Policy Management

MPE / MRA Key Performance Indicators and Operational Measurements Application Note

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Chapter 1

Introduction

Topics:

This application note describes the key performance indicators (KPIs) for the Tekelec MPE and MRA devices.

How This Guide is Organized

The information in this guide is presented in the following order:

- *Introduction* contains general information about this guide, the organization of this guide, and how to get technical assistance.
- *OSSI/XML-Based Key Performance Indicators* identifies the Key Performance Indicators (KPI) Statistics for Multimedia Policy Engine (MPE) and Multiprotocol Routing Agent (MRA) that are accessible through the Operation Support System Interface (OSSI) XML interface.
- *Key Performance Indicators* describes the supported KPI.
- *KPI Dashboard* explains how each of the columns in the KPI dashboard are mapped to a specific statistic in the KPI statistics.
- *Mapping Display to KPIs* describes support of alarms and traps for Simple Network Management Protocol (SNMP).
- *Color Threshold Configuration* describes the color configuration of the KPI Dashboard fields.
- *SNMP-Based KPI Values* describes system-resource KPI values based on SNMP.
- *SNMP-Based Key Operational Measurements* describes operational-measurement values.

Scope and Audience

This guide is intended for system integrators and other qualified service personnel responsible for managing a Policy Management system.

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

	**DANGER**: (This icon and text indicate the possibility of *personal injury*.)
	**WARNING**: (This icon and text indicate the possibility of *equipment damage*.)

	**CAUTION**: (This icon and text indicate the possibility of *service interruption*.)

Customer Care Center

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

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

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

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

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

  Phone:

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

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

  TAC Regional Support Office Hours:

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

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

  Phone:

  +1-919-460-2150

  TAC Regional Support Office Hours (except Brazil):

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

  - **Argentina**

    Phone:

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

  - **Brazil**

    Phone:

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

TAC Regional Support Office Hours:

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

- **Chile**

  Phone:

  1230-020-555-5468

- **Colombia**

  Phone:

  01-800-912-0537

- **Dominican Republic**

  Phone:

  1-888-367-8552

- **Mexico**

  Phone:

  001-888-367-8552

- **Peru**

  Phone:

  0800-53-087

- **Puerto Rico**

  Phone:

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

- **Venezuela**

  Phone:

  0800-176-6497

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

  Regional Office Hours:

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

  - **Signaling**

    Phone:

    +44 1784 467 804 (within UK)

  - **Software Solutions**

    Phone:

    +33 3 89 33 54 00

- **Asia**

- **India**

  Phone:

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

  TAC Regional Support Office Hours:

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

- **Singapore**

  Phone:

  +65 6796 2288

  TAC Regional Support Office Hours:

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

Emergency Response

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

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

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

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

Related Publications

The Policy Management product set includes the following publications, which provide information for the configuration and use of Policy Management products in a wireless environment:

- *Feature Notice*
- *Wireless Release Notice*
- *Roadmap to Hardware Documentation*
- *Configuration Management Platform Wireless User Guide*

- *Multi-Protocol Routing Agent User's Guide*
- *Troubleshooting Reference Guide*
- *SNMP User Guide*
- *OSSI XML Interface Definitions Reference Guide*
- *Analytics Data Stream Reference*
- *MPE / MRA Key Performance Indicators and Operational Measurements Application Note*

Locate Product Documentation on the Customer Support Site

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

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

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

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

Chapter 2

MPE/MRA Key Performance Indicators

Topics:

This application note describes the key performance indicators (KPIs) for the Tekelec MPE/MRA device.

For full information on using the SNMP interface, see the *SNMP User's Guide*.

OSSI/XML-Based Key Performance Indicators

The following paragraphs and examples identify the OSSI XML interfaces KPI Statistics for MPE/MRA. The OSSI XML interface retrieves the most critical KPIs and delivers them in a single query/response. The single-query response model facilitates external monitoring of the KPIs by scripts run on systems that are external to the MPE/MRA products.

The OSSI persists KPI statistics as part of a scheduled task, "OM Statistics." Once persisted, this data is available for query though the interface. This allows for both monitoring and historical reporting.

For more details on this interface, consult the *OSSI XML Interface Definition Guide*.

A query request can contain a number of parameters that allow you to request a specific set of data and format how that data is returned. The following example shows requests and responses that help demonstrate this:

```
<?xml version="1.0" encoding="UTF-8"?>
<XmlInterfaceRequest>
  <QueryOmStats DeltaCount="false">
   <StartTime>2010-07-23T18:35:00Z</StartTime>
    <KpiStats/>
  </QueryOmStats>
</XmlInterfaceRequest>
```

In this example, a request retrieves KPI statistics for all MPEs and MRAs configured within the system. The default behavior of the system is to return all available data unless you explicitly list MPEs/MRAs as part of the request (see below). This request also specifies that counter values be returned as absolutes (rather than deltas) and that the time interval is from 6:35 on 7/23 (GMT) until the current time.

An alternative method would be to explicitly call out the MPEs and MRAs for which you want to retrieve KPI data:

```
<?xml version="1.0" encoding="UTF-8
"?>
<XmlInterfaceRequest>
 <QueryOmStats DeltaCount="false">
  <StartTime>2010-07-23T18:35:00Z</StartTime>
  <EndTime>2010-07-28T18:35:00Z</EndTime>
  <KpiStats>
   <PolicyServer>MPE-99</PolicyServer>
   <MRA>MRA-Helper</MRA>
  </KpiStats>
  </QueryOmStats>
</XmlInterfaceRequest>
```

The "DeltaCount" attribute indicates whether the statistics are compared to the values from the previous time period, that is it should return the statistics increase since the specified start time. However, delta calculations are only performed on counter values that consistently increment and for which the time period value makes sense. For KPI statistics that means that TransactionStartCount, TransactionEndCount, MessagesInCount, and MessagesOutCount can be returned as either absolute or delta calculations. Other statistics, such as those representing number of connections, maximums and percentages, are always returned as absolute values.

Time values can be specified in GMT format (by including the 'Z' character) or just as local time to the CMP system. The EndTime tag is optional to the request. If absent then all data up to the current time is returned.

Key Performance Indicators

The MRA and MPE support a framework for providing internal counters and statistics. This framework includes support for many low-level protocol details, and is used as the basis for most of the values available on the Reports Tab in the CMP for each of these systems. This framework is also used as the basis for the Operational Measurements portion of the OSSI XML Interface that can be used to retrieve the counters and statistics on external systems that programmatically monitor the health of the MRA/MPE systems.

The KPI statistics object is defined within the existing statistics framework for the MRA and MPE. This object is shared by both systems. This object is also supported in the Operational Measurements portion of the OSSI XML Interface and other existing tools that are built around the statistics framework.

The KPI Dashboard, found in the CMP, provides a simple system-wide overview of the health and performance of all systems in the network. This KPI Dashboard is based on the new statistics object as well. See the *CMP User Guide* for details on accessing the KPI Dashboard.

The following sections describe the supported KPIs. If the Stats Reset Configuration is in Manual mode, the counters represent the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period. See the *CMP User Guide* for details on how to set the configuration.

COMCOL Policy Server Java Alarms - PCRF Group

In *Table 2: COMCOL Policy Server Java Alarms - PCRF Group*, the following alarms were reported prior to Release 7.5 using a different mechanism. The table lists the original severity (Old Severity), OID, and ID as well as the current severity and number.

Table 2: COMCOL Policy Server Java Alarms - PCRF Group

Name	Old Severity	COMCOL Severity	Old OID	Old ID	COMCOL Number	Description
MSC_CONN_LOST	Error	Minor	90001	1102	71102	CMTS connection lost
RADIUS_SERVER_STOP	Error	Minor	--	2806	72806	RADIUS Server stopped
SPC_CONN_CLOSED	Error	Minor	--	1204	71204	SPC Socket closed
LDAP_CONN_FAILED	Error	Minor	61605	1605	71605	Connection to LDAP server failed
LDAP_CONN_CLOSED	Warning	Minor	61602	1605	71605	Connection to LDAP server closed
AM_CONN_LOST	Error	Minor	60002	1004	71004	AM socket closed
MSR_DB_NOT_REACHABLE	Error	Minor	61707	1685	71685	Unable to connect to MSR after several attempts
DIAMETER_TOO_BUSY	Warning	Minor	--	2904	72904	Diameter load shedding set a busy status
RADIUS_TOO_BUSY	Warning	Minor	--	2905	72905	RADIUS load shedding set a busy status
TRANSPORT_DISCONNECTED	Error	Minor	60102	1403	71403	Diameter connection socket is closed
TRANSPORT_CLOSED	Warning	Minor		1402	71402	Diameter Transport Closed
NO_NETWORK_ELEMENT_FOUND	Warning	Minor	--	1440	71440	No network elements found that corresponds to the Diameter authorization request

Name	Old Severity	COMCOL Severity	Old OID	Old ID	COMCOL Number	Description
NO_QOS_PROFILE _DEFINED	Warning	Minor	60107	1421	71421	A default profile for this media type has to be configured
LDAP_ERROR_MESSSAGE	Warning	Minor	61615	1615	71615	DB plug-in search error
POLICY_CRITICAL_ALARM	--	Critical	--	--	74000	Critical Policy Alarm
POLICY_MAJOR_ALARM	--	Major	--	--	74001	Major Policy Alarm
POLICY_MINOR_ALARM	--	Minor	--	--	74002	Minor Policy Alarm
POLICY_DEFAULT_ALARM	--	Minor	--	--	74003	Default Policy Alarm
SCE_ADD_USER	Info	Minor	--	2450	72450	SCE application add user control
SCE_RECONFIG	Notice	Minor	--	2500	72500	CSE connection is reconfigured
RADIUS_SERVER_START _FAILED	Warning	Minor	--	2801	72801	RADIUS server start failed
RADIUS_SERVER _INVALID_MSG	Warning	Minor	--	2803	72803	RADIUS server received invalid message
RADIUS_SERVER _CORRUPT_AUTH	Warning	Minor	--	2804	72804	Authenticator is corrupted
NEW_CONN_REJECTED	Warning	Minor	--	1408	71408	New connection rejected because a functioning connection currently exists
RECEIVED_MESSAGE_EXC	Warning	Minor	60103	1406	71406	Diameter message error

Name	Old Severity	COMCOL Severity	Old OID	Old ID	COMCOL Number	Description
SEND_MESSAGE	Warning	Minor	--	1404	71404	Diameter peer received answer message exception
PEER_STATUS_CHANGE	Warning	Minor	60104	1407	71407	Diameter peer status has been changed
REJECT_MISSING_AVP	Warning	Minor	60105	1409	71409	Reject Diameter message because AVP is missing
MESSAGE_TIMEOUT	Warning	Minor	--	1410	71410	Diameter message processing timeout
DUPLICATE_MESSAGE	Warning	Minor	--	1411	71411	Duplicated Diameter message received
SPR_EXCEPTION	Warning	Minor	--	1699	71699	SPR generic exception
SCE_PRF_UPDATE _OPER_FAILED	Warning	Minor	--	2505	72505	Profile update operation failed
SCE_QUOTA_OPER_FAILED	Warning	Minor	--	2506	72506	Quota operation failed
DIAMETER_REJECT_NO _PCEF_AVAILABLE	Warning	Minor	60106	1420	71420	Diameter reject, no PCEF available for subscriber ID
DHCP_UNEXPECTED _EVENT_ID	Warning	Minor	--	1630	71630	DHCP Communication exception
DHCP_NO_RESULT _EVENT_ID	Warning	Minor	--	1600	71600	Did not find any results
DHCP_BAD_PRIMARY _ADDRESS_EVENT_ID	Warning	Minor	--	1634	71634	No primary address specified
DHCP_BAD_SECONDARY _ADDRESS_EVENT_ID	Warning	Minor	--	1635	71635	No secondary address specified

Name	Old Severity	COMCOL Severity	Old OID	Old ID	COMCOL Number	Description
BAD_RELAY_ADDRESS _EVENT_ID	Warning	Minor	--	1633	71633	DHCP bad relay address event ID
DIAMETER_PCC_RULE _MAX_RETRY_REACHED	Warning	Minor	--	1443	71443	The retry counter has reached the maximum attempt number
DIAMETER_SCE_GX _NO_SCE_PROFILE	Warning	Minor	--	1450	71450	No SCE profile or default profile set for subscriber
PCC_RULE_RETRY _CANCELED	Warning	Minor	--	1444	71444	Retry to install rule is canceled.
PCC_RULE_RETRY _ERROR_TOO_MANY	Warning	Minor	--	1445	71445	MPE reached maximum simultaneous rule installation retries
DIAMETER_PCC_RULE _FAILED	Warning	Minor	--	1441	71441	Diameter PCC Rule failed
DIAMETER_NO _NETWORK_ELEMENT_FOUND	Warning	Minor	60108	1442	71442	Diameter rule failed, no network element found
SCE_INVALID_NULL_PKG	Warning	Minor	--	2506	72506	Invalid null package during login pull
DQOS_DOWNSTREAM _CONNECTION_CLOSED	Warning	Minor	--	1101	71101	DQoS Downstream Connection Closed
BRAS_CONNECTION_ CLOSED	Warning	Minor	--	1702	71702	B-RAS Connection Closed
SPR_CONNECTION_CLOSED	Warning	Minor	--	1682	71682	SPR Connection Closed
DQOS_AM_CONNECTION _CLOSED	Warning	Minor	--	1104	71104	DQoS Am Connection Closed

Name	Old Severity	COMCOL Severity	Old OID	Old ID	COMCOL Number	Description
SCE_CONNECTION_LOST	Warning	Minor	--	2501	72501	SCE Connection Lost
SH_EL_BAD_REALM	Warning	Minor	--	1661	71661	SH EL Bad Realm
SH_EL_BAD_ADDRESS	Warning	Minor	--	1662	71662	SH EL Bad Address
COPS_UNKNOWN_GATEWAY	Warning	Minor	--	1703	71703	COPS Unknown Gateway
COPS_UNKNOWN_GATEWAY	Warning	Minor	--	1703	71703	COPS Unknown Gateway

KPIs about Alarms

These KPIs cover counters of critical, major and minor alarms.

Table 3: KPIs about Alarms

Name	Description	Class	Type	Depends on	Scope*
Critical alarm	Service is being interrupted; number of alarms is shown				MPE*, MRA*
Major alarm	Service may be interrupted if the issue is not corrected; number of alarms is shown				MPE*, MRA*
Minor alarm	Non-service affecting fault; number of alarms is shown				MPE*, MRA*

Note: * indicates counters that appear in the KPI Dashboard.

KPIs about Connectivity

Connectivity counters include information on connections between MRAs and MPEs.

CurrentMPEConnectionCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Current number of active connections to an MPE.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA

Configured MPE Connection Count

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Number of configured connections to MPEs that should be active.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA

Current DRMA Connection Count

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Current number of connections to a remote MRA.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA

Current DRMA Connection Count

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Current number of connections to a remote MRA.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA

Current Connected NE Count

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Current number of network elements that have active connections to the system. For connection-less protocols (e.g. CurrentConnected NECount RADIUS over UDP), a network element is considered connected (or active) from the MPE's/MRA's perspective, if messages were received from that network element within the last minute.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

Configured NE Count

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Number of network elements that are configured and associated with the system.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

Current MRA Connection Count

Measurement Group: KPI Stats

Measurement Type: Counter

Description: Current number of connections to an MRA forwarding requests.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

Configured MRA Connection Count

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Number of configured connections to MRAs that should be active.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

Current SPR Connection Count

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Current number of connections to external subscriber repositories (such as LDAP, or Sh-based HSS, etc).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

Configured SPR Connection Count

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Number of configured connections to external subscriber repositories (such as LDAP, or Sh-based HSS, etc) that should be active.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

KPIs about Event Triggers

These statistics are tracked per network element and per MPE.

AN_GW_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the Policy Management PCRF to indicate that upon the change of the serving Access Node Gateway, PCC rules are requested. When used in a CCR command, this value indicates that the PCEF generated the request because the serving Access Node gateway changed. The new value of the serving Access Node gateway is indicated in the AN-GW-Address AVP.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The AN_GW_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating AN_GW_CHANGE is received.

Measurement Scope: MPE

DEFAULT_EPS_BEARER_QOS_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon a change in the default EPS Bearer QoS, PCEF informs the PCRF. When used in a CCR command, this value indicates that the PCEF generated the request because there has been a change in the default EPS Bearer QoS. The new value is provided in the Default-EPS-Bearer-QoS AVP. This event trigger is reported when the corresponding event occurs, even if the event trigger is not provisioned by the PCRF. Not applicable in 3GPP-GPRS access type.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The DEFAULT_EPS_BEARER_QOS_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating DEFAULT_EPS_BEARER_QOS_CHANGE is received.

Measurement Scope: MPE

GW_PCEF_MALFUNCTION

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used to indicate that the PCC rule could not be successfully installed (for those provisioned from the PCRF) or activated (for those pre-provisioned in PCEF) or enforced (for those already successfully installed) due to GW/PCEF malfunction.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The GW_PCEF_MALFUNCTION is incremented each time a CCR command with Event-Trigger AVP value indicating GW_PCEF_MALFUNCTION is received.

Measurement Scope: MPE

IP_CAN_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon a change in the IP-CAN type, PCC rules are requested. When used in a CCR command, this value indicates that the PCEF generated the request because there was a change of IP-CAN type. IP-CAN-Type AVP is provided in the same request with the new value. The RAT-Type AVP also is provided when applicable to the specific IP-CAN Type (e.g. 3GPP IP-CAN Type).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The IP_CAN_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating IP_CAN_CHANGE is received.

Measurement Scope: MPE

LOSS_OF_BEARER

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon loss of bearer, GW should inform PCRF. When used in a CCR command, this value indicates that the PCEF generated the request because the bearer associated with the PCC rules indicated by the corresponding Charging-Rule-Report AVP was lost. The PCC-Rule-Status AVP within the Charging-Rule-Report AVP indicates that these PCC rules are temporarily inactive. Applicable to those access-types that handle multiple bearers within one single IP-CAN session (e.g. GPRS).

The mechanism of indicating loss of bearer to the GW is IP-CAN access type specific. For GPRS, this is indicated by a PDP context modification request with Maximum Bit Rate (MBR) in QoS profile changed to 0 kbps.

When the PCRF performs the bearer binding, the PCEF provides the Bearer-Identifier AVP to indicate the bearer that has been lost.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The LOSS_OF_BEARER is incremented each time a CCR command with Event-Trigger AVP value indicating LOSS_OF_BEARER is received.

Measurement Scope: MPE

MAX_NR_BEARERS_REACHED

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used to indicate that the PCC rule could not be successfully installed (for those provisioned from PCRF) or activated (for those pre-provisioned in PCEF) or enforced (for those already successfully installed) due to the fact that the maximum number of bearers has been reached for the IP-CAN session.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The MAX_NR_BEARERS_REACHED is incremented each time a CCR command with Event-Trigger AVP value indicating MAX_NR_BEARERS_REACHED is received.

Measurement Scope: MPE

OUT_OF_CREDIT

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that the PCEF shall inform the PCRF about the PCC rules for which credit is no longer available, together with the applied termination action. When used in a CCR command, this value indicates that the PCEF generated the request because the PCC rules indicated by the corresponding Charging-Rule-Report AVP have run out of credit, and that the termination action indicated by the corresponding Final-Unit-Indication AVP applies.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The OUT_OF_CREDIT is incremented each time a CCR command with Event-Trigger AVP value indicating OUT_OF_CREDIT is received.

Measurement Scope: MPE

PLMN_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon a PLMN change PCC rules are requested. When used in a CCR command, this value indicates that the PCEF generated the request because there was a change of PLMN. 3GPP-SGSN-MCC-MNC AVP is provided in the same request with the new value.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The PLMN_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating PLMN_CHANGE is received.

Measurement Scope: MPE

QOS_CHANGE_EXCEEDING_AUTHORIZATION

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that only upon a requested Quality of Service (QoS) change beyond the current authorized value(s) at bearer level, PCC rules are requested. When used in a CCR command, this value indicates that the PCEF generated the request because there has been a change in the requested QoS beyond the authorized value(s) for a specific bearer. The Bearer-Identifier AVP is provided to indicate the affected bearer. QoS-Information AVP is required to be provided in the same request with the new value.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The QOS_CHANGE_EXCEEDING_AUTHORIZATION is incremented each time a CCR command with Event-Trigger AVP value indicating QOS_CHANGE_EXCEEDING_AUTHORIZATION is received.

Measurement Scope: MPE

QOS_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon any QoS change (even within the limits of the current authorization) at bearer or APN level, PCC rules are requested. When used in a CCR command, this value indicates that the PCEF generated the request because there has been a change in the requested QoS for a specific bearer (e.g. the previously maximum authorized QoS has been exceeded) or APN. The Bearer-Identifier AVP is provided to indicate the affected bearer. QoS-Information AVP is required to be provided in the same request with the new value. When applicable at APN level, this event trigger is reported when the corresponding event occurs, even if the event trigger is not provisioned by the PCRF.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The QOS_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating QOS_CHANGE is received.

Measurement Scope: MPE

RAI_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon a change in the RAI, PCEF shall inform the PCRF. When used in a CCR command, this value indicates that the PCEF generated the request because there has been a change in the RAI. The new RAI value is provided in the RAI AVP. If the user location has been changed but the PCEF cannot get the detail location information (e.g. handover from 3G to 2G network), the PCEF shall send the RAI AVP to the PCRF by setting the LAC of the RAI to value 0x0000. Applicable only to 3GPP-GPRS and 3GPP-EPS access types.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The RAI_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating RAI_CHANGE is received.

Measurement Scope: MPE

RAT_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon a RAT change PCC rules are requested. When used in a CCR command, this value indicates that the PCEF generated the request because of a RAT change. The new RAT type is provided in the RAT-Type AVP.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The RAT_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating RAT_CHANGE is received.

Measurement Scope: MPE

REALLOCATION_OF_CREDIT

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that the PCEF shall inform the PCRF about the PCC rules for which credit has been reallocated after the former out of credit indication. When used in a CCR command, this value indicates that the PCEF generated the request because the PCC rules indicated by the corresponding Charging-Rule-Report AVP have been reallocated credit after the former out of credit indication.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The REALLOCATION_OF_CREDIT is incremented each time a CCR command with Event-Trigger AVP value indicating REALLOCATION_OF_CREDIT is received.

Measurement Scope: MPE

RECOVERY_OF_BEARER

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is in CCA and RAR commands by the PCRF used to indicate that upon recovery of bearer, GW informs PCRF. When used in a CCR command, this value indicates that the PCEF generated the request because the bearer associated with the PCC rules indicated by the corresponding Charging-Rule-Report AVP was recovered. The PCC-Rule-Status AVP within the Charging-Rule-Report AVP indicates that these rules are active again. Applicable to those access-types that handle multiple bearers within one single IP-CAN session (e.g. GPRS).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The RECOVERY_OF_BEARER is incremented each time a CCR command with Event-Trigger AVP value indicating RECOVERY_OF_BEARER is received.

Measurement Scope: MPE

RESOURCES_LIMITATION

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used to indicate that the PCC rule could not be successfully installed (for those provisioned from PCRF) or activated (for those pre-provisioned in PCEF) or enforced (for those already successfully installed) due to a limitation of resources at the PCEF.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The RESOURCES_LIMITATION is incremented each time a CCR command with Event-Trigger AVP value indicating RESOURCES_LIMITATION is received.

Measurement Scope: MPE

REVALIDATION_TIMEOUT

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon revalidation timeout, PCEF informs the PCRF. When used in a CCR command, this value indicates that the PCEF generated the request because there has been a PCC revalidation timeout.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The REVALIDATION_TIMEOUT is incremented each time a CCR command with Event-Trigger AVP value indicating REVALIDATION_TIMEOUT is received.

Measurement Scope: MPE

SERVICE_FLOW_DETECTION

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: Proprietary event.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The SERVICE_FLOW_DETECTION is incremented each time a CCR command with Event-Trigger AVP value indicating SERVICE_FLOW_DETECTION is received.

Measurement Scope: MPE

SGSN_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Gauge

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon the change of the serving SGSN, PCC rules are requested. When used in a CCR command, this value indicates that the PCEF generated the request because the serving SGSN changed. The new value of the serving SGSN is indicated in either 3GPP-SGSN-Address AVP or 3GPP-SGSN-IPv6-Address AVP. Applicable only to 3GPP-GPRS and 3GPP-EPS access types.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over

cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The SGSN_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating SGSN_CHANGE is received.

Measurement Scope: MPE

SUCCESSFUL_RESOURCE_ALLOCATION

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that the PCEF can inform the PCRF of successful resource allocation for those rules that requires so. When used in a CCR or RAA command, this value indicates that the PCEF informs the PCRF that the resources for a rule have been successfully allocated. The affected rules are indicated within the Charging-Rule-Report AVP with the PCC-Rule-Status AVP set to the value ACTIVE (0).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The SUCCESSFUL_RESOURCE_ALLOCATION is incremented each time a CCR command with Event-Trigger AVP value indicating SUCCESSFUL_RESOURCE_ALLOCATION is received.

Measurement Scope: MPE

TFT_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon a TFT change at bearer level PCC rules are requested. When used in a CCR command, this value indicates that the PCEF generated the request because of a change in the TFT. The Bearer-Identifier AVP is provided to indicate the affected bearer. All the TFT values for this bearer are provided in TFT-Packet-Filter-Information AVP. This event trigger is provisioned by the PCRF at the PCEF. Applicable only to 3GPP-GPRS.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The TFT_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating TFT_CHANGE is received.

Measurement Scope: MPE

UE_IP_ADDRESS_ALLOCATE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: When used in a CCR command, this value indicates that the PCEF generated the request because a UE IPv4 address is allocated. The Framed-IP-Address AVP is provided in the same request. This event trigger is not required to be provisioned by the PCRF. This event trigger is reported when the corresponding event occurs, even if the event trigger is not provisioned by the PCRF.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The UE_IP_ADDRESS_ALLOCATE is incremented each time a CCR command with Event-Trigger AVP value indicating UE_IP_ADDRESS_ALLOCATE is received.

Measurement Scope: MPE

UE_IP_ADDRESS_RELEASE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: When used in a CCR command, this value indicates that the PCEF generated the request because a UE IPv4 address is released. The Framed-IP-Address AVP is provided in the same request. This event trigger is not required to be provisioned by the PCRF. This event trigger is reported when the corresponding event occurs, even if the event trigger is not provisioned by the PCRF.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The UE_IP_ADDRESS_RELEASE is incremented each time a CCR command with Event-Trigger AVP value indicating UE_IP_ADDRESS_RELEASE is received.

Measurement Scope: MPE

UE_TIME_ZONE_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon a change to the time zone the UE is currently located in, PCC rules shall be requested. When used in a CCR command, this value indicates that the PCEF generated the request because the time zone the UE is currently located in has changed. The new value of the UE's time zone is indicated in the 3GPP-MS-TimeZone AVP.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The UE_TIME_ZONE_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating UE_TIME_ZONE_CHANGE is received..

Measurement Scope: MPE

USAGE_REPORT

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in a CCA and RAR commands by the PCRF when requesting usage monitoring at the PCEF. The PCRF also provides in the CCA or RAR command the Usage-Monitoring-Information AVP(s) including the Monitoring-Key AVP and the Granted-Service-Unit AVP. When used in a CCR command, this value indicates that the PCEF generated the request to report the accumulated usage for one or more monitoring keys. The PCEF also provides the accumulated usage volume using the Usage-Monitoring-Information AVP(s) including the Monitoring-Key AVP and the Used-Service-Unit AVP.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The USAGE_REPORT is incremented each time a CCR command with Event-Trigger AVP value indicating USAGE_REPORT is received.

Measurement Scope: MPE

USAGE_THRESHOLD_REACHED

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: Proprietary event.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The USAGE_THRESHOLD_REACHED is incremented each time a CCR command with Event-Trigger AVP value indicating USAGE_THRESHOLD_REACHED is received.

Measurement Scope: MPE

USER_LOCATION_CHANGE

Measurement Group: Diameter Policy and Charging Enforcement Function (PCEF), Diameter Bearer Binding and Event Reporting (BBERF) Stats

Measurement Type: Counter

Description: This value is used in CCA and RAR commands by the PCRF to indicate that upon a change in the user location (i.e. i.e. applicable for CGI/SAI/RAI/TAI/ECGI), PCEF informs the PCRF. When used in a CCR command, this value indicates that the PCEF generated the request because there has been a change in the user location. The new location value is provided in the 3GPP-User-Location-Info AVP. If the user location has been changed but the PCEF cannot get the detail location information (e.g. handover from 3G to 2G network), the PCEF sends the 3GPP-User-Location-Info AVP to the PCRF by setting the LAC of the CGI/SAI to value 0x0000, LAC of the RAI to value 0x0000 for GPRS access, and setting the TAC of the TAI to value 0x0000, setting the ECI of the ECGI to value 0x0000 for the EPS access.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The USER_LOCATION_CHANGE is incremented each time a CCR command with Event-Trigger AVP value indicating USER_LOCATION_CHANGE is received.

Measurement Scope: MPE

KPIs about Diameter

Diameter Protocol errors can include problems with commands, connectivity, and bandwidth.

AAR Timeout

Measurement Group: Diameter AF Stats

Measurement Type: Counter

Description: A count of the number of AA-Request messages sent where an AA-Answer message was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each AAA timeout message

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

ASR Timeout

Measurement Group: Diameter AF Stats

Measurement Type: Counter

Description: A count of the number of Abort Session Requests (ASR) messages sent where an ASA message was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over

cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each time an ASR message times out

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

CCR Timeout

Measurement Group: Diameter BBERF Stats, Diameter PCEF Stats

Measurement Type: Counter

Description: A count of the number of Credit Control Request (CCR) messages sent where a CC-Answer message was not received in a predefined amount of time, per network element.. This should equal to the number of CCR-I/U/T Timeouts combined.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each CCR timeout message

Measurement Scope: MPE or MRA (per network element)

CCR-I Timeout

Measurement Group: Diameter BBERF Stats, Diameter PCEF Stats

Measurement Type: Counter

Description: A count of the number of Credit Control Request-Initial (CCR-I) messages sent where a CCA-Initial message was not received in a predefined amount of time.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each CCR-I timeout message

Measurement Scope: MPE or MRA (per network element)

CCR-T Timeout

Measurement Group: Diameter BBERF Stats, Diameter PCEF Stats

Measurement Type: Counter

Description: A count of the number of Credit Control Request-Terminate (CCR-T) messages sent where a CCA-Terminate message was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each CCR-T timeout message

Measurement Scope: MPE or MRA (per network element)

CCR-U Timeout

Measurement Group: Diameter BBERF Stats, Diameter PCEF Stats

Measurement Type: Counter

Description: A count of the number of Credit Control Request-Update (CCR-U) messages sent where a CCA-Update message was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each CCR-U timeout message

Measurement Scope: MPE or MRA (per network element)

DBR Timeout

Measurement Group: DRMA Stats

Measurement Type: Counter

Description: A count of the number of Diameter Binding Request (DBR) messages sent where a Diameter Binding Answer message was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each DBR timeout message

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

LNR Timeout

Measurement Group: DRMA Stats

Measurement Type: Counter

Description: A count of the number of Diameter Load Notify Request (LNR) messages sent where a Diameter Load Notify Answer message was not received in a predefined amount of time.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each LNR timeout message

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

LSR Timeout

Measurement Group: DRMA Stats

Measurement Type: Counter

Description: A count of the number of Diameter Load Subscription Request (LSR) messages sent where a Diameter Load Subscription Answer message was not received in a predefined amount of time.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each LSR timeout message

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

PUR Timeout

Measurement Group: Sh Stats

Measurement Type: Counter

Description: A count of the number of Profile Update Request (PUR) messages sent where a Profile Update Answer (PUA) message was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each PUR timeout message

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

RAR Timeout

Measurement Group: Diameter AF Stats, Diameter BBERF Stats, Diameter PCEF Stats

Measurement Type: Counter

Description: A count of the number of ReAuthorization Request (RAR) messages sent where an RAA message was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each time a RAR times out

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

RUR Timeout

Measurement Group: DRMA Stats

Measurement Type: Counter

Description: RUR Timeout: A count of the number of Diameter Routing Update Request (RUR) messages sent where a Diameter Routing Update Answer message was not received in a predefined amount of time.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each RUR timeout message

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

SNR Timeout

Measurement Group: Sh Stats

Measurement Type: Counter

Description: A count of the number of Subscription Notification Request (SNR) messages sent where a Subscription Notification Answer (SNA) was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each SNR timeout message

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

STR Timeout

Measurement Group: Diameter AF Stats

Measurement Type: Counter

Description: A count of the number of Session Termination Requests (STR) messages sent where an STA message was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each STR timeout message

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

UDR Timeout

Measurement Group: Sh Stats

Measurement Type: Counter

Description: A count of the number of User Data Request (UDR) messages sent where a User Data Answer (UDA) message was not received in a predefined amount of time, per network element.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Each UDR timeout message

Measurement Scope: MPE or MRA (per network element)

Note: This measurement appears in the KPI Dashboard.

DIAMETER_AUTHORIZATION_REJECTED

Measurement Group: Stats

Measurement Type:

Description: A request was received for which the user could not be authorized. This error could occur if the service requested is not permitted to the user

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_APPLICATION_UNSUPPORTED

Measurement Group: Stats

Measurement Type:

Description: A request was sent for an application that is not supported.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_AUTHENTICATION_REJECTED

Measurement Group: Stats

Measurement Type:

Description: The authentication process for the user failed, most likely due to an invalid password used by the user. Further attempts must only be tried after prompting the user for a new password.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_AVP_NOT_ALLOWED

Measurement Group: Stats

Measurement Type:

Description: A message was received with an AVP that must not be present. The Failed-AVP AVP must be included and contain a copy of the offending AVP.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_AVP_OCCURS_TOO_MANY_TIMES

Measurement Group: Stats

Measurement Type:

Description: A message was received that included an AVP that appeared more often than permitted in the message definition. The Failed-AVP AVP must be included and contain a copy of the first instance of the offending AVP that exceeded the maximum number of occurrences.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_AVP_UNSUPPORTED

Measurement Group: Stats

Measurement Type:

Description: The peer received a message that contained an AVP that is not recognized or supported and was marked with the Mandatory bit. A Diameter message with this error must contain one or more Failed- AVP AVPs containing the AVPs that caused the failure.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_COMMAND_UNSUPPORTED

Measurement Group: Stats

Measurement Type:

Description: The Request contained a Command-Code that the receiver did not recognize or support. This must be used when a Diameter node receives an experimental command that it does not understand.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_CONTRADICTING_AVPS

Measurement Group: Stats

Measurement Type:

Description: The Home Diameter server has detected AVPs in the request that contradicted each other, and is not willing to provide service to the user. One or more Failed-AVP AVPs must be present, containing the AVPs that contradicted each other.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_CREDIT_CONTROL_NOT_APPLICABLE

Measurement Group: Stats

Measurement Type:

Description: The credit-control server determines that the service can be granted to the end user but that no further credit control is needed for the service (e.g., service is free of charge).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_CREDIT_LIMIT_REACHED

Measurement Group: Stats

Measurement Type:

Description: The credit-control server denies the service request because the end user's account could not cover the requested service. If the CCR contained used-service-units they are deducted, if possible.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_END_USER_SERVICE_DENIED

Measurement Group: Stats

Measurement Type:

Description: The credit-control server denies the service request due to service restrictions. If the CCR contained used-service-units, they are deducted, if possible.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_INVALID_AVP_BIT_COMBO

Measurement Group: Stats

Measurement Type:

Description: The request contained an AVP with which is not allowed to have the given value in the AVP Flags field. A Diameter message indicating this error must include the offending AVPs within a Failed-AVP AVP.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over

cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_INVALID_AVP_BITS

Measurement Group: Stats

Measurement Type:

Description: A request was received that included an AVP whose flag bits are set to an unrecognized value, or that is inconsistent with the AVP's definition.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_INVALID_AVP_LENGTH

Measurement Group: Stats

Measurement Type:

Description: The request contained an AVP with an invalid length. A Diameter message indicating this error must include the DIAMETER_INVALID_AVP_LENGTH offending AVPs within a Failed-AVP AVP.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_INVALID_AVP_BITS

Measurement Group: Stats

Measurement Type:

Description: A request was received that included an AVP whose flag bits are set to an unrecognized value, or that is inconsistent with the AVP's definition.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_INVALID_AVP_VALUE

Measurement Group: Stats

Measurement Type:

Description: The request contained an AVP with an invalid value in its data portion. A Diameter message indicating this error must include the offending AVPs within a Failed-AVP AVP.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_INVALID_BIT_IN_HEADER

Measurement Group: Stats

Measurement Type:

Description: This error is returned when an unrecognized bit in the Diameter header is set to one (1).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_INVALID_HDR_BITS

Measurement Group: Stats

Measurement Type:

Description: A request was received whose bits in the Diameter header were either set to an invalid combination, or to a value.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_INVALID_MESSAGE_LENGTH

Measurement Group: Stats

Measurement Type:

Description: This error is returned when a request is received with an invalid message length.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_LOOP_DETECTED

Measurement Group: Stats

Measurement Type:

Description: An agent detected a loop while trying to get the message to the intended recipient. The message MAY be sent to an alternate peer, if one is available, but the peer reporting the error has identified a configuration problem.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_MISSING_AVP

Measurement Group: Stats

Measurement Type:

Description: The request did not contain an AVP that is required by the Command Code definition. If this value is sent in the Result-Code AVP, a Failed-AVP AVP should be included in the message. The Failed-AVP AVP must contains an example of the missing AVP complete with the Vendor-Id if applicable. The value field of the missing AP should be of correct minimum length and contain zeroes.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_NO_COMMON_APPLICATION

Measurement Group: Stats

Measurement Type:

Description: This error is returned when a CER message is received, and there are no common applications supported between the peers.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_NO_COMMON_SECURITY

Measurement Group: Stats

Measurement Type:

Description: This error is returned when a CER message is received, and there are no common security mechanisms supported between the peers. A Capabilities-Exchange-Answer (CEA) must be returned with the Result-Code AVP set to public static final DiameterResultCode DIAMETER_NO_COMMON_SECURITY.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_OUT_OF_SPACE

Measurement Group: Stats

Measurement Type:

Description: A Diameter node received the accounting request but was unable to commit it to stable storage due to a temporary lack of space.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_RATING_FAILED

Measurement Group: Stats

Measurement Type:

Description: This error code is used to inform the credit-control client that the credit-control server cannot rate the service request due to insufficient rating input, an incorrect AVP combination, or an AVP or an AVP value that is not recognized or supported in the rating. The Failed-AVP AVP must be included and contain a copy of the entire AVP(s) that could not be processed successfully or an example of the missing AVP complete with the Vendor-Id if applicable. The value field of the missing AVP should be of correct minimum length and contain zeros.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_REALM_NOT_SERVED

Measurement Group: Stats

Measurement Type:

Description: The intended realm of the request is not recognized.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_REDIRECT_INDICATION

Measurement Group: Stats

Measurement Type:

Description: A redirect agent has determined that the request could not be satisfied locally and the initiator of the request should direct the request directly to the server, whose contact information has been added to the response. When set, the Redirect-Host AVP must be present.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_RESOURCES_EXCEEDED

Measurement Group: Stats

Measurement Type:

Description: A request was received that cannot be authorized because the user has already expended allowed resources. An example of this error condition is a user that is restricted to one dial-up PPP port, but who attempts to establish a second PPP connection.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_TOO_BUSY

Measurement Group: Stats

Measurement Type:

Description: When returned, a Diameter node should attempt to send the message to an alternate peer. This error must only be used when a specific server is requested, and it cannot provide the requested service.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_UNABLE_TO_COMPLY

Measurement Group: Stats

Measurement Type:

Description: This error is returned when a request is rejected for unspecified reasons.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_UNABLE_TO_DELIVER

Measurement Group: Stats

Measurement Type:

Description: This error is given when Diameter cannot deliver the message to the destination, either because no host within the realm supporting the required application was available to process the request, or because Destination-Host AVP was given without the associated Destination-Realm AVP.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_UNKNOWN_PEER

Measurement Group: Stats

Measurement Type:

Description: A CER was received from an unknown peer.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_UNKNOWN_SESSION_ID

Measurement Group: Stats

Measurement Type:

Description: The request contained an unknown Session-Id.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_UNSUPPORTED_VERSION

Measurement Group: Stats

Measurement Type:

Description: This error is returned when a request was received, whose version number is unsupported.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

DIAMETER_USER_UNKNOWN

Measurement Group: Stats

Measurement Type:

Description: The specified end user is unknown in the credit-control server.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

ELECTION_LOST

Measurement Group: Stats

Measurement Type:

Description: The peer has determined that it has lost the election process and has therefore disconnected the transport connection.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

KPIs about Latency

Separate transaction latency information for incoming and outgoing messages can be tracked per network element and per MPE/MRA, and in each protocol category (AF, PCEF, BBERF, DRMA, and Sh).

For incoming transactions to the MRA listed in this section, the transaction time includes:

- Processing time by the MRA
- Processing time by the MPE
- Processing time by any external SPR the MPE may contact
- Network latency in communication to and from the MPE
- Network latency in communication to and from any external SPR

For outgoing transactions from the MRA, the transaction time includes:

- Processing time by all network elements (PCEF, BBERF, etc)
- Network latency in communications to and from external network elements

Average Transaction Time

Measurement Group: Nac Stats

Measurement Type: Gauge

Description: The average transaction processing time for incoming and outgoing messages, per network element.

Depends on the average in 'Total Trans Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Recalculated whenever a transaction is processed.

Measurement Scope: MPE or MRA

Note: This measurement appears in the KPI Dashboard.

Maximum Transaction Time

Measurement Group: Nac Stats

Measurement Type: Gauge

Description: The maximum transaction processing time for incoming and outgoing messages, per network element.

A numeric value to indicate the current load shedding status (0 = not actively shedding load, 1 = actively shedding load).

Depends on the maximum in 'Total Trans Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time exceeds the current value.

Measurement Scope: MPE or MRA

Note: This measurement appears in the KPI Dashboard.

Transactions Processed in [0-20] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 0-20 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 0-19.

Measurement Scope: MPE or MRA

Transactions Processed in [20-40] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 20-40 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 20-39.

Measurement Scope: MPE or MRA

Transactions Processed in [40-60] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 40-60 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 40-59.

Measurement Scope: MPE or MRA

Transactions Processed in [60-80] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 60-80 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over

cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 60-79.

Measurement Scope: MPE or MRA

Transactions Processed in [80-100] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 80-100 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 80-99.

Measurement Scope: MPE or MRA

Transactions Processed in [100-120] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 100-120 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 100-119.

Measurement Scope: MPE or MRA

Transactions Processed in [120-140] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 120-140 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 120-139.

Measurement Scope: MPE or MRA

Transactions Processed in [140-160] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 140-160 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 140-159.

Measurement Scope: MPE or MRA

Transactions Processed in [160-180] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 160-180 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 160-179.

Measurement Scope: MPE or MRA

Transactions Processed in [180-200] ms

Measurement Group: Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in 180-200 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time falls in the range 180-199.

Measurement Scope: MPE or MRA

Transactions Processed in [> 200] ms

Measurement Group: Diameter Application Function (AF), Policy and Charging Enforcement Function (PCEF), Bearer Binding and Event Reporting (BBERF), Distributed Routing and Management Application (DRMA), and Shell (Sh) Stats

Measurement Type: Counter

Description: Number of transactions processed in greater than 200 ms for incoming and outgoing messages, per network element.

Depends on the Histogram Entry on 'Total Trans In Time'.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When a transaction time is 200 or greater.

Measurement Scope: MPE or MRA

KPIs about Load Shedding

Load shedding is a method of reducing excess load from a system to reduce latency.

LoadSheddingStatus

Measurement Group: KPI Stats

Measurement Type: Enum

Description: A numeric value to indicate the current load shedding status (0 = not actively shedding load, 1 = actively shedding load).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

LoadSheddingDistressCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: The number of times that load shedding has gone into a "distress" state where it was shedding load.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

LoadSheddingEfficiency

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: A value between 0 and 100 that indicates that amount of traffic that is being accepted (not shed).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

KPIs about Offered Load

Offered load refers to the traffic intensity or total load of traffic.

TransactionStartCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Number of transactions started since the last reset. This number is the total number of Gx/Gx+/Gx-Lite/SCE-Gx/Gxx/Gy CCR, and Rx AAR/STR and RADIUS accounting messages received, and Gx/Gx+/Gx-Lite /SCE-Gx/Gxx/Gy/Rx RAR and SCE-Gx/Gy/Rx ASR messages sent.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

TransactionEndCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Number of transactions completed since the last reset. This is the total number of Gx/Gx+/Gx-Lite/SCE-Gx/Gxx/Gy CCA, and Rx AAA/STA and RADIUS accounting response messages sent, and Gx/Gx+/Gx-Lite /SCE-Gx/Gxx/Gy/Rx RAA and SCE-Gx/Gy/Rx ASA messages received.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

MessagesInCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Total number of messages received (of any type).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

MessagesOutCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Total number of messages sent (of any type).

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

CurrentTransactionsPerSecond

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Number of transactions started in the last one-second interval.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

MaxTransactionsPerSecond

Measurement Group: KPI Stats

Measurement Type: Max

Description: The peak rate of transactions started. Depends on Maximum on Current Transactions Per Second

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

CurrentTPSPercentageOfCapacity

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: The number of transactions started in the last one-second interval as a percentage of the capacity of the system.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

MaxTPSPercentageOfCapacity

Measurement Group: KPI Stats

Measurement Type: Max

Description: The maximum value observed for the CurrentTPSPercentageOfCapacity. Depends on Maximum on Current TPS Percentage Of Capacity

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

KPIs about Offered Load by Traffic Type

Offered load refers to the traffic intensity or total load of traffic. Related KPI counters are described in *KPIs about Offered Load*.

CurrentLTETransactionsPerSecond

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: The number of transactions started in the last second that are establishing LTE sessions.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

CurrentEHRPDTransactionsPerSecond

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: The number of transactions started in the last second that are establishing eHRPD sessions.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

CurrentRXTransactionsPerSecond

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: The number of transactions started in the last second that are establishing Rx sessions.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE, MRA

KPIs about Quota Profile

These KPIs may be helpful for diagnosis of quota-profile issues.

Activated

Measurement Group: Quota Profile Stats

Measurement Type: Counter

Description: Tracks the number of times the specific Quota Profile was activated.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When the specified Quota Profile is activated as part of a Policy Action.

Measurement Scope: MPE

Note: This measurement appears in the KPI Dashboard.

Event Threshold Reached

Measurement Group: Quota Profile Stats

Measurement Type: Counter

Description: Tracks the number of times the configured event threshold was reached for the specific Quota Profile

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When the quota profile's Events (service-specific) Threshold (Gy only) has been reached for a subscriber and the gateway sends a report with the THRESHOLD Reporting Reason.

Measurement Scope: MPE

Note: This measurement appears in the KPI Dashboard.

Time Threshold Reached

Measurement Group: Quota Profile Stats

Measurement Type: Counter

Description: Tracks the number of times the configured time threshold limit was reached for the specific Quota Profile.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: When the quota profile's Time Threshold has been reached for a subscriber and the gateway sends a report with THRESHOLD Reporting Reason.

Measurement Scope: MPE

Note: This measurement appears in the KPI Dashboard.

Volume Threshold Reached

Measurement Group: Quota Profile Stats

Measurement Type: Counter

Description: Tracks the number of times the configured volume threshold limit was reached for the specific Quota Profile.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The subscriber's quota profile Volume Threshold has been reached.

Measurement Scope: MPE

Note: This measurement appears in the KPI Dashboard.

KPIs about RADIUS Protocol Error Messages

More information about RADIUS protocol errors can be found with these KPIs.

RADIUS_ADMINISTRATIVELY_PROHIBITED

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_INVALID_ATTRIBUTE_VALUE

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_INVALID_EAP_PACKET

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_INVALID_REQUEST

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_LOCATION_INFO_REQUIRED

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_MISSING_ATTRIBUTE

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_MULTI_SESSION_SELECTION_UNSUPPORTED

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_NAS_ID_MISMATCH

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_PROXY_PROCESSING_ERROR

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_REQUEST_INITIATED

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_REQUEST_NOT_ROUTABLE

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_RESOURCES_UNAVAILABLE

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_SESSION_CONTEXT_REMOVED

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_SESSION_NOT_REMOVEABLE

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_SESSION_NOT_FOUND

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_UNSUPPORTED_ATTRIBUTE

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_UNSUPPORTED_EXTENSION

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

RADIUS_UNSUPPORTED_SERVICE

Measurement Group: Stats

Measurement Type:

Description:

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MPE

KPIs about Active Server System Resources and Status

Information on the health of the active server. For the standby server, see *KPIs about Standby Server System Resources and Status*.

PrimaryCPUUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: CPU Utilization on the active server.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over

cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

PrimaryDiskUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Disk Utilization on the active server.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

PrimaryMemoryUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Memory Utilization on the active server.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

PrimaryServerFailureCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Failure count on active server.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

PrimaryServerStatus

Measurement Group: KPI Stats

Measurement Type: Enum

Description: Status of the active server as a numeric value. These map to the following states:

-1 = Off-Line

-2 = Unsupported Version

0 = Unknown

11 = Initializing

12 = On-Line

20 = Non-Service Affecting Failure

30 = Degraded

100 = Failed

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

PrimaryUpTimeMillis

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: System uptime on the active server in milliseconds.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

KPIs about Standby Server System Resources and Status

Information on the health of the standby server. For the active server, see *KPIs about Active Server System Resources and Status*.

SecondaryCPUUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: CPU Utilization on the standby server.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

SecondaryDiskUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Disk Utilization on the standby server.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

SecondaryMemoryUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Memory Utilization on the standby server.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

SecondaryServerFailureCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Failure count on standby server.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over

cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

SecondaryServerStatus

Measurement Group: KPI Stats

Measurement Type: Enum

Description: Status of the standby server as a numeric value. These map to the following states:

-1 = Off-Line

-2 = Unsupported Version

0 = Unknown

11 = Initializing

12 = On-Line

20 = Non-Service Affecting Failure

30 = Degraded

100 = Failed

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

SecondaryUpTimeMillis

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: System uptime on the standby server in milliseconds.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

KPIs about Server System Resources and Status

Information on the health of the physical servers in the cluster. There can be up to three servers in the cluster. For information on the active server, see *KPIs about Active Server System Resources and Status*. For information on the standby server, see *KPIs about Standby Server System Resources and Status*.

ServerACPUUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: CPU Utilization on Server A.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerADiskUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Disk Utilization on Server A.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerAMemoryUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Memory Utilization on Server A.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerABladeFailureCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Failure count of the Server A blade.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerABladeStatus

Measurement Group: KPI Stats

Measurement Type: Enum

Description: Status of the Server A blade as a numeric value. These map to the following states:

-1 = Off-Line

-2 = Unsupported Version

0 = Unknown

11 = Initializing

12 = On-Line

20 = Non-Service Affecting Failure

30 = Degraded

100 = Failed

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerAUpTimeMillis

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: System uptime on Server A in milliseconds.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerBCPUUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: CPU Utilization on Server B.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerBDiskUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Disk Utilization on Server B.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerBMemoryUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Memory Utilization on Server B.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset. If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerBBladeFailureCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Failure count of the Server B blade.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerBBladeStatus

Measurement Group: KPI Stats

Measurement Type: Enum

Description: Status of the Server B blade as a numeric value. These map to the following states:

-1 = Off-Line

-2 = Unsupported Version

0 = Unknown

11 = Initializing

12 = On-Line

20 = Non-Service Affecting Failure

30 = Degraded

100 = Failed

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerBUpTimeMillis

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: System uptime on Server B in milliseconds.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerCCPUUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: CPU Utilization on Server C.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset. If the configuration is in Interval mode, then

the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerCDiskUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Disk Utilization on Server C.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerCMemoryUtilizationPercentage

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Memory Utilization on Server C.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerCBladeFailureCount

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: Failure count of the Server C blade.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerCBladeStatus

Measurement Group: KPI Stats

Measurement Type: Enum

Description: Status of the Server C blade as a numeric value. These map to the following states:

-1 = Off-Line

-2 = Unsupported Version

0 = Unknown

11 = Initializing

12 = On-Line

20 = Non-Service Affecting Failure

30 = Degraded

100 = Failed

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

ServerCUpTimeMillis

Measurement Group: KPI Stats

Measurement Type: Gauge

Description: System uptime on Server C in milliseconds.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition:

Measurement Scope: MRA, MPE

KPIs about Session Cleanup

As sessions are aged out due to inactivity, they are marked to be removed from the system. A reauthorization is sent and if there is no response or an error indicating the session is no longer active on the network element is received, the session is removed from the system. Otherwise, the session is deemed still active and the aging process is reset.

These statistics track the various stages of the session cleanup process and include:

- Number of session ready for cleanup (aged)

- Number of sessions removed from the system (cleaned up) because the reauthorization answer (RAA) was returned with an error code
- Number of sessions for which reauthorization (RAR) timed out
- Number of sessions for which reauthorization (RAR) timed out, but the session was removed from the system (cleaned up) due to old age
- Number of sessions reauthorized (deemed still active)

Reauthorization Timeouts

Measurement Group: Session Cleanup Stats

Measurement Type: Gauge

Description: Tracks the number of sessions where reauthorization timed out.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: A RAR message sent to the gateway times out.

Measurement Scope: MPE

Reauthorized

Measurement Group: Session Cleanup Stats

Measurement Type: Gauge

Description: Tracks the number of stale sessions that were reauthorized.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: A SUCCESS message is returned by the gateway after a RAR is sent.

Measurement Scope: MPE

Removed on unknown session id

Measurement Group: Session Cleanup Stats

Measurement Type: Gauge

Description: Tracks the number of stale sessions that were deleted from the system because reauthorization failed with error response.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The gateway returned an error response for a RAR message.

Measurement Scope: MPE

Removed for Expiration

Measurement Group: Session Cleanup Stats

Measurement Type: Gauge

Description: Tracks the number of sessions where reauthorization timed out, but the sessions were deleted from the system due to their age.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: Session is being removed from the system due to its age.

Measurement Scope: MPE

Sessions Ready for Cleanup

Measurement Group: Session Cleanup Stats

Measurement Type: Gauge

Description: Tracks the number of sessions currently considered stale.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The Session Cleanup Task has started and determined the number of sessions deemed inactive for a predefined amount of time.

Measurement Scope: MPE

KPIs about Session/Database Capacity

These KPIs include information on the bandwidth allocated to Diameter, RADIUS, or PDN sessions; percentage of bandwidth in use; and the number of bindings.

Table 4: KPIs about Session/Database Capacity

Name	Description	Class	Type	Depends on	MPE or MRA*
CurrentMRA BindingCount	Current number of bindings.	KPI Stats	Gauge	NA	MRA
MaxMRABinding Count	The peak number of bindings.	KPI Stats	Max	Maximum on 'Current MRABinding Count'	MRA

Name	Description	Class	Type	Depends on	MPE or MRA*
TotalMRABinding Count	The running total of new bindings ever created. This number will never get smaller (unless there is a reset).	KPI Stats	Gauge	NA	MRA
CurrentSessionCount	Current number of Diameter and RADIUS sessions.	KPI Stats	Gauge	NA	MPE
MaxSessionCount	The peak number of Diameter and RADIUS sessions.	KPI Stats	Max	Maximum on 'Current Session Count'	MPE
CurrentSession PercentageOf Capacity	The number of Diameter and RADIUS sessions established as a percentage of the system capacity.	KPI Stats	Gauge	NA	MPE*
MaxSession PercentageOf Capacity	The maximum value observed for the CurrentSessionPercentageOf Capacity.	KPI Stats	Max	Maximum on 'Current Session Percentage Of Capacity'	MPE
CurrentPDN ConnectionCount	The current number of PDN Connections established on the system.	KPI Stats	Gauge	NA	MPE*, MRA*
MaxPDNConnection Count	The maximum value observed for the CurrentPDNConnectionCount.	KPI Stats	Max	Maximum on 'Current PDNConnection Count'	MPE, MRA
CurrentPDN Connection PercentageOf Capacity	The number of PDN Connections established as a percentage of the system capacity.	KPI Stats	Gauge	NA	MPE*, MRA*
MaxPDN Connection PercentageOf Capacity	The maximum value observed for the CurrentPDNConnectionPercentage OfCapacity	KPI Stats	Max	Maximum on 'Current PDNConnection Percentage Of Capacity'	MPE, MRA

KPIs about Traffic Profiles

Traffic profiles mapped to Policy and Charging Control (PCC) rules are available as a KPI. The following information is tracked:

- Number of times that the installation was attempted
- Number of time that the profile was removed by the PCRF
- Number of times that there was an error because of failed installation or removal by the gateway

Failed or Removed by Gateway

Measurement Group: Traffic Profile Stats

Measurement Type: Counter

Description: Tracks the number of times that a specific Traffic Profile failed to be installed on the gateway, and the number of times the gateway removed a rule without being directed to by the PCRF. This covers all instances where the gateway sends a Rule Report with status INACTIVE for a specific Traffic Profile.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: A Rule-Report is received with status INACTIVE for a specific rule.

Measurement Scope: MPE

Installed Attempt

Measurement Group: Traffic Profile Stats

Measurement Type: Counter

Description: Tracks the number of times the PCRF attempted to install a specific Traffic Profile.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: The specified rule is included in the Charging-Rule-Install AVP.

Measurement Scope: MPE

Removed by PCRF

Measurement Group: Traffic Profile Stats

Measurement Type: Counter

Description: Tracks the number of times the PCRF initiated the removal of a specific Traffic Profile.

Collection Interval: If the Stats Reset Configuration is in Manual mode, the counter represents the number of occurrences since the statistics were last reset (or since the currently active server took over

cluster processing). If the configuration is in Interval mode, then the counters represent the number of occurrences in the last 15 minutes (default), or the configured period.

Peg Condition: A Remove Rule Report is sent by the PCRF for the specified rule.

Measurement Scope: MPE

KPI Dashboard

The KPI Dashboard provides a multi-site system-level summary of performance and operational health indicators in the CMP web-based GUI. The display includes indicators for:

- Offered load (transaction rate)
- System capacity (counters for active sessions)
- Inter-system connectivity
- Physical resource utilization (memory, CPU)
- System status
- Alarms
- Protocol errors

The KPI dashboard displays the indicators for all the systems on a single page. *Figure 1: KPI Dashboard when MRA Devices are Managed by CMP System* shows the dashboard when the MRA devices are managed by the CMP system. Each MRA device and any associated MPE devices are grouped under the MRA name. MPE devices that are not associated with an MRA device are displayed under **All Isolated MPEs**.

Note: If all MPE devices are associated with an MRA device, then the **All Isolated MPEs** section is not displayed.

An example of the KPI dashboard when MRA devices are not managed by the CMP system is shown in *Figure 2: KPI Dashboard when MRA Devices are not Managed by CMP System*.

KPI Dashboard (Stats Reset: Interval / Last Refresh :05/01/2013 16:01:15)

Show mra17-58 ☑
Show All Isolated MPEs ☑

Change Thresholds

mra17-58	Performance						Connections			Alarms			Protocol Errors	
MRA	State	TPS	PDN	Active Subscribers	CPU %	Memory %	MPE	MRA	Network Elements	Critical	Major	Minor	Sent	Received
mra17-58(Server-A)	Active	19 (0%)	3000 (0%)	3000 (0%)	9	54	2 of 2	0 of 0	1 of 4	0	0	0	0	0
mra17-58(Server-B)	Standby				8	55								
MPE	State	TPS	PDN	Active Sessions	CPU %	Memory %	MRA	HSS		Critical	Major	Minor	Sent	Received
mpe17-54(Server-A)	Active	19 (0%)	3000 (0%)	3000 (0%)	9	81	1 of 1	0 of 0		0	0	0	0	0
mpe17-54(Server-B)	Standby				8	64								
mpe17-62(Server-A)	Active (logging)	0 (0%)	2 (0%)	3 (0%)	6	59	1 of 1	0 of 0		0	0	0	0	0

All Isolated MPEs	Performance						Connections			Alarms			Protocol Errors	
MPE	State	TPS	PDN	Active Sessions	CPU %	Memory %	MRA	HSS		Critical	Major	Minor	Sent	Received
mpe17-36(Server-A)	Active	9 (0%)	1 (0%)	1517 (0%)	10	103	1 of 1	0 of 0		1	0	2	0	0
mpe17-36(Server-B)	Standby				10	85								
mpe17-79(Server-A)	Active	7 (0%)	1500 (0%)	1500 (0%)	9	95	1 of 1	0 of 0		1	0	0	0	0

Figure 1: KPI Dashboard when MRA Devices are Managed by CMP System

Name	Performance					Connections		Alarms			Protocol Errors	
MPE	State	TPS	Sessions	CPU %	Memory %	SPR	Network Elements	Critical	Major	Minor	Sent	Received
MPE93(Server-A)	Active	0 (0%)	1 (0%)	16	67	1 of 1	0 of 3	0	0	1	27	74
MPE	State	TPS	Sessions	CPU %	Memory %	SPR	Network Elements	Critical	Major	Minor	Sent	Received
MPE99(Server-A)	Active	0 (0%)	0 (0%)	16	62	0 of 0	0 of 3	0	0	3	0	4

Figure 2: KPI Dashboard when MRA Devices are not Managed by CMP System

The headings for each table and how those headings are mapped to KPI statistics are shown in *Mapping Display to KPIs*.

For both versions of the KPI dashboard, each row within a table represents a single system. The table cells are rendered using a color scheme to highlight areas of concern that is well adopted by the telecommunication industry. The table contents are periodically refreshed every 10 seconds; this time period is not configurable. The color changing thresholds are user configurable.

In the top right corner there is a Change Thresholds button that allows you to change threshold settings used to determine cell coloring (discussed below). When MRA devices are managed by the CMP system, a button on the top left corner lists each of the MRA devices with a checkbox that allows the user to enable/disable the table for that MRA device.

Each MRA or MPE system has three rows in the table. The first row displays information for the active server, Server A, in the cluster. The second row displays information for the standby server, Server B, in the cluster, if present. And the third row displays information for the spare server, Server C, if present. If any of these are set to Reverse Site Preference, then an "R" will appear by the server's State. Several of the KPI columns are not populated for the standby or spare server (since the server is not active). The only columns that contain data are: Status, CPU%, and Memory%. For Connections, Alarms, and Protocol Errors, the column's information is a hyperlink that will open a more detailed report.

If a monitored system is unreachable, or if the data is unavailable for some reason, then the status is set to "Off-line" and the values in all the associated columns is cleared. In this situation, the entire row is displayed with the error color (red). If a monitored system does not support KPI retrieval then the status is set to "N/A" and the values in all the associated columns are cleared. No coloring is applied.

The columns that display information in the form of X (Y%) (e.g. "TPS" and "PDN Connections"/"Sessions") correspond to the following: X represents the actual numeric value and Y represents the % of rated system capacity that is consumed.

The columns that display connection counts are displayed in the form "X of Y" where X is the current number of connections and Y is the configured number of connections. When X and Y are not the same, the column uses the warning color to indicate a connectivity issue, unless X is 0, in which case the error color is displayed.

The Alarm and Protocol Errors columns display the number of current events. If there are any Critical or Major alarms, then these cells will be colored red or yellow, respectively.

Note: To learn more about an alarm and how to resolve it, see the *Policy Management Troubleshooting Guide* for this release.

Click on the name of an MPE or MRA device to display detailed statistics. For more information on detailed device statistics, see the description on the Reports tab for the device.

Mapping Display to KPIs

The following tables explain how each of the columns in the KPI dashboard are mapped to a specific statistic in the KPI statistics. On the initial KPI Dashboard window, KPIs for each MRA and MPE device are shown. Since the tables contain row entries for the active, standby and spare servers (if georedundancy is configured), the mapping is described for all three servers. *Table 5: KPI Definitions for MRA Devices* shows the mappings for MRA devices; *Table 6: KPI Definitions for MPE Devices when MRA Devices are Managed by CMP System* shows the mappings for MPE devices when the MRA devices are managed by the CMP system; and *Table 7: KPI Definitions for MPE Devices when MRA Devices are not Managed by CMP System* shows the mappings for MPE devices when the MRA devices are not managed by the CMP system.

Table 5: KPI Definitions for MRA Devices

KPI Dashboard Column	Mapping to Statistics	
	Active server	**Standby and spare server (spare only shows Status, CPU % and Memory%)**
Name	Not derived from statistics.	Not derived from statistics.
State	Label representation of the PrimaryServerStatus	Label representation of the SecondaryServerStatus
TPS	CurrentTransactionsPerSecond and CurrentTPSPercentageOfCapacity	None
PDN	CurrentPDNConnectionCount and CurrentPDNConnectionPercentageOf Capacity	None
Active Subscribers	CurrentMRABindingCount and CurrentMRABindingPercentageOfCapacity	None
CPU %	PrimaryCPUUtilizationPercentage	SecondaryCPUUtilizationPercentage
Memory %	PrimaryMemoryUtilizationPercentage	SecondaryMemoryUtilizationPercentage
MPE Connections	A value in the form "X of Y", where: X is CurrentMPEConnectionCount Y is ConfiguredMPEConnectionCount	None
MRA Connections	A value in the form "X of Y", where: X is CurrentMRAConnectionCount Y is ConfiguredMRAConnectionCount	None

KPI Dashboard Column	Mapping to Statistics	
Network Element Connections	A value in the form "X of Y", where: X is CurrentConnectedNECount Y is ConfiguredNECount	None
Critical Alarms	Not derived from statistics	Not derived from statistics
Major Alarms	Not derived from statistics	Not derived from statistics
Minor Alarms	Not derived from statistics	Not derived from statistics
Protocol Errors Sent	CurrentProtocolErrorSentCount	None
Protocol Errors Received	CurrentProtocolErrorReceivedCount	None

Table 6: KPI Definitions for MPE Devices when MRA Devices are Managed by CMP System

KPI Dashboard Column	Mapping to Statistics	
	Active server	**Standby server**
Name	Not derived from statistics.	Not derived from statistics.
State	Label representation of the PrimaryServerStatus	Label representation of the SecondaryServerStatus
TPS	CurrentTransactionsPerSecond and CurrentTPSPercentageOfCapacity	None
PDN	CurrentPDNConnectionCount and CurrentPDNConnectionPercentageOf Capacity	None
Active Sessions	CurrentSessionCount and CurrentSessionPercentageOfCapacity	None
CPU %	PrimaryCPUUtilizationPercentage	SecondaryCPUUtilizationPercentage
Memory %	PrimaryMemoryUtilizationPercentage	SecondaryMemoryUtilizationPercentage
MRA Connections	A value in the form "X of Y", where: X is CurrentMRAConnectionCount	None

KPI Dashboard Column	Mapping to Statistics	
	Y is ConfiguredMRAConnectionCount	
HSS Connections	A value in the form "X of Y", where: X is CurrentSPRConnectionCount Y is ConfiguredSPRConnectionCount	None
Critical Alarms	Not derived from statistics	Not derived from statistics
Major Alarms	Not derived from statistics	Not derived from statistics
Minor Alarms	Not derived from statistics	Not derived from statistics
Protocol Errors Sent	CurrentProtocolErrorSentCount	None
Protocol Errors Received	CurrentProtocolErrorReceivedCount	None

Table 7: KPI Definitions for MPE Devices when MRA Devices are not Managed by CMP System

KPI Dashboard Column	Mapping to Statistics	
	Active server	**Standby server**
Name	Not derived from statistics.	Not derived from statistics.
State	Label representation of the PrimaryServerStatus	Label representation of the SecondaryServerStatus
TPS	CurrentTransactionsPerSecond and CurrentTPSPercentageOfCapacity	None
Sessions	CurrentSessionCount and CurrentSessionPercentageOfCapacity	None
CPU %	PrimaryCPUUtilizationPercentage	SecondaryCPUUtilizationPercentage
Memory %	PrimaryMemoryUtilizationPercentage	SecondaryMemoryUtilizationPercentage
SPR	A value in the form "X of Y", where: X is CurrentSPRConnectionCount Y is ConfiguredSPRConnectionCount	None

KPI Dashboard Column	Mapping to Statistics	
Network Element	A value in the form "X of Y", where: X is CurrentConnectedNECount	None
Critical Alarms	Not derived from statistics	Not derived from statistics
Major Alarms	Not derived from statistics	Not derived from statistics
Minor Alarms	Not derived from statistics	Not derived from statistics
Protocol Errors Sent	CurrentProtocolErrorSentCount	None
Protocol Errors Received	CurrentProtocolErrorReceivedCount	None

Clicking on an MRA or MPE name opens the Reports tab. See the Reports tab for the device for details on reports.

Color Threshold Configuration

The Color Threshold Configuration popup window is brought up when you click the **Change Thresholds** button, located in the top right corner of the KPI Dashboard.

The values displayed in the dialog boxes are the current settings. The user can modify the values and click **Save** to put the new values into effect. The values is saved so the next time the dashboard is opened it uses the same values.

Note: Saving the thresholds affects other users that may be viewing the dashboard at the same time.

The **Cancel** button closes the popup dialog without any changes to the KPI dashboard display. The **Reset** button restores the values to their defaults. The TPS and session limits for the Policy Management device will be set to the officially supported rates for the current software release.

SNMP-Based KPI Values

SNMP-based KPI values are system resources.

Memory

The memory values in CAMIANT-MIB are percentages; the values in UCD-SNMP-MIB are raw counters.

Table 8: Tekelec Memory Values

MIB	Object ID	Name	Description
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.3	memTotalSwap	Total memory swap space on the host.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.4	memAvailSwap	Available memory swap space on the host; compare against memTotalSwap.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.5	memTotalReal	Total physical memory space on the host.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.6	memAvailReal	Available physical memory space on the host; compare against memTotalReal.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.100	memSwapError	Error flag; 1 indicates very little swap space left.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.101	memSwapErrorMsg	Message text for memSwapError.

Disk Space

The disk space value gives a percentage value for each partition used by the system (eight total).

Table 9: Disk Space Values

MIB	Object ID	Name	Description
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.9.1.9	dskPercent	Percentage of space used on the disk

CPU

The CPU values in CAMIANT-MIB are percentages; the values in UCD-SNMP-MIB are raw counters.

Table 10: CPU Values

MIB	Object ID	Name	Description
HOST-RESOURCES-MIB	1.3.6.1.2.1.25.3.3.1.2	hrProcessorLoad	Processor utilization for each processor in server (four total).

SNMP-Based Key Operational Measurements

SNMP-based OM values are system resources.

Platform Performance

The values presented in the SNMP response are a snapshot at the time of the query.

Table 11: SNMP Response Values

MIB	Object ID	Name	Description
IF-MIB	.1.3.6.1.2.1.2.2.1.5	ifSpeed	Used to determine the percentage utilization.
IF-MIB	.1.3.6.1.2.1.2.2.1.10	ifInOctets	Used to determine utilization.
IF-MIB	.1.3.6.1.2.1.2.2.1.13	ifInDiscards	Can be an indicator of congestion.
IF-MIB	.1.3.6.1.2.1.2.2.1.16	ifOutOctets	Used to determine utilization.
IF-MIB	.1.3.6.1.2.1.2.2.1.19	ifOutDiscards	Can be an indicator of congestion.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.100	memSwapError	Error flag; 1 indicates very little swap space left.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.6	memAvailReal	Available physical memory space on the host.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.5	memTotalReal	Total real/physical memory size on the host.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.3	memTotalSwap	Total swap size configured on host.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.4.4	memAvailSwap	Available swap size on host.

MIB	Object ID	Name	Description
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.9.1.9	dskPercent	Percentage of space used on the disk.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.11.3	ssSwapIn	Amount of memory swapped in from disk (KB/s).
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.11.4	ssSwapOut	Amount of memory swapped to disk (KB/s).
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.11.50	ssCpuRawUser	Total CPU usage by application run by non-privileged user since the system booted.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.11.51	ssCpuRawNice	Total CPU usage by applications running at a non-default priority level.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.11.52	ssCpuRawSystem	Total CPU usage by applications run by privileged system processes since the system booted.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.11.53	ssCpuRawIdle	The percentage of time the CPU is running idle. Subtract this value from 100 to get a good approximation of total CPU Usage.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.11.55	ssCpuRawKernel	Kernel CPU time.
UCD-SNMP-MIB	.1.3.6.1.4.1.2021.11.61	ssCpuRawSoftIRQ	Soft IRQ CPU time.
HOST-RESOURCES-	.1.3.6.1.2.1.25.4.2.1.1	hrSWRunIndex	Unique value for each piece of software running on the server (returns all PID values).
HOST-RESOURCES-MIB	.1.3.6.1.2.1.25.5.1.1.2	hrSWRunPerfMem	The total amount of real system memory allocated to a specific process. This is broken down per PID and is expressed in KB.
HOST-RESOURCES-MIB	.1.3.6.1.2.1.25.3.3.1.2	hrProcessorLoad	The average, over the last minute, of the percentage of time that this processor was not idle. Implementations

MIB	Object ID	Name	Description
			may approximate this one-minute smoothing period if necessary.