messages that have been sent by the HSS (HSS/SLF module).
30015	NumberOfLIADiamSuccess	Counts the number of LIA messages with 'DIAMETER Success' that have been sent by the HSS (HSS/SLF module).
30016	NumberOfLIADiamUserUnknown	Counts the number of LIA messages with 'DIAMETER User unknown' that have been sent by the HSS (HSS/SLF module).
30017	NumberOfLIADiamUnableToComply	Counts the number of LIA messages with 'DIAMETER Unable to comply' that have been sent by the HSS (HSS/SLF module).
30018	NumberOfLIADiamMissingAVP	Counts the number of LIA messages with 'DIAMETER Missing AVP' that have been sent by the HSS (HSS/SLF module).
30019	NumberOfLIADiamIdNotRegistered	Counts the number of LIA messages with 'DIAMETER Error identity not registered' that have been sent by the HSS (HSS/SLF module).
30020	NumberOfLIADiamRedirectInd	Counts the number of LIA messages with 'DIAMETER Redirect indication' that have been sent by the HSS (HSS/SLF module).
30021	NumberOfLIADiamTooBusy	Counts the number of LIA messages with 'DIAMETER Too Busy' that have been sent by the HSS (HSS/SLF module).
30022	NumberOfLIADiamUnregService	Counts the number of LIA messages with 'DIAMETER Unregistered service' that have been sent by the HSS (HSS/SLF module).
	MAR (Multimedia-Authentication-Request)	
30023	NumberOfMAR	Counts the number of MAR messages received by the HSS (HSS/SLF module).

	MAA (Multimedia-Authentication-Answer)	
30024	NumberOfMAA	Counts the total number of MAA messages that have been sent by the HSS (HSS/SLF module).
30025	NumberOfMAADiamSuccess	Counts the number of MAA messages with 'DIAMETER Success' that have been sent by the HSS (HSS/SLF module).
30026	NumberOfMAADiamUserUnknown	Counts the number of MAA messages with 'DIAMETER User unknown' that have been sent by the HSS (HSS/SLF module).
30027	NumberOfMAADiamUnableToComply	Counts the number of MAA messages with 'DIAMETER Unable to comply' that have been sent by the HSS (HSS/SLF module).
30028	NumberOfMAADiamMissingAVP	Counts the number of MAA messages with 'DIAMETER Missing AVP' that have been sent by the HSS (HSS/SLF module).
30029	NumberOfMAADiamIdDontMatch	Counts the number of MAA messages with 'DIAMETER Error Identities don't match' that have been sent by the HSS (HSS/SLF module).
30030	NumberOfMAASchemeNotSupported	Counts the number of MAA messages with 'DIAMETER Error Authentication Scheme not supported' that have been sent by the HSS (HSS/SLF module).
30031	NumberOfMAADiamRedirectInd	Counts the number of MAA messages with 'DIAMETER Redirect Indication' that have been sent by the HSS (HSS/SLF module).
30032	NumberOfMAADiamTooBusy	Counts the number of MAA messages with 'DIAMETER Too Busy' that have been sent by the HSS (HSS/SLF module).
	UAR (User-Authorization-Request)	
30000	NumberOfUAR	Counts the number of UAR messages received by the HSS (HSS/SLF module).
	UAA (User-Authorization-Answer)	

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30001	NumberOfUAA	Counts the total number of UAA messages that have been sent by the HSS (HSS/SLF module).
30002	NumberOfUADiamSuccess	Counts the number of UAA messages with 'DIAMETER Success' that have been sent by the HSS (HSS/SLF module).
30003	NumberOfUADiamUserUnknown	Counts the number of UAA messages with 'DIAMETER User unknown' that have been sent by the HSS (HSS/SLF module).
30004	NumberOfUADiamUnableToComply	Counts the number of UAA messages with 'DIAMETER Unable to comply' that have been sent by the HSS (HSS/SLF module).
30005	NumberOfUADiamMissingAVP	Counts the number of UAA messages with 'DIAMETER Missing AVP' that have been sent by the HSS (HSS/SLF module).
30006	NumberOfUADiamIdDontMatch	Counts the number of UAA messages with 'DIAMETER Error Identities don't match' that have been sent by the HSS (HSS/SLF module).
30007	NumberOfUADiamAuthRejected	Counts the number of UAA messages with 'DIAMETER Authorization rejected' that have been sent by the HSS (HSS/SLF module).
30008	NumberOfUADiamRoamNotAllowed	Counts the number of UAA messages with 'DIAMETER Error roaming not allowed' that have been sent by the HSS (HSS/SLF module).
30009	NumberOfUADiamSubsRegistration	Counts the number of UAA messages with 'DIAMETER Subsequent registration' that have been sent by the HSS (HSS/SLF module).
30010	NumberOfUADiamIdNotRegistered	Counts the number of UAA messages with 'DIAMETER Error identity not registered' that have been sent by the HSS (HSS/SLF module).
30011	NumberOfUADiamFirstReg	Counts the number of UAA messages with 'DIAMETER First registration' that have been sent by the HSS (HSS/SLF module).

30012	NumberOfUADiamRedirectInd	Counts the number of UAA messages with 'DIAMETER Redirect Indication' that have been sent by the HSS (HSS/SLF module).
30113	NumberOfUADiamTooBusy	Counts the number of UAA messages with 'DIAMETER Too Busy' that have been sent by the HSS (HSS/SLF module).
	SAR (Server-Assignment-Request)	
30033	NumberOfSAR	Counts the number of SAR messages received by the HSS (HSS/SLF module).
	SAA (Server-Assignment-Answer)	
30034	NumberOfSAA	Counts the total number of SAA messages that have been sent by the HSS (HSS/SLF module).
30035	NumberOfSAADiamSuccess	Counts the number of SAA messages with 'DIAMETER Success' that have been sent by the HSS (HSS/SLF module).
30036	NumberOfSAADiamUserUnknown	Counts the number of SAA messages with 'DIAMETER User unknown' that have been sent by the HSS (HSS/SLF module).
30037	NumberOfSAADiamUnableToComply	Counts the number of SAA messages with 'DIAMETER Unable to comply' that have been sent by the HSS (HSS/SLF module).
30038	NumberOfSAADiamMissingAVP	Counts the number of SAA messages with 'DIAMETER Missing AVP' that have been sent by the HSS (HSS/SLF module).
30039	NumberOfSAADiamIdDontMatch	Counts the number of SAA messages with 'DIAMETER Error Identities don't match' that have been sent by the HSS (HSS/SLF module).
30040	NumberOfSAADiamIdAlreadyReg	Counts the number of SAA messages with 'DIAMETER Error Identity already registered' that have been sent by the HSS (HSS/SLF module).
30041	NumberOfSAADiamAVPOccursTooManyTimes	Counts the number of SAA messages with 'DIAMETER AVP occurs too many times' that have been sent by the HSS (HSS/SLF module).

30042	NumberOfSAADiamErrAssigType	Counts the number of SAA messages with 'DIAMETER Error in assignment type' that have been sent by the HSS (HSS/SLF module).
30043	NumberOfSAADiamRedirectInd	Counts the number of SAA messages with 'DIAMETER Redirect Indication' that have been sent by the HSS (HSS/SLF module).
30044	NumberOfSAADiamTooBusy	Counts the number of SAA messages with 'DIAMETER Too Busy' that have been sent by the HSS (HSS/SLF module).
	RTA (Registration-Termination-Answer)	
30053	NumberOfRTA	Counts the number of RTA messages received by the HSS (HSS/SLF module).
30054	NumberOfRTAFailed	Counts the number of RTA messages with 'DIAMETER Failed' that have been received by the HSS (HSS/SLF module).
	RTR (Registration-Termination-Request)	
30050	NumberOfRTR	Counts the number of RTR messages sent by the HSS (HSS/SLF module).
30051	NumberOfRTRRemoteRcvd	Counts the number of RTR messages received from remote peers.
30052	NumberOfRTRRemoteSent	Counts the number of RTR messages sent to remote peers.
	PPA (Push-Profile-Answer)	
30048	NumberOfPPA	Counts the number of PPA messages received by the HSS (HSS/SLF module).
30049	NumberOfPPAFailed	Counts the number of PPA messages with 'DIAMETER Failed' that have been received by the HSS (HSS/SLF module).
	PPR (Push-Profile-Request)	
30045	NumberOfPPR	Counts the number of PPR messages sent by the HSS (HSS/SLF module).
30046	NumberOfPPRRemoteRcvd	Counts the number of PPR messages received from remote peers.

30047	NumberOfPPRRemoteSent	Counts the number of PPR messages sent to remote peers.
	UDR (User-Data-Request)	
30077	NumberOfUDR	Counts the number of UDR messages received by the HSS (HSS/SLF module).
	UDA (User-Data-Answer)	
30078	NumberOfUDA	Counts the total number of UDA messages that have been sent by the HSS (HSS/SLF module).
30079	NumberOfUDADiamSuccess	Counts the number of UDA messages with 'DIAMETER Success' that have been sent by the HSS (HSS/SLF module).
30080	NumberOfUDADiamUserUnknown	Counts the number of UDA messages with 'DIAMETER User unknown' that have been sent by the HSS (HSS/SLF module).
30081	NumberOfUDADiamUnableToComply	Counts the number of UDA messages with 'DIAMETER Unable to comply' that have been sent by the HSS (HSS/SLF module).
30082	NumberOfUDADiamMissingAVP	Counts the number of UDA messages with 'DIAMETER Missing AVP' that have been sent by the HSS (HSS/SLF module).
30083	NumberOfUDADiamOpNotAllowed	Counts the number of UDA messages with 'DIAMETER Error Operation not allowed' that have been sent by the HSS (HSS/SLF module).
30084	NumberOfUDADiamDataCannotBeRead	Counts the number of UDA messages with 'DIAMETER Error user data cannot be read' that have been sent by the HSS (HSS/SLF module).
30085	NumberOfUDADiamRedirectInd	Counts the number of UDA messages with 'DIAMETER Redirect Indication' that have been sent by the HSS (HSS/SLF module).
30086	NumberOfUDADiamTooBusy	Counts the number of UDA messages with 'DIAMETER Too Busy' that have been sent by the HSS (HSS/SLF module).
	PUR (Profile-Update-Request)	

30055	NumberOfPUR	Counts the number of PUR messages received by the HSS (HSS/SLF module).
	PUA (Profile-Update-Answer)	
30056	NumberOfPUA	Counts the total number of PUA messages that have been sent by the HSS (HSS/SLF module).
30057	NumberOfPUADiamSuccess	Counts the number of PUA messages with 'DIAMETER Success' that have been sent by the HSS (HSS/SLF module).
30058	NumberOfPUADiamUserUnknown	Counts the number of PUA messages with 'DIAMETER User unknown' that have been sent by the HSS (HSS/SLF module).
30059	NumberOfPUADiamUnableToComply	Counts the number of PUA messages with 'DIAMETER Unable to comply' that have been sent by the HSS (HSS/SLF module).
30060	NumberOfPUADiamMissingAVP	Counts the number of PUA messages with 'DIAMETER Missing AVP' that have been sent by the HSS (HSS/SLF module).
30061	NumberOfPUADiamCannotBeModified	Counts the number of PUA messages with 'DIAMETER Error user data cannot be modified' that have been sent by the HSS (HSS/SLF module).
30062	NumberOfPUADiamOpNotAllowed	Counts the number of PUA messages with 'DIAMETER Error Operation not allowed' that have been sent by the HSS (HSS/SLF module).
30063	NumberOfPUADiamDataOutOfSync	Counts the number of PUA messages with 'DIAMETER Error transparent data out of sync' that have been sent by the HSS (HSS/SLF module).
30064	NumberOfPUADiamTooMuchData	Counts the number of PUA messages with 'DIAMETER Error too much data' that have been sent by the HSS (HSS/SLF module).
30065	NumberOfPUADiamRedirectInd	Counts the number of PUA messages with 'DIAMETER Redirect Indication' that have been sent by the HSS (HSS/SLF module).

30066	NumberOfPUADiamTooBusy	Counts the number of PUA messages with 'DIAMETER Too Busy' that have been sent by the HSS (HSS/SLF module).
	SNR (Subscribe-Notification-Request)	
30067	NumberOfSNR	Counts the number of SNR messages received by the HSS (HSS/SLF module).
	SNA (Subscribe-Notification-Answer)	
30068	NumberOfSNA	Counts the total number of SNA messages that have been sent by the HSS (HSS/SLF module).
30069	NumberOfSNADiamSuccess	Counts the number of SNA messages with 'DIAMETER Success' that have been sent by the HSS (HSS/SLF module).
30070	NumberOfSNADiamUserUnknown	Counts the number of SNA messages with 'DIAMETER User unknown' that have been sent by the HSS (HSS/SLF module).
30071	NumberOfSNADiamUnableToComply	Counts the number of SNA messages with 'DIAMETER Unable to comply' that have been sent by the HSS (HSS/SLF module).
30072	NumberOfSNADiamMissingAVP	Counts the number of SNA messages with 'DIAMETER Missing AVP' that have been sent by the HSS (HSS/SLF module).
30073	NumberOfSNADiamDataCannotBeNotified	Counts the number of SNA messages with 'DIAMETER Error user data cannot be modified' that have been sent by the HSS (HSS/SLF module).
30074	NumberOfSNADiamOpNotAllowed	Counts the number of SNA messages with 'DIAMETER Error Operation not allowed' that have been sent by the HSS (HSS/SLF module).
30075	NumberOfSNADiamRedirectInd	Counts the number of SNA messages with 'DIAMETER Redirect Indication' that have been sent by the HSS (HSS/SLF module).
30076	NumberOfSNADiamTooBusy	Counts the number of SNA messages with 'DIAMETER Too Busy' that have been sent by the HSS (HSS/SLF module).

	PNA (Push-Notification-Answer)	
30090	NumberOfPNA	Counts the number of PNA messages received by the HSS (HSS/SLF module).
30091	NumberOfPNAFailed	Counts the number of PNA messages with 'DIAMETER Failed' that have been received by the HSS (HSS/SLF module).
	PNR (Push-Notification-Request)	
30087	NumberOfPNR	Counts the number of PNR messages sent by the HSS (HSS/SLF module).
30088	NumberOfPNRRemoteRcvd	Counts the number of PNR messages received from remote peers.
30089	NumberOfPNRRemoteSent	Counts the number of PNR messages sent to remote peers.
	Auto Enrollments	
30092	NumberOfAutoEnrollmentSuccess	Number of Successful Auto Enrollments.
30093	NumberOfAutoEnrollmentFailure	Number of Failed Auto Enrollments.
	Connect-Active-Peers	
	Number of Active Peers	Number of Active Peers connected to the HSS (HSS/SLF module)
	Active-Sessions	
	Number of Active Sessions	Number of active Diameter Sessions in the HSS (HSS/SLF module)
	Applications	
	Number of Applications	Number of Diameter Application roles assumed by the HSS (HSS/SLF module).(Cx and Sh).
	Backup-Peers	
	Number of Backup Peers	Number of backup Peers.
	Connections-Accepted	
	Number of Connections Accepted	Number of Diameter Connections accepted by HSS (HSS/SLF module)
	Connections-Created	
	Number of Connections Created	Number of Diameter Connections created by the HSS (HSS/SLF module)
	Current-Connections	

	Number of Current Connections	Number of current Diameter Connections handled by HSS (HSS/SLF module)
	Rejected-Requests-Discarded	
	Number of Rejected Requests Discarded due to License	Number of messages discarded by Diameter Stack due to lack of license tokens.
	Routes	
	Number of Routes	Number of Routes that can be used by HSS (HSS/SLF module) to send outgoing Diameter requests.
	Transactions	
	Number of Transactions	Number of Diameter Transactions processed by the HSS (HSS/SLF module)

For instructions on how to view the values of these counters, refer to [View the Current Day's Performance Measurements from the WebCI](#).

DNS ENUM Application Counters

The DNS ENUM performance management, being integrated in the HSS process, is integrated in the SDM Performance framework.

The DNS ENUM server integrated in the HSS supports the DNS NAPTR queries and answers with the provisioned NAPTR records.

The goal of the DNS ENUM Counters functionality is to offer the opportunity to view instantaneously or periodically:

- How many DNS NAPTR queries have been received.
- How many DNS NAPTR answers have been sent by the DNS ENUM Server.

The number of messages the DNS receives are counted for each blade with an HSS service running traffic. These counters are identified by a unique name and counter ID.

The following DNS ENUM counters are available:

Table 13: DNS ENUM Counters

Counter ID	Name	Description
31000	NumberOfQueryDnsRcvd	Counts the total number of DNS queries received by the ENUM Server.
31001	NumberOfQueryDnsValidRespSent	Counts the total number of successful DNS answers sent by the ENUM Server.
31002	NumberOfQueryDnsErrorRespSent	Counts the total number of DNS answers encoded as errors sent by the ENUM Server.

31003	NumberOfConfig DnsRemoteRcvd	Counts the total number of Config DNS messages received from the remote peer.
31004	NumberOfDelete DnsRemoteRcvd	Counts the total number of Delete DNS received from the remote peer.
31005	NumberOfConfig DnsRemoteSent	Counts the total number of Config DNS messages sent to the remote peer.
31006	NumberOfDelete DnsRemoteSent	Counts the total number of Delete DNS messages sent to the remote peer.
31007	NumberOfQueryDnsBlack ListNxDomainRespSent	Number of DNS Black List hit with NxDomain response sent

For instructions on how to view the values of these counters, refer to [View XML Performance Measurement Reports](#).

AAA Application Counters

The AAA performance management, being integrated in the HSS process, is integrated in the SDM Performance framework.

The AAA server integrated in the HSS supports the following RADIUS message types:

- Access-Request
- Access-Accept
- Access-Reject
- Disconnect-Request
- Disconnect-Ack
- Disconnect-Nack
- Accounting-Request
- Accounting- Response.
- Access-Challenge

Traffic data can be gathered from the AAA server in order to allow an operator to analyze the system behavior. RADIUS messages are counted for incoming and outgoing messages.

The goal of the AAA Counters functionality is to offer the opportunity to view instantaneously or periodically:

- How many RADIUS requests have been received at AAA level.
- How many RADIUS answers have been sent by AAA

The following AAA counters are available:

Table 14: AAA Counters

Counter ID	Name	Description
Counter ID	AAA Access-Accept	Description
40020	NumberOfAccessAccept	Number of Access-Accept messages sent.

40021	NumberOfWimaxHaAccessAccept	Number of Wimax-HA-Access-Accept messages sent.
40022	NumberOfWimaxDHCPAccessAccept	Number of Wimax-DHCP-Access-Accept messages sent.
40023	NumberOfEapAccessAccept	Number of EAP-Access-Accept messages sent.
40024	NumberOfEapPskAccessAccept	Number of EAP-PSK-Access-Accept messages sent.
40025	NumberOfEapSimAccessAccept	Number of EAP-SIM-Access-Accept messages sent.
40026	NumberOfEapNoAuthAccessAccept	Number of EAP-NoAuth-Access-Accept messages sent.
Counter ID	AAA Access-Accept-Remote-Received	Description
40096	NumberOfAccessAcceptRemoteRcvd	Number of Access-Accept-Remote messages received.
Counter ID	AAA Access-Challenge	Description
40027	NumberOfAccessChallenge	Number of Access-Challenge messages sent.
40028	NumberOfWimaxEapAccessChallenge	Number of Wimax-EAP-Access-Challenge messages sent .
Counter ID	AAA Access-Reject	Description
40035	NumberOfAccessRejectRadiusTooBusy	Number of Access-Reject-Radius-Too-Busy messages sent .
40038	NumberOfAccessRejectInvalidPassword	Number of Access-Reject-Invalid-Password messages sent .
40039	NumberOfAccessRejectCannotProcess	Number of Access-Reject-Cannot-Process messages sent .
40040	NumberOfAccessRejectInvalidUserName	Number of Access-Reject-Invalid-Username messages sent .

40041	NumberOfAccessRejectUserServiceDisabled	Number of Access-Reject-User-Service-Disabled messages sent .
40042	NumberOfAccessRejectServiceValuesNot Provisioned	Number of Access- Reject-Service-Values- Not-Provisioned messages sent .
40043	NumberOfAccessRejectConflictingService Types	Number of Access-Reject-Conflicting-Service-Types messages sent .
40044	NumberOfAccessRejectConflictingFramed Protocols	Number of Access-Reject-Conflicting-Framed-Protocols messages sent .
40045	NumberOfAccessRejectConflictingAccess Requests	Number of Access-Reject-Conflicting-Access-Requests messages sent .
40046	NumberOfAccessRejectStaticIpNasChange	Number of Access-Reject-Static-IP-NAS-Change messages sent .
40047	NumberOfAccessRejectEapAuthentication Failed	Number of Access-Reject-EAP-Authentication-Failed messages sent .
40048	NumberOfAccessRejectMissingParameters	Number of Access-Reject-EAP-Missing-Parameters messages sent .
40049	NumberOfAccessRejectCannotAllocate Address	Number of Access-Reject-Cannot-Allocate-IP-Address messages sent .
40050	NumberOfAccessRejectMissingChap Challenge	Number of Access-Reject-Missing-Chap-Challenge messages sent .
40051	NumberOfAccessRejectMissingUserData	Number of Access-Reject-Missing-User-Data messages sent .
40052	NumberOfAccessRejectBadChapPassword	Number of Access-Reject-Bad-Chap-Password messages sent .
40036	NumberOfAccessRejectClientNotAuthorized	Number of Access-Reject-Client-Not-Authorized messages sent .
40037	NumberOfAccessRejectInvalidAccessRequest	Number of Access-Reject-Invalid-Access-Request messages sent .

40053	NumberOfAccessRejectEapInconsistent Subtype	Number of Access-Reject-EAP-Inconsistent-Subtype messages sent .
40054	NumberOfAccessRejectEapUnknownSubtype	Number of Access-Reject-EAP-Unknown-Subtype messages sent .
40055	NumberOfAccessRejectEapSessionNotFound	Number of Access-Reject-EAP-Session-Not-Found messages sent .
40056	NumberOfAccessRejectNoEapTypeMatch	Number of Access-Reject-No-EAP-Type-Match messages sent .
40057	NumberOfAccessRejectEapInvalidVersion	Number of Access-Reject-EAP-Invalid-Version messages sent .
40058	NumberOfAccessRejectEapInvalidIdentity	Number of Access-Reject-EAP-Invalid-Identity messages sent .
40059	NumberOfAccessRejectEapMissingNonce	Number of Access-Reject-EAP-Missing-Nonce messages sent .
40060	NumberOfAccessRejectEapNoTriplets	Number of Access-Reject-EAP-No-Triplets messages sent .
40061	NumberOfAccessRejectEapMissingMacAttr	Number of Access-Reject-EAP-Missing-MAC-Attr messages sent .
40062	NumberOfAccessRejectEapMacMismatch	Number of Access-Reject-EAP-MAC-Mismatch messages sent .
40063	NumberOfAccessRejectEapInvalidIdentityType	Number of Access-Reject-EAP-Invalid-Identity-Type messages sent .
40064	NumberOfAccessRejectEapUnsupportedType	Number of Access-Reject-EAP-Unsupported-Type messages sent .
40065	NumberOfAccessRejectEapTooManyEap Sessions	Number of Access-Reject-EAP-Too-Many-Sessions messages sent .
40066	NumberOfAccessRejectEapCannotCreate Session	Number of Access-Reject-EAP-Cannot-Create-Session messages sent .

40067	NumberOfAccessRejectEapExistingSessionDiffType	Number of Access-Reject-EAP-Existing-Session-Diff-Type messages sent .
40068	NumberOfAccessRejectEapNoCommonAuthMethod	Number of Access-Reject-EAP-No-Common-Auth-Method messages sent .
40069	NumberOfAccessRejectEapRoleReversalNotSupported	Number of Access-Reject-EAP-Role-Reversal-Not-Supported messages sent .
40070	NumberOfAccessRejectWimaxNoSessionFound	Number of Access-Reject-Wimax-No-Session-Found messages sent .
40071	NumberOfAccessRejectWimaxHaIpMismatch	Number of Access-Reject-Wimax-HA-IP-Mismatch messages sent .
40072	NumberOfAccessRejectWimaxMnHaSpiMismatch	Number of Access-Reject-Wimax-MN-HA-SPI-Mismatch messages sent .
40073	NumberOfAccessRejectWimaxInvalidMessage	Number of Access-Reject-Wimax-Invalid-Message messages sent .
40034	NumberOfAccessReject	Number of Access-Reject messages sent.
Counter ID	AAA Access-Reject-Remote-Received	Description
40095	NumberOfAccessRejectRemoteRcvd	Number of Access-Reject-Remote messages received.
Counter ID	AAA Access-Request	Description
40017	NumberOfWimaxEapAccessRequest	Number of Wimax-EAP-Access-Request messages received.
40018	NumberOfWimaxHaAccessRequest	Number of Wimax-HA-Access-Request messages received.
40019	NumberOfWimaxDHCPAccessRequest	Number of Wimax-DHCP-Access-Request messages received.
40016	NumberOfAccessRequest	Number of access requests received.

Counter ID	AAA Accounting-Request-Remote-Received	Description
40092	NumberOfAccountingRequestRemoteRcvd	Number of Accounting-Request-Remote messages received.
Counter ID	AAA Accounting-Answer-Remote-Received	Description
40093	NumberOfAccountingAnswerRemoteRcvd	Number of Accounting-Answer-Remote messages received
Counter ID	AAA Accounting-Request-Received	Description
40029	NumberOfAccountingReqRcvd	Number of Accounting-Request messages received from the remote peers.
Counter ID	AAA Accounting-Request-Sent	Description
40030	NumberOfAccountingReqSent	Number of Accounting-Request messages sent.
Counter ID	AAA Accounting-Response-Received	Description
40031	NumberOfAccountingRespRcvd	Number of Accounting-Response messages received from the remote peers.
Counter ID	AAA Accounting-Response-Returned	Description
40033	NumberOfAccountingRespReturned	Number of Accounting-Response messages returned.
Counter ID	AAA Accounting-Response-Sent	Description
40032	NumberOfAccountingRespSent	Number of Accounting-Response messages sent.
Counter ID	AAA Config-NAS-Remote-Received	Description
40078	NumberOfConfigNasRemoteRcvd	Number of Configure-NAS-Remote messages received.
Counter ID	AAA Config-NAS-Remote-Sent	Description
40084	NumberOfConfigNasRemoteSent	Number of Configure-NAS-Remote messages sent.
Counter ID	AAA Data-Context-Timeout	Description
40097	NumberOfDataContextTimeout	Number of Data-Context-Timeouts.
Counter ID	AAA Delete-NAS-Remote-Received	Description

40079	NumberOfDeleteNasRemoteRcvd	Number of Delete-NAS-Remote messages received.
Counter ID	AAA Delete-NAS-Remote-Sent	Description
40086	NumberOfDeleteNasRemoteSent	Number of Delete-NAS-Remote messages sent.
Counter ID	AAA Disconnect-NAS-Remote-Received	Description
40076	NumberOfDiscNasRemoteRcvd	Number of Disconnect-NAS-Remote messages received.
Counter ID	AAA Disconnect-NAS-Remote-Sent	Description
40082	NumberOfDiscNasRemoteSent	Number of Disconnect-NAS-Remote messages sent.
Counter ID	AAA Disconnect-User-Remote-Received	Description
40077	NumberOfDiscUserRemoteRcvd	Number of Disconnect-User-Remote messages received.
Counter ID	AAA Disconnect-User-Remote-Sent	Description
40083	NumberOfDiscUserRemoteSent	Number of Disconnect-User-Remote messages sent.
Counter ID	AAA Discarded-Packets	Description
40098	NumberOfDiscardPackets	Number of Discarded-Packets.
40099	NumberOfUnknownMsgCodeDiscard	Number of Unknown-Msg-Code-Discarded-Packets.
40100	NumberOfAccountingAppNotConfigured Discard	Number of Accounting-App-Not-Configured-Discarded-Packets.
40101	NumberOfMissingSecretDiscard	Number of Missing-Secret-Discarded-Packets.
40102	NumberOfValidationFailedDiscard	Number of Validation-Failed-Discarded-Packets.
40103	NumberOfEapValidationFailedDiscard	Number of EAP-Validation-Failed-Discarded-Packets.
40104	NumberOfEapAuthFailedDiscard	Number of EAP-Authentication-Failed-Discarded-Packets.
40105	NumberOfWimaxHaAuthFailedDiscard	Number of Wimax-HA-Authentication-Failed-Discarded-Packets.

40106	NumberOfWimaxDHCPAuthFailedDiscard	Number of Wimax-DHCP-Authentication-Failed-Discarded-Packets.
Counter ID	AAA EAP-TLS-Received-Fragmented-Packets	Description
40107	NumberOfReceivedEAPTLSTLSFragmented Packets	Number of EAP-TLS-Fragmented-Packets received.
Counter ID	AAA EAP-TLS-Received-Fragments	Description
40108	NumberOfReceivedEAPTLSTLSFragments	Number of EAP-TLS-Fragments received.
Counter ID	AAA EAP-TLS-Discarded-Fragments	Description
40109	NumberOfDiscardedEAPTLSTLSFragments	Number of EAP-TLS-Fragments discarded
Counter ID	AAA Node-Active-Remote-Received	Description
40081	NumberOfNodeActiveRemoteRcvd	Number of Node-Active-Remote messages received.
Counter ID	AAA Node-Active-Remote-Sent	Description
40088	NumberOfNodeActiveRemoteSent	Number of Node-Active-Remote messages sent.
Counter ID	AAA Radius-Disconnect-Ack-Received	Description
40075	NumberOfRadiusDisconnectAck	Number of Radius-Disconnect-Ack messages received.
Counter ID	AAA Radius-Disconnect-Nack-Received	Description
40085	NumberOfRadiusDisconnectNack	Number of Radius-Disconnect-Nack messages received.
Counter ID	AAA Radius-Disconnect-Sent	Description
40074	NumberOfRadiusDisconnect	Number of Radius-Disconnect messages sent.
Counter ID	AAA Radius-Disconnect-Remote-Received	Description
40094	NumberOfRadiusDisconnectRemoteRcvd	Number of Radius-Disconnect-Remote messages received
Counter ID	AAA Radius-Packet-Remote-Received	Description
40089	NumberOfRadiusPacketRemoteRcvd	Number of Radius-Packet-Remote messages received.

Counter ID	AAA Radius-Packet-Remote-Sent	Description
40091	NumberOfRadiusPacketRemoteSent	Number of Radius-Packet-Remote messages sent.
Counter ID	AAA Stop-NAS-Remote-Received	Description
40080	NumberOfStopNasRemoteRcvd	Number of Stop-NAS-Remote messages received.
Counter ID	AAA Stop-NAS-Remote-Sent	Description
40087	NumberOfStopNasRemoteSent	Number of Stop-NAS-Remote messages sent.

For instructions on how to view the values of these counters, refer to the [View XML Performance Measurement Reports](#) section of this document.

LTE-HSS Application Counters

The LTE-HSS performance management is integrated in the SDM Performance framework.

The LteHssServer integrated in the LTE-HSS supports the following Diameter message types:

- Update Location Request/ Answer (ULR/ULA)
- Cancel Location Request/ Answer (CLR/CLA)
- Purge UE Request/ Answer (PUR/PUA)
- Delete Subscriber Data Request/ Answer (DSR/DSA)
- Insert Subscriber Data Request/ Answer (IDR/IDA)
- Reset Subscriber Request/ Answer (RSR/RSA)
- NotifyRequest/ Answer (NOR/NOA)
- Authentication Information Retrieval/ Answer (AIR/AIA)

Traffic data can be gathered from the LteHssServer in order to allow an operator to analyze the system behavior. Diameter messages are counted for incoming and outgoing messages.

Each counter is incremented upon a received Diameter request, a received diameter answer, a sent diameter request and a sent diameter answer.

The goal of the LTE-HSS Counters functionality is to offer the opportunity to view instantaneously or periodically:

- How many Diameter requests have been received at LTE-HSS level.
- How many Diameter answers have been sent by LTE-HSS.

The number of messages the LTE-HSS receives are counted for each blade with an LteHss service running traffic. These counters are identified by a unique name and counter ID.

The following LTE-HSS counters are available:

Table 15: LTE-HSS Counters

Counter ID	Name	Description
Authentication Information Retrieval/Answer (AIR/AIA)		
41001	NumberOfAIR	Number of Authentication-Information-Request messages received.
41010	NumberOfAIA	Number of Authentication-Information-Answer messages sent.
41064	NumberOfAIR_OK	Counts the number of correct AIR request received by the LTE-HSS.
41016	NumberOfAIR_INVALID_PARAMETER	Counts the number of AIR received by the LTE-HSS with invalid attributes.
41017	NumberOfAIR_MISSING_MANDATORY_PARAMETER	Counts the number of AIR received by the LTE-HSS with missing mandatory attributes.
41018	NumberOfAIA_MISSING_AVP	Counts the number of AIA sent by the LTE-HSS with diameter result code set to DIAMETER_MISSING_AVP.
41020	NumberOfAIA_UNABLE_TO_COMPLY	Counts the number of AIA sent by the LTE-HSS with diameter result code set to UNABLE_TO_COMPLY (internal error, cannot access database, etc.).
41021	NumberOfAIA_AUTHORIZATION_REJECTED	Counts the number of AIA sent by the LTE-HSS with diameter result code set to DIAMETER_AUTHORIZATION_REJECTED. (Ex: Received request for E-UTRAN vectors and SIM type is GERAN)
41022	NumberOfAIA_FEATURE_UNSUPPORTED	Number of specific Authentication-Information-Answer messages sent
41023	NumberOfAIA_SUCCESS	Counts the number of AIA sent by the LTE-HSS with diameter result code set to DIAMETER_SUCCESS. Authentication vector have been successfully computed.
41083	NumberOfAIA_USER_UNKNOWN	Counts the number of AIA sent by the LTE-HSS with diameter result code set to DIAMETER_ERROR_USER_UNKNOWN. IMSI does not exist in DB.
41084	NumberOfNOA_UNKNOWN_SERVING_NODE	Number of specific Notify-Answer messages sent.
41024	NumberOfAIA_UNKNOWN_EPS_SUBSCRIPTION	Counts the number of AIA sent by the LTE-HSS with diameter result code set to DIAMETER_ERROR_UNKNOWN_EPS

Counter ID	Name	Description
		_SUBSCRIPTION. IMSI exists in DB but has no EPS subscription defined.
Cancel Location Request/Answer (CLR/CLA)		
41004	NumberOfCLA	Number of Cancel-Location-Answer messages received.
41013	NumberOfCLR	Number of Cancel-Location-Request messages sent.
41065	NumberOfCLA_OK	Counts the number of CLA received by the LTE-HSS with result code set to DIAMETER_SUCCESS.
41066	NumberOfCLA_INVALID_PARAMETER	Counts the number of CLA received by the LTE-HSS with result code set to DIAMETER_INVALID_PARAMETER.
41067	NumberOfCLA_MISSING_MANDATORY_PARAMETER	Counts the number of CLA received by the LTE-HSS with result code set to DIAMETER_MISSING_MANDATORY_PARAMETER.
41025	NumberOfCLR_MME_UPDATE_PROCEDURE	Counts the number of CLR request sent by the LTE-HSS for cancellation type set to MME_UPDATE_PROCEDURE. (Ex: MME/MME roaming)
41026	NumberOfCLR_SGSN_UPDATE_PROCEDURE	Counts the number of CLR request sent by the LTE-HSS for cancellation type set to SGSN_UPDATE_PROCEDURE. (Ex: SGSN/SGSN roaming)
41027	NumberOfCLR_SUBSCRIPTION_WITHDRAWAL	Counts the number of CLR request sent by the LTE-HSS for cancellation type set to SUBSCRIPTION_WITHDRAWAL. (Ex: Subscription has been deleted).
41028	NumberOfCLR_UPDATE_PROCEDURE_IWF	Counts the number of CLR request sent by the LTE-HSS for cancellation type set to UPDATE_PROCEDURE_IWF. (No used).
41029	NumberOfCLR_INITIAL_ATTACH_PROCEDURE	Counts the number of CLR request sent by the LTE-HSS for cancellation type set to INITIAL_ATTACH_PROCEDURE. (When a user attaches first time on the network).
Update Location Request/Answer (ULR/ULA)		
41000	NumberofULR	Number of Update-Location-Request messages received.

Counter ID	Name	Description
41009	NumberOfULA	Number of Update-Location-Answer messages sent.
41030	NumberOfULR_OK	Counts the number of ULR request received by the LTE-HSS without errors in attributes.
41031	NumberOfULR_INVALID_PARAMETER	Counts the number of ULR request received by the LTE-HSS with invalid attributes.
41032	NumberOfULR_MISSING_MANDATORY_PARAMETER	Counts the number of ULR request received by the LTE-HSS with missing mandatory parameters.
41033	NumberOfULA_SUCCESS	Counts the number of ULA sent by the LTE-HSS with result code set to DIAMETER_SUCCESS. (Ex: ULR request has been successfully processed).
41034	NumberOfULA_MISSING_AVP	Counts the number of ULA sent by the LTE-HSS with result code set to DIAMETER_MISSING_MANDATORY_AVP. (Ex: ULR received with missing mandatory attribute).
41035	NumberOfULA_UNABLE_TO_COMPLY	Counts the number of ULA sent by the LTE-HSS with result code set to DIAMETER_UNABLE_TO_COMPLY. (Ex: ULR was ok, but when processing it an error occurred, cannot access to database, ect...).
41036	NumberOfULA_RAT_NOT_ALLOWED	Counts the number of ULA sent by the LTE-HSS with result code set to DIAMETER_ERROR_RAT_NOT_ALLOWED. ULR has been received with Radio Access Type set to UTRAN and in the subscriber profile, UTRAN RAT is set to not allowed.
41037	NumberOfULA_ROAMING_NOT_ALLOWED	Counts the number of ULA sent by the LTE-HSS with result code set to DIAMETER_ERROR_ROAMING_NOT_ALLOWED. The user is roaming in an unauthorized VLMN network.
41040	NumberOfULA_UNKNOWN_EPS_SUBSCRIPTION	Counts the number of ULA sent by the LTE-HSS with result code set to DIAMETER_ERROR_UNKNOWN_EPS_SUBSCRIPTION. The user is known in the DB but there is not EPS subscription defined.
41038	NumberOfULA_USER_UNKNOWN	Counts the number of ULA sent by the LTE-HSS with result code set to DIAMETER_ERROR_USER_UNKNOWN. The user is not defined in the database.

Counter ID	Name	Description
41039	NumberOfULA_FEATURE_UNSUPPORTED	Counts the number of ULA sent by the LTE-HSS with result code set to DIAMETER_ERROR_FEATURE_UNSUPPORTED. The MME/SGSN did not send any supported feature AVP in the ULR and the "featureNotSupportedAcceptMessage" option in the LteHssConfig entity is set to true.
NotifyRequest/Answer (NOR/NOA)		
41002	NumberOfNOR	Number of Notify-Request messages received.
41011	NumberOfNOA	Number of Notify-Answer messages sent.
41041	NumberOfNOR_OK	Counts the number of NOR request received by the LTE-HSS without errors in attributes.
41042	NumberOfNOR_INVALID_PARAMETER	Counts the number of NOR request received by the LTE-HSS with invalid attributes.
41043	NumberOfNOR_MISSING_MANDATORY_PARAMETER	Counts the number of NOR request received by the LTE-HSS with missing mandatory parameters.
41044	NumberOfNOA_SUCCESS	Counts the number of NOA sent by the LTE-HSS with result code set to DIAMETER_SUCCESS. (Ex: NOR request has been successfully processed).
41045	NumberOfNOA_MISSING_AVP	Counts the number of NOA sent by the LTE-HSS with result code set to DIAMETER_MISSING_MANDATORY_AVP. (Ex: NOA received with missing mandatory attribute).
41046	NumberOfNOA_UNABLE_TO_COMPLY	Counts the number of NOA sent by the LTE-HSS with result code set to DIAMETER_UNABLE_TO_COMPLY. (Ex: NOA was ok, but when processing it an error occurred, cannot access to database, etc...).
41047	NumberOfNOA_USER_UNKNOWN	Counts the number of NOA sent by the LTE-HSS with result code set to DIAMETER_ERROR_USER_UNKNOWN. The user is not defined in the database.
Purge UE Request/Answer (PUR/PUA)		
41003	NumberOfPUR	Number of Purge-UE-Request messages received.
41012	NumberOfPUA	Number of Purge-UE-Answer messages sent.
41048	NumberOfPUR_OK	Counts the number of PUR request received by the LTE-HSS without errors in attributes.

Counter ID	Name	Description
41049	NumberOfPUR_INVALID_PARAMETER	Counts the number of PUR request received by the LTE-HSS with invalid attributes.
41050	NumberOfPUR_MISSING_MANDATORY_PARAMETER	Counts the number of PUR request received by the LTE-HSS with missing mandatory parameters.
41051	NumberOfPUA_SUCCESS	Counts the number of PUA sent by the LTE-HSS with result code set to DIAMETER_SUCCESS. (Ex: PUR request has been successfully processed).
41052	NumberOfPUA_MISSING_AVP	Counts the number of PUA sent by the LTE-HSS with result code set to DIAMETER_MISSING_MANDATORY_AVP. (Ex: PUA received with missing mandatory attribute).
41063	NumberOfPUA_UNABLE_TO_COMPLY	Counts the number of PUA sent by the LTE-HSS with result code set to DIAMETER_UNABLE_TO_COMPLY. (Ex: PUA was ok, but when processing it an error occurred, cannot access to database, etc.).
41053	NumberOfPUA_USER_UNKNOWN	Counts the number of PUA sent by the LTE-HSS with result code set to DIAMETER_ERROR_USER_UNKNOWN. The user is not defined in the database.
Insert Subscriber Data Request/Answer (IDR/IDA)		
41005	NumberOfIDA	Number of Insert-Subscriber-Data-Answer messages received.
41014	NumberOfIDR	Number of Insert-Subscriber-Data-Request messages sent.
41054	NumberOfIDA_OK	Counts the number of IDA received by the LTE-HSS with result code set to DIAMETER_SUCCESS. (IDR previously sent has been accepted by MME/SGSN).
41055	NumberOfIDA_INVALID_PARAMETER	Counts the number of IDA received by the LTE-HSS with result code set to DIAMETER_ERROR_INVALID_PARAMETER. (IDR previously sent has been rejected by
41056	NumberOfIDA_MISSING_MANDATORY_PARAMETER	Counts the number of IDA received by the LTE-HSS with result code set to DIAMETER_ERROR_MISSING_PARAMETER. (IDR previously sent has been rejected by MME/SGSN).
Delete Subscriber Data Request/Answer (DSR/DSA)		

Counter ID	Name	Description
41006	NumberOfDSA	Number of Delete-Subscriber-Data-Answer messages received.
41015	NumberOfDSR	Number of Delete-Subscriber-Data-Request messages sent.
41057	NumberOfDSA_OK	Counts the number of DSA received by the LTE-HSS with result code set to DIAMETER_SUCCESS. (DSR previously sent has been accepted by MME/SGSN).
41058	NumberOfDSA_INVALID_PARAMETER	Counts the number of DSA received by the LTE-HSS with result code set to DIAMETER_ERROR_INVALID_PARAMETER. (DSR previously sent has been rejected by MME/SGSN).
41059	NumberOfDSA_MISSING_MANDATORY_PARAMETER	Counts the number of DSA received by the LTE-HSS with result code set to DIAMETER_ERROR_MISSING_PARAMETER. (DSR previously sent has been rejected by MME/SGSN).
Reset Subscriber Request/Answer (RSR/RSA)		
41007	NumberOfRSR	Number of Reset-Request messages sent.
41008	NumberOfRSA	Number of Reset-Answer messages received.
41060	NumberOfRSA_OK	Counts the number of RSA received by the LTE-HSS with result code set to DIAMETER_SUCCESS. (RSR previously sent has been accepted by MME/SGSN).
41061	NumberOfRSA_INVALID_PARAMETER	Counts the number of RSA received by the LTE-HSS with result code set to DIAMETER_ERROR_INVALID_PARAMETER. (RSR previously sent has been rejected by MME/SGSN).
41062	NumberOfRSA_MISSING_MANDATORY_PARAMETER	Counts the number of RSA received by the LTE-HSS with result code set to DIAMETER_ERROR_MISSING_PARAMETER. (RSR previously sent has been rejected by MME/SGSN).
The following counters are provided to count messages received from and sent to a remote node:		
IPC Messages counters between the SDM's LTE-HSS/ngHLR (HLR-Proxy)		
41068	NumberOfCancelLocationAck RemoteRcvd	Counts the number of MAP-Cancel-Location-Ack received by the SDM's HLR proxy. This is considering that the LTE-HSS has previously

Counter ID	Name	Description
		requested the HLR proxy to send a MAP-CL to the external legacy HLR.
41069	NumberOfCancelLocationReq RemoteRcvd	Counts the number of Cancel-Location received by the SDM's HLR proxy. The HLR proxy is requesting the LTE-HSS to send a Diameter Cancel Location to the MME.
41070	NumberOfAuthInfoAckRemote Rcvd	Counts the number of MAP-SAI-Ack received from the SDM's HLR proxy. This is considering that the LTE-HSS has previously requested the HLR proxy to send a MAP-SAI to the external legacy HLR in order to retrieve authentication vectors from the legacy AuC.
41071	NumberOfDSRRemoteSent	Counts the number of DSR messages sent to the remote HSS that handles an expected Diameter connection. The local LTE-HSS doesn't have the Diameter connection to the Diameter peer, to which the DSR has to be sent.
41072	NumberOfIDRRemoteSent	Counts the number of IDR messages sent to remote HSS that handles an expected Diameter connection. The local LTE-HSS doesn't have the Diameter connection to the Diameter peer to which the IDR has to be sent.
41073	NumberOfCLRRemoteSent	Counts the number of CLR messages sent to the remote HSS that handles an expected Diameter connection. The local LTE-HSS doesn't have the Diameter connection to the Diameter peer to which the CLR has to be sent.
41074	NumberOfCancelLocationReq RemoteSent	Number of Cancel Location requests sent remote.
41075	NumberOfAuthInfo RemoteSent	Number of Auth Info requests sent remote.
41076	NumberOfAuthInfo RemoteRcvd	Number of Auth Info requests received remote.
41077	NumberOfDSRRemoteRcvd	Number of DSR received remote.
41078	NumberOfIDRRemoteRcvd	Number of IDR received remote.
41079	NumberOfCLRRemoteRcvd	Number of CLR received remote.
41080	NumberOfMapSaiRemoteSent	Counts the number of AIR sent to the SDM's HLR-Proxy to retrieve Authentication vectors from the external legacy HLR.
41081	NumberOfMapUIAckRemote Rcvd	Counts the number of MAP-UL-Ack that the LTE-HSS has received from the SDM's HLR-Proxy after having requested a MAP-UL upon 3G 4G roaming.

Counter ID	Name	Description
41082	NumberOfMapUIRemoteSent	Counts the number of MAP-UL that the LTE- HSS asked to send towards the HLR-Proxy to the legacy HLR. This counter is incremented upon 3G to 4G roaming.
41083	NumberOfAIA_USER_UNKNOWN	Number of specific Authentication-Information-Answer messages sent.
42000	NumberOfMEIdentityCheckRcvd	Number of ME-Identity-Check requests received.
42001	NumberOfWhiteListReturned	Number of ME-Identity-Check answer sent with EquipmentStatus = WHITELIST.
42002	NumberOfGreyListReturned	Number of ME-Identity-Check answer sent with EquipmentStatus = GREYLIST.
42003	NumberOfBlackListReturned	Number of ME-Identity-Check answer sent with EquipmentStatus = BLACKLIST.
42004	NumberOfBlackListIMSIMatch	Number of black list IMEI with successful IMSI override.
42005	NumberOfBlackListIMSIMis Match	Number of black list IMEI with unsuccessful IMSI override.
42006	NumberOfUnknownIMEI Status	Number of unknown IMEI returned.
42007	NumberOfNoMatchForIMEI	Number of IMEI not found in database.
42008	NumberOfMapCheckImeiRcvd	Number of MAP_CHECK_IMEI received.
42009	NumberOfWhiteListReturned GlobalResp	Number of ME-Identity-Check answer sent with EquipmentStatus = WHITELIST due to Global Response.
42010	NumberOfGreyListReturned GlobalResp	Number of ME-Identity-Check answer sent with EquipmentStatus = GREYLIST due to Global Response.
42011	NumberOfBlackListReturned GlobalResp	Number of ME-Identity-Check answer sent with EquipmentStatus = BLACKLIST due to Global Response.
42012	NumberOfUnknownIMEI StatusGlobalResp	Number of unknown IMEI returned due to Global Response.
42013	NumberOfDynamicIMSI Recording	Number of Dynamic IMSI/IMEI association.
42014	NumberOfDynamicSV Recording	Number of Dynamic IMEI SV recording.

For instructions on how to view the values of these counters, refer to [View the Current Day's Performance Measurements from the WebCI](#). Operations are also available from the CLI to retrieve the result of each one of these counters. For instructions on these operations, refer to the 'LteStatistics' entity in the "LTE-HSS Operations" section of the *SDM System Configuration - Reference Manual*.

Chapter 3

Statistics

Topics:

- *Number of Active HLR Subscriber Statistics.....75*

Number of Active HLR Subscriber Statistics

In addition to the HLR counters, the operator can obtain, either through the Tekelec CLI or WebCI, statistics on the number of active HLR subscribers. The License Manager creates an entry in the LicenseLog[] entity at the beginning of each calendar month and creates up to a maximum of 12 entries, one for each calendar month. It updates the date and the number of active HLR subscribers on a daily basis. At the end of each calendar month, there is an entry in the LicenseLog[] entity that indicates the total number of subscribers that were active during that month. The LicenseLog[] entity keeps the number of active HLR subscribers on a monthly basis over the past year.

For information on how to obtain the number of active subscribers on the ngHLR, refer to the procedure that shows how to view the license logs in the "Viewing the number of active HLR subscribers" section of the *SDM Monitoring, Maintaining, Troubleshooting - User Guide*.

View XML Performance Measurement Reports

Topics:

- *View the System's Daily Performance Measurements.....77*
- *View the Current Day's Performance Measurements from the WebCI.....77*
- *PM Counter Value Table.....78*
- *Edit the Thresholds for the OS Resource Counters from the WebCI.....82*
- *PM counter threshold table.....82*
- *View historical performance measurement reports through SSH interface.....84*

View the System's Daily Performance Measurements

Data can be gathered from the system to allow the operator to analyze the system's behavior. The SDM counters report the number of messages that have been processed successful, or unsuccessful, by the system during its runtime. This shows how an application service behaves among the other applications running on the network.

Counters can be viewed from the following:

- The WebCI's PM Counter Value window accessible from the Oamp folder.
- **Note:** In the current release, only the OS Resource counters, some HLR application counters and the HLR Subscriber counters are displayed in the WebCI.

For instructions on how to view the counters from the WebCI, refer to [View the Current Day's Performance Measurements from the WebCI](#).

- The daily XML file created by the system's applications are located in the /blue/var/pm directory. These files can be accessed using an SSH session. Only the historical files can be viewed using the SSH session. For instructions on how to view the counters using a SSH session, refer to [View historical performance measurement reports through SSH interface](#).

View the Current Day's Performance Measurements from the WebCI

The following procedure describes how to view the current performance measurements (counters) from the WebCI.

Note: The counters that can be displayed in this window are only the ones that have been reported in the current day. In order to view the values reported in previous days, refer to the [View Historical Performance Measurement Reports Through SSH](#) section.

1. From the main menu, navigate to **Oamp ► PMCounterValue**. The PM Counter Value window is displayed.
2. Select or enter a value for one or all of these options to display a list or a specific counter. The Network Operator can choose to display counters that have one, or all of the following characteristics:

The following procedure describes how to view the current performance measurements (counters) from the WebCI.

- JobId
 - 1: OS Resource counters
 - 2: DP Request Statistics
 - 3: HLR-MNP counters that are reset every 60 minutes
 - 5: LTE message counters
 - 6: HSS message counters
 - 7: AAA message counters
 - 8: DNS message counters
 - 9: HLR subscriber counters that are reset every 24 hours

- 10: HLR subscriber counters that are reset every 15 minutes
 - 11: HLR subscriber counters that are reset every 5 minutes
 - 12: SIP Registrar counters that are reset every 10 minutes
 - 13: SIP Redirect counters that are reset every 10 minutes
 - 14: SIP Reg Client counters that are reset every 10 minutes
 - 15: Eir message counters
- ShelfId: Counters that have been reported on a specific shelf.
 - CounterContext: Specifies in which context this counter applies for (i.e., for which module or for which IMSI range,etc).
 - CounterIndex: Counters that have been reported during a specific period of time (hhmm).
 - CounterId: Counter with a specific CounterId.
 - SlotId: Counters that have been reported on a specific slot.
3. Click the **Search** button. The PM Counter Value table is displayed with the list of counters corresponding to the characteristic(s) specified in the search engine.

JobId	JobShelfId	JobSlotId	CounterId	CounterName	CounterIndex	CounterValue	CounterValueMin	CounterValueMax	CounterContext	Description
2	1	1	2023	RequestOnGcDb	12:50	30			19	Number of request on SC DB
2	1	1	2022	RequestOnLocalDB	12:50	30			19	Number of request on local DB
2	1	1	2002	RequestUpdate	12:50	4			19	Number of UPDATE request
2	1	1	2000	RequestSelect	12:50	56			19	Number of SELECT request
2	1	1	2010	RequestController	13:00	1			19	Number of CONTROLLER request
2	1	1	2023	RequestOnGcDb	13:00	1			19	Number of request on SC DB
2	1	1	2010	RequestController	13:10	1			19	Number of CONTROLLER request
2	1	1	2023	RequestOnGcDb	13:10	1			19	Number of request on SC DB
2	1	2	2000	RequestSelect	13:10	62			19	Number of SELECT request
2	1	2	2002	RequestUpdate	13:10	4			19	Number of UPDATE request
2	1	2	2022	RequestOnLocalDB	13:10	30			19	Number of request on local DB
2	1	2	2023	RequestOnGcDb	13:10	36			19	Number of request on SC DB
2	1	3	2000	RequestSelect	13:10	62			19	Number of SELECT request
2	1	3	2002	RequestUpdate	13:10	4			19	Number of UPDATE request
2	1	3	2022	RequestOnLocalDB	13:10	30			19	Number of request on local DB
2	1	3	2023	RequestOnGcDb	13:10	36			19	Number of request on SC DB
2	1	10	2000	RequestSelect	13:10	62			19	Number of SELECT request
2	1	10	2002	RequestUpdate	13:10	4			19	Number of UPDATE request
2	1	10	2022	RequestOnLocalDB	13:10	30			19	Number of request on local DB
2	1	10	2023	RequestOnGcDb	13:10	36			19	Number of request on SC DB
2	1	3	2000	RequestSelect	13:10	471			11	Number of SELECT request
2	1	3	2001	RequestInsert	13:10	30			11	Number of INSERT request

Note: Since the HLR-Subscriber-Counters-24h jobs are generated once a day, no values will appear if this counter is selected in the WebCI.

Figure 1: PM Counter Value Window From the WebCI

4. (Optional) If the list of counters is long, click on the yellow arrows to navigate the multiple pages.

PM Counter Value Table

This table displays the current counter values that have been reported in the current day. For a list of these counters, refer to the [Performance Measurement Counters](#) section of this document.

Operations Permitted: Display.

Table 16: PMCounterValue attributes

Attributes	Value Range	Default	Description
JobId	Enum: 1 (OS-Critical-Resource) 2 (DP-Request-Stats) 4 (HLR-MNP-60min) 5 (LTE-Message-Counters) 6 (HSS-Message-Counters) 7 (AAA-Message-Counters) 8 (DNS-Message-Counters) 9 (HLR-Subscriber-Counters-24h) 10 (HLR-Subscriber-Counters-15min) 11 (HLR-Subscriber-Counters-5min) 12 (SIP-REGISTRAR-10min) 13 (SIP-REDIRECT-10min) 14 (SIP-REGCLIENT-10min) 15 (Eir-Message-Counters)	N/A	Numerical identifier of the job.
JobShelfId	Integer	N/A	Identifies the shelf on which the job has been configured to run. In the current release, only one shelf is supported. This is mostly for future use when multi-shelf deployments will be supported.
JobSlotId	Integer (1-15)	N/A	Identifies the slot on which the job has been configured to run.
CounterId	Integer	N/A	Numerical identifier of the counter.

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Attributes	Value Range	Default	Description
CounterIndex	hh:mm	N/A	Period of time when the counter value has been reported.
CounterName	String	N/A	Name of the counter.
CounterValue	Integer or decimal	N/A	Value of the counter currently reported. For some counters, this can be an average between the time it was reset and the time it was reported. If this is the case, the CounterValueMin and CounterValueMax will be populated.
CounterValueMin	Integer or decimal	N/A	In the case where the CounterValue is reported as an average, this indicates the minimum value the counter has reached between the time it was reset and reported.
CounterValueMax	Integer or decimal	N/A	In the case where the CounterValue is reported as an average, this indicates the maximum value the counter has reached between the time it was reset and reported.
CounterContext	Integer 0 Unknown 1 Framework 2 SchemaManager 3 ChassisManager 4 SystemManager 5 DataProvider 6 DpController 7 OampEventViewer 8 OampEventMgr 9 OampManager	N/A	This applies either to the DP Request Statistics counters or the HLR Subscriber counters. For the DP Request Statistics counters: This parameter is the ID of the module for which the count applies for. For example, the DP Request statistics counters can be used by any application. This counter context will indicate for which application the value of the counter applies for.

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Attributes	Value Range	Default	Description
	10 OampPerformanceManager 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 37 DataAccessServer		For the HLR Subscriber counters: This parameter indicates the context of the counter (i.e., VLR number, Imsi Range, etc.).
Description	String	N/A	Description of the counter name.

Edit the Thresholds for the OS Resource Counters from the WebCI

The following procedure shows how to edit the thresholds defined in the system for the OS Resource counters listed in Table OS Resource Counters with Thresholds.

For details on the Counter Threshold attributes and the different values it supports, refer to the *SDM Reference Manual*.

1. From the main menu, navigate to Oamp > PMCounterThreshold. The PM Counter Threshold window is displayed.

CounterId	CounterName	AlarmId	CounterAlarmSeverity	CounterThresholdValue	CounterThresholdHysteresis	Description	Action
5	CpuOverallLoad	301	AlarmMajor	95	0	CPU overall load	Modify
5	CpuOverallLoad	300	AlarmMinor	80	0	CPU overall load	Modify
10	LoadAverage1Min	303	AlarmMajor	3	0	Load average value in 1 minute	Modify
10	LoadAverage1Min	302	AlarmMinor	2	0	Load average value in 1 minute	Modify
11	LoadAverage5Min	305	AlarmMajor	3	0	Load average value in 5 minutes	Modify
11	LoadAverage5Min	304	AlarmMinor	2	0	Load average value in 5 minutes	Modify
12	LoadAverage15Min	307	AlarmMajor	3	0	Load average value in 15 minutes	Modify
12	LoadAverage15Min	306	AlarmMinor	2	0	Load average value in 15 minutes	Modify
24	MemoryPercentUsed	309	AlarmMajor	95	0	Percentage used physical memory	Modify
24	MemoryPercentUsed	308	AlarmMinor	80	0	Percentage used physical memory	Modify
29	SwapMemoryPercentUsed	311	AlarmMajor	95	0	Percentage used swap memory	Modify
29	SwapMemoryPercentUsed	310	AlarmMinor	80	0	Percentage used swap memory	Modify
50	BandwidthPublicIface	313	AlarmMajor	80	0	Bandwidth of public interface	Modify
50	BandwidthPublicIface	312	AlarmMinor	60	0	Bandwidth of public interface	Modify
51	DiscardInPacketsPublicIface	314	AlarmMajor	1	0	Discarded inbound packets on public interface	Modify
52	DiscardOutPacketsPublicIface	315	AlarmMajor	1	0	Discarded outbound packets on public interface	Modify
53	ErrorInPacketsPublicIface	316	AlarmMajor	1	0	Error inbound packets on public interface	Modify
54	ErrorOutPacketsPublicIface	317	AlarmMajor	1	0	Error outbound packets on public interface	Modify

Figure 2: Counter Threshold Window from the WebCI

2. Click the **Modify** button corresponding to the counter threshold to edit.
3. When the PmCounterThreshold Provisioning window is displayed, enter the new values and click **Commit**. Below is a description of the CounterThreshold entity and more details on the attributes and the values supported.

PM counter threshold table

The PM Counter Threshold table describes the PM Counter Threshold attributes and supported values. The table is used by the Network Operator to view and edit the thresholds for the alarms of the OS Resource counters. For a list of the OS Resource counters with defined thresholds, refer to [Table 5: OS Resource Counters with Thresholds](#).

Operations Permitted: Display and modify.

Table 17: PMCounterThreshold mandatory attributes

Attributes	Value Range	Default	Description
CounterId	Integer	N/A	Numerical identifier of the counter.
CounterAlarmSeverity	Enum: 1 (Trace) 2 (Debug) 3 (Info) 4 (Notice) 5 (Warning) 6 (Error) 7 (Alarm Warning) 8 (Alarm Minor) 9 (Alarm Major) 10 (Alarm Critical)	N/A	Severity of the alarm this counter's threshold triggers.

Table 18: PMCounterThreshold optional attributes

Attributes	Value Range	Default	Description
CounterThreshold Value	0-100	Default thresholds are defined on a per counter basis. Refer to the section 10.3 of this document for the threshold values set by default for each OS Resource counter.	Value in percentage of the threshold for this counter. When a threshold is reached, the corresponding alarm is raised. Important: When modifying the threshold value, if the new value is lower than the hysteresis value, you must also modify the hysteresis value and make sure it is lower than the threshold value.
CounterThreshold Hysteresis	Integer (<max threshold value)	N/A	By default, the threshold hysteresis is not defined, which means that only the threshold value is considered by the system to generate or clear the counter's corresponding alarms. However, the threshold hysteresis can be defined for

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Attributes	Value Range	Default	Description
			each counter in order to set a range within which the counter's corresponding alarm remains active. After the alarm has already been raised (the counter value has reached or exceeded the threshold value), if the counter value goes back down, below the threshold value, the alarm will remain active as long as the counter value is also equal or higher than the threshold hysteresis value. When the counter value goes back down, below the threshold hysteresis value, the system clears the alarm.

View historical performance measurement reports through SSH interface

- Must be member of Operation or Admin user group
- Login through SSH client with a username and password

This procedure describes how to view the historical performance measurements files through the SSH interface.

1. Go to the bin directory by typing

```
# cd /blue/var/pm
```

2. List the performance logs in the directory by typing

```
# ls
```

3. View the current counts by typing

```
# more <filename>.xml
```

where filename has the following formats:

- Format of a Normal PM Report:

```
<Type><StartDate>.<StartTime>-<EndTime>_<UniqueID>_<JobName>
```

For example:

```
A20110321.000000-240000_BluesliceNetworks_HLR-Subscriber-Counters-15min
```

OR

- Format of an Exception PM Report:

```
<Type><StartDate>.<StartTime>-<EndTime>_<UniqueID>_<JobName>_Exception
```

View XML Performance Measurement Reports

For example:

```
A20110321.000000-240000_BluesliceNetworks_HLR-Subscriber-Counters-15min  
_Exception
```

Glossary

A

AAA	Authentication, Authorization, and Accounting
ATI	Any Time Interrogation An ATI message allows an external server to interrogate an HLR and obtain information about the location and/or state of a GSM subscriber. Incoming application-terminated

C

CSCF	Call Session Control Function
------	-------------------------------

E

ENUM	TElephone NUmber Mapping
------	--------------------------

H

HLR	Home Location Register
-----	------------------------

HSS	Home Subscriber Server A central database for subscriber information.
-----	--

I

IMSI	International Mobile Subscriber Identity
------	--

L

LIA	Link Interface Applique
-----	-------------------------

M

MAA	Management ATM Adaptation
-----	---------------------------

O

O

OLO Other Licensed Operator

OS Operations Systems

P

PNA Push-Notification-Answer
Sent by a client in response to the Push-Notification-Request command.

PNR Push Notification Request on Sh Interface
Sent by a Diameter server to a Diameter client in order to notify changes in the user data in the server.

PUA Profile-Update-Answer
Command sent by a client in response to the Profile-Update-Request command.

PUR Profile Update Request on Sh Interface
Command sent by a Diameter client to a Diameter server in order to update user data in the server.

R

RN Routing Number

RTR Router
Routes all types of SMS traffic.

S

SAR Segmentation and Reassembly

S

SIM	Subscriber Identity Module An ID card the size of a credit card for GSM network subscribers, and is typically referred to as a chip card or smartcard.
SIP	Session Initiation Protocol
SLF	Subscription Locator Function
SNA	Subscribes Notification Answer on Sh Interface
SNR	Subscriber Notification Request on Sh Interface

U

UDA	User-Data-Answer Sent by a server in response to the User-Data-Request command.
UDR	User-Data-Request A user-identity and service indication sent by a Diameter client to a Diameter server in order to request user data.

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.
-----	---