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MTAS Signaling Traffic Performance Indicators

Abstract

This document covers MTAS signaling traffic performance indicators intended for PM reports supporting IMS.

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1 Revision history

Rev.	Date	Responsible	Description
A	2017-04-10	EVARAKS	Aligned document according to IMCN Signaling Traffic Performance Indicators 2/154 43-HSC 113 10 Rev D1
B	2017-06-20	EIHAANT	Document updated according to TR HV89213 due to contradiction with FS Licensing in MTAS 49/155 17-AVA 901 18 Rev F1
C	2017-12-20	EALENDM	Updated 4.1.1 section for vMTAS1.9
D	2018-03-29	EALENDM	Updated description for MtasSipSummary Counters Updated counter's description in section 4.1.1 for vMTAS 1.10 for the following counters: MtasMmtOrigNetworkSuccessSessionEstablish MtasMmtOrigUnregNetworkSuccessSessionEstablish MtasMmtTermNetworkSuccessSessionEstablish MtasMmtTermUnregNetworkSuccessSessionEstablish

2 Introduction

2.1 Purpose

This document defines performance measures and formulas (KPI:s and PI:s) mainly for signaling traffic, based on available counters in MTAS with the intention to support the making of PM reports for IMS performance management.

2.2 Scope

Performance management is the process to produce, transfer, collect, store and present data, which can be used to verify the physical and logical configuration of the network and to locate potential problems as early as possible. The performance indicators specified in this document has the purpose to enable verification of the applied signalling traffic model in the deployed network, supervise the resource utilization and capacity indicators.

The following performance management areas are supported:

- Performance Indicators.Resource utilization; CPU, Memory and Disk utilization

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- Signaling traffic; Signaling traffic performance indicators and formulas are reported to support the dimensioning process, according to the Ericsson default traffic model for IMS

This document covers Multi Media Telephony (MMTel) services.

2.3 General information

2.3.1 Formula naming

General information about formulas, for example:

Equation 1. IMS Registration Set-up Success Ratio

$$IMSRegSetupSuccRatio = \frac{cscfAcceptedRegistrations}{cscfAcceptedRegistrations + cscfRejectedRegistrations}$$

Equation name, in this case IMS Registration Set-up Success Ratio, is used as label for the in KPI presentation and therefore needs to be unique.

The formula end result, in this case *IMSRegSetupSuccRatio* is not presented and used as placeholder in the formula.

2.3.2 Service and node availability

The accessibility formulas in this document cover the accessibility of a system service as such. If the complete accessibility with the node availability is considered, then the system service accessibility shall be multiplied with the availability of the node.

Example:

$$IMSRegSuccRatio_{Total} = IMSRegSuccRatio * nodeAvailability$$

2.3.3 Aggregation on system level

The node measurements are delivered on a per node basis. The performance indicators have an interest both on node level and system level. It is not stated in the formulas whether they cover node or system level, it is an assumption that both levels are available in a PM report package.

2.3.4 Trend analysis

The performance indicators and formulas specified in this document are mainly intended for trend analysis. Due to the nature of the the subnetwork manager performance manager application collection, storage and presentation mechanisms, real time graphs are not supported.

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2.3.5 Busy hour performance indicators

The busy hour performance indicators are calculated from measurements reported per granularity period over a one hour sliding window, obtaining the busy hour values. The busy hour calculation is not indicated in the formulas, it is assumed to be a generic function of the subnetwork manager performance manager application.

2.3.6 General for formulas on intensities

In this document, formulas on intensities, meaning events per time unit are generally expressed as events per second or in some few cases, events per hour. A reporting tool may select any time resolution, where events per second and events per hour are the most prioritized.

2.3.7 Formula and measurement names and the formula editor

The formula editor used for this document uses presentation conventions in formula and measurement names that introduce possible confusions. Reserved function names, for example $\tan()$, Re is presented with a specific format also for formula and measurement names. These function presentations shall be neglected. Example, the formula name IMSRegSuccRatio is presented as *IMS Re gSuccRatio*. The intended formula name is IMSRegSuccRatio.

3 Dimensioning

This chapter specifies the performance indicators in vMTAS.

3.1 MTAS Capacity

KPIs defined in this section provide an indication of capacity from dimensioning aspect.

3.1.1 Formula

Equation 1. IMS MTAS Sessions

$$\text{IMSMTASActiveUsers} = \text{MtasFuncOngoingSess}$$

IMSMTASActiveUsers is the current number of active users on node level. This formula can only be used as an indication of the MTAS active users over time. The MTAS active user capacity license cannot be supervised since it is per user according to definition "A user that has received or initiated a session at least once, during one calendar month."

Equation 2. IMS MTAS Sessions in Busy Hour

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IMSMTASSessBusyHour =

$$\frac{\sum_{i=1}^n \text{MtasFuncOngoingMmtSessAvg}}{n}$$

n = The number of measurement values in one hour.

IMSMTASSessBusyHour is the current number of simultaneous MMTel service sessions (half calls) on node level. IMSMTASSessBusyHour is calculated from the sum of answered (by 200 OK) session setup reported per granularity period over a one hour sliding window, obtaining the busy hour value, see also section 2.3.4, Busy hour performance indicators.

Equation 3. IMS MTAS Mobile Service Sessions in Busy Hour

IMSMTASMobileSessBusyHour =

$$\frac{\sum_{i=1}^n \text{MtasFuncOngoingMobileSessAvg}}{n}$$

n = The number of measurement values in one hour.

IMSMTASMobileSessBusyHour is the current number of simultaneous mobile service sessions (half calls) on node level. IMSMTASMobileSessBusyHour is calculated from the sum of answered (by 200 OK) session setup reported per granularity period over a one hour sliding window, obtaining the busy hour value, see also section 2.3.4, Busy hour performance indicators.

Equation 4. IMS ST AS SIP Trunking Sessions in Busy Hour

IMSSTASSipTrunkingSessBusyHour =

$$\frac{\sum_{i=1}^n \text{MtasStCurrentSessions}}{n}$$

n = The number of measurement values in one hour.

IMSSTASSipTrunkingSessBusyHour is the current number of simultaneous SIP Trunking sessions on node level. IMSSTASSipTrunkingSessBusyHour is calculated from the sum of answered (by 200 OK) session setup reported per granularity period over a one hour sliding window, obtaining the busy hour value, see also section 2.3.4, Busy hour performance indicators..

Equation 5. IMS Conference AS Conference Participants in Busy Hour

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IMSConfASConfParticipantsBusyHour =

$$\frac{\sum_{i=1}^n \text{MtasConfSchedParticipants}}{n}$$

n = The number of measurement values in one hour.

IMSConfASConfParticipantsBusyHour contains the number of conference participants currently active in a scheduled conference session. *IMSConfASConfParticipantsBusyHour* is calculated from the sum of conference participants reported per granularity period over a one hour sliding window, obtaining the busy hour value, see also section 2.3.4, Busy hour performance indicators.

Counter Name	Definition
MtasFuncOngoingSess	The current number of active users on node level. Counter on MTAS node.
MtasFuncOngoingMmtSessAvg	The average number of simultaneous Mmt Services sessions (half calls) on node level. Counter on MTAS node.
MtasFuncOngoingMobileSessAvg	The average number of simultaneous Mobile Services sessions (half calls) on node level. Counter on MTAS node.
MtasStCurrentSessions	Gauge for current number of sessions in ST AS. Both initiated and established sessions are included. The counter reflects the measure controlled by the ST AS session capacity license. The Gauge is incremented by 1 when a PBX originating or terminating call session is initiated and decremented by 1 when the call session is terminated. Counter on MTAS node.
MtasConfSchedParticipants	The total number of conference participants currently active in a scheduled conference session. Updated whenever a participant joins/leaves the conference. The counter does not take into account media connectivity status of the participant. A participant is considered active as long as an established SIP dialog exists. Counter on MTAS node.

Reference [1].

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4 Signaling Traffic Performance Indicators

This chapter covers signaling traffic Performance Indicators supporting the dimensioning and capacity planning of the IMS. Signaling traffic Performance Indicators are listed at node level. The formulas in this chapter are all assumed to be reported per busy hour.

4.1 MTAS

Performance indicators at MTAS node level supporting the dimensioning and capacity planning of the MTAS node. The MMTel signalling traffic model is used for the selection of performance indicators. This chapter is structured according to two sections; the MMTel Use Cases and MMTel Interface Summary, where the protocol level is covered.

4.1.1 MTAS Mean Holding Time

Equation 6. IMS MMTel AS Originating Active Session Duration [Seconds]

$$IMSMMTelASOrigSessionDuration[S] = \frac{(MtasMmtOrigCommDuration + MtasMmtOrigUnregCommDuration)}{(MtasMmtInitOrigSessOk + MtasMmtInitOrigUnregSessOk)}$$

IMSMMTelASOrigSessionDuration is the mean session time duration in seconds for originating registered and unregistered sessions measured in MMTelAS. The mean duration includes the active duration of call, that is, session setup phase is not included. The duration may be calculated per CSCF or for the MMTelAS node.

Equation 7. IMS MMTel AS Terminating Active Session Duration [Seconds]

$$IMSMMTelASTermSessionDuration[S] = \frac{(MtasMmtTermCommDuration + MtasMmtTermUnregCommDuration)}{(MtasMmtInitTermSessOk + MtasMmtInitTermUnregSessOk)}$$

IMSMMTelASTermSessionDuration is the mean session time duration in seconds for terminating registered and unregistered sessions measured in MTAS. The mean duration includes the active duration of call, that is, session setup phase is not included. The duration may be calculated per CSCF or for the MTAS node.

Equation 8. IMS MMTel AS Originating Session Duration [Seconds]

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$$\begin{aligned}
 &IMSMMTelASOrigSessionDuration[S] = \\
 &\frac{(MtasMmtOrigCommDurationInitial + MtasMmtOrigUnregCommDurationInitial)}{\sum_{\substack{respCode=20n \\ respCode=18m}} (MtasMmtOrigNetworkSuccessSessionEstablish + \\
 &\quad MtasMmtOrigUnregNetworkSuccessSessionEstablish)} + \\
 &\frac{(MtasMmtOrigSessEarlyCancel + MtasMmtOrigUnregSessEarlyCancel + \\
 &\quad \sum_{\substack{Cscf=n \\ Cscf=1}} MtasMmtOrigFailedAttempt + MtasMmtOrigUnregFailedAttempt + \\
 &\quad MtasMmtInitOrigSessNokI + MtasMmtInitOrigUnregSessNokI)}{Cscf=n}
 \end{aligned}$$

$IMSMMTelASOrigSessionDuration$ is the mean session time duration in seconds for originating registered and unregistered sessions measured in MMTelAS. The mean duration includes session setup and duration of call. The duration may be calculated per CSCF or for the MMTelAS node.

Equation 9. IMS MMTel AS Terminating Session Duration [Seconds]

$$\begin{aligned}
 &IMSMMTelASTermSessionDuration[S] = \\
 &\frac{(MtasMmtTermCommDurationInitial + MtasMmtTermUnregCommDurationInitial)}{\sum_{\substack{respCode=20n \\ respCode=18m}} (MtasMmtTermNetworkSuccessSessionEstablish + \\
 &\quad MtasMmtTermUnregNetworkSuccessSessionEstablish)} + \\
 &\frac{(MtasMmtTermSessEarlyCancel + MtasMmtTermUnregSessEarlyCancel + \\
 &\quad \sum_{\substack{Cscf=n \\ Cscf=1}} MtasMmtTermFailedAttempt + MtasMmtTermUnregFailedAttempt + \\
 &\quad MtasMmtInitTermSessNokI + MtasMmtInitTermUnregSessNokI)}{Cscf=n}
 \end{aligned}$$

$IMSMMTelASTermSessionDuration$ is the mean session time duration in seconds for terminating registered and unregistered sessions measured in MTAS. The mean duration includes session setup and duration of call. The duration may be calculated per CSCF or for the MTAS node.

Equation 10. IMS MMTel AS Mean Holding Time [Seconds]

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$$\begin{aligned}
 IMSMMTelASMeanHoldingTime[S] = & \\
 & (MtasMmtOrigCommDurationInitial + \\
 & \sum_{Cscf=1}^{Cscf=n} MtasMmtOrigUnregCommDurationInitial + \\
 & \sum_{Cscf=1}^{Cscf=n} MtasMmtTermCommDurationInitial + \\
 & MtasMmtTermUnregCommDurationInitial) \\
 & (MtasMmtOrigNetworkSuccessSessionEstablish + \\
 & \sum_{respCode=18m}^{respCode=20n} MtasMmtOrigUnregNetworkSuccessSessionEstablish + \\
 & \sum_{respCode=18m}^{respCode=20n} MtasMmtTermNetworkSuccessSessionEstablish + \\
 & MtasMmtTermUnregNetworkSuccessSessionEstablish) \\
 & (MtasMmtOrigSessEarlyCancel + MtasMmtOrigUnregSessEarlyCancel + \\
 & MtasMmtTermSessEarlyCancel + MtasMmtTermUnregSessEarlyCancel + \\
 & \sum_{Cscf=1}^{Cscf=n} MtasMmtOrigFailedAttempt + MtasMmtOrigUnregFailedAttempt + \\
 & \sum_{Cscf=1}^{Cscf=n} MtasMmtTermFailedAttempt + MtasMmtTermUnregFailedAttempt + \\
 & MtasMmtInitOrigSessNokI + MtasMmtInitOrigUnregSessNokI + \\
 & MtasMmtInitTermSessNokI + MtasMmtInitTermUnregSessNokI)
 \end{aligned}$$

IMSMMTelASMeanHoldingTime is the mean session time duration in seconds for originating registered and unregistered sessions measured in MTAS. The mean holding time includes session setup and duration of call. The mean holding time is calculated for the MTAS node, that is all CSCFs.

Equation 11. IMS MMTel AS Originating Service Duration [Seconds]

$$\begin{aligned}
 IMSMMTelASOrigServiceDuration[S] = & \\
 & (MtasMmtOrigServiceDuration + MtasMmtOrigUnregServiceDuration) \\
 & (MtasMmtInitOrigSessOk + MtasMmtInitOrigUnregSessOk)
 \end{aligned}$$

IMSMMTelASOrigServiceDuration is the mean service time duration in seconds for originating registered and unregistered sessions measured in MMTelAS. Service time is the time elapsed for execution of all originating services configured for particular user. The duration may be calculated per CSCF or for the MMTelAS node.

Equation 12. IMS MMTel AS Terminating Service Duration [Seconds]

$$\begin{aligned}
 IMSMMTelASTermServiceDuration[S] = & \\
 & (MtasMmtTermServiceDuration + MtasMmtTermUnregServiceDuration) \\
 & (MtasMmtInitTermSessOk + MtasMmtInitTermUnregSessOk)
 \end{aligned}$$

IMSMMTelASTermServiceDuration is the mean service time duration in seconds for terminating registered and unregistered sessions measured in MTAS. Service time is the time elapsed for execution of all terminating services configured for particular user. The duration may be calculated per CSCF or for the MTAS node.

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Equation 13. IMS MMTel AS Originating Alerting Session Duration [Seconds]

$$IMSMMTelASOrigAlertSessionDuration[S] = \frac{(MtasMmtOrigCommDurationAlert + MtasMmtOrigUnregCommDurationAlert) + \sum_{\substack{respCode=20n \\ respCode=18m}} (MtasMmtOrigNetworkSuccessSessionEstablish + MtasMmtOrigUnregNetworkSuccessSessionEstablish)}{T * 1000}$$

IMSMMTelASOrigAlertSessionDuration is the mean alerting session time duration in seconds for originating registered and unregistered sessions measured in MMTelAS. Alerting session time is the time elapsed from when MMTel AS sends 180 or 200 if no 180 (for initial INVITE), until final negative response or established session released (BYE). The duration may be calculated per CSCF or for the MMTelAS node.

Equation 14. IMS MMTel AS Terminating Alerting Session Duration [Seconds]

$$IMSMMTelASTermAlertSessionDuration[S] = \frac{(MtasMmtTermCommDurationAlert + MtasMmtTermUnregCommDurationAlert) + \sum_{\substack{respCode=20n \\ respCode=18m}} (MtasMmtTermNetworkSuccessSessionEstablish + MtasMmtTermUnregNetworkSuccessSessionEstablish)}{T * 1000}$$

IMSMMTelASTermAlertSessionDuration is the mean alerting session time duration in seconds for terminating registered and unregistered sessions measured in MTAS. Alerting session time is the time elapsed from when MMTel AS sends 180 or 200 if no 180 (for initial INVITE), until final negative response or established session released (BYE). The duration may be calculated per CSCF or for the MTAS node.

Equation 15. IMS MMTel AS Carried Load [kErlang]

$$IMSMMTelASCarriedLoad[kErlang] = \frac{(MtasMmtOrigCommDurationInitial + \sum_1^n MtasMmtTermCommDurationInitial + MtasMmtOrigUnregCommDurationInitial + MtasMmtTermUnregCommDurationInitial)}{T * 1000}$$

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IMSMMTelASCarriedLoad is the MTAS load in kilo Erlang over a period of time e.g. one hour. IMSMMTelASCarriedLoad covers the total session duration, that is, session setup, answering and session completion. The accumulated call time is added for the period of time in seconds and divided with the period of time in seconds. Note that this formula is using the half call model, for one end-to-end session, time for one originating and one terminating session is counted. The formula covers IMS to IMS sessions and IMS to PSTN/PLMN breakin/breakout sessions. Transit sessions are not covered.

Unit is kilo Erlang(kErlang), which is a practical unit for a node.

Equation 16. IMS MMTel AS Mean Originating Parlay-X Session Duration

$$IMSMMTelASMeanOrgParlaySessionDuration[S] = \frac{\sum_{CSCF1}^{CSCFn} MtasPxOrigCommDuration}{\sum_{rspCode=18m}^{rspCode=20n} (MtasPxOrigAsSuccessSessionEstablish + MtasPxOrigNetworkSuccessSessionEstablish)}$$

Equation 17. IMS MMTel AS Mean Terminating Parlay-X Session Duration

$$IMSMMTelASMeanTermParlaySessionDuration[S] = \frac{\sum_{CSCF1}^{CSCFn} MtasPxTermCommDuration}{\sum_{rspCode=18m}^{rspCode=20n} (MtasPxTermAsSuccessSessionEstablish + MtasPxTermNetworkSuccessSessionEstablish)}$$

Note: The two Parlay-X session duration formulas are approximate, since session established (180 or 200 response) counters are used. Pure session answered (200 response) counters should be used but are not available.

Equation 18. IMS MMTel AS Mean Conference Time

$$IMSMMTelASMeanConfTime[S] = \frac{\sum_{CSCF1}^{CSCFn} MtasConfCommDuration}{MtasConfActiveConferences}$$

IMSMMTelASMeanConfTime is the mean conference time per active conference.

Equation 19. IMS MMTel AS Mean Conference Time per Participant

$$IMSMMTelASConfTimePerParticipants[S] = \frac{\sum_{CSCF1}^{CSCFn} MtasConfCommDuration}{MtasConfParticipants}$$

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IMSMMTelASConfTimePerParticipant is the mean conference time per conference participant.

Equation 20. IMS MMTel AS Mean Third Party Call Time

$$IMSMMTelASMean3PtyCallTime[S] = \frac{\sum_{CSCF1}^{CSCFn} Mtas3ptyCommDuration}{Mtas3ptyCreationOk}$$

IMSMMTelASMean3PtyCallTime is the mean call time per third party call.

Counter Name	Definition
MtasMmtOrigCommDuration	Total time from the time when an Originating call has received 200 (INVITE) message to the time when the call has been ended (BYE has been received). Total communication duration time for originating calls. The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtTermCommDuration	Total time from the time when Terminating calls has received 200 (INVITE) message to the time when the calls has been ended (BYE has been received). Total communication duration time for terminating calls. The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtOrigUnregCommDuration	Total time from the time when Originating Unregistered calls has received 200 (INVITE) message to the time when the calls has been ended (BYE has been received). Total communication duration time for terminating unregistered calls. The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtTermUnregCommDuration	Total time from the time when Terminating Unregistered calls has received 200 (INVITE) message to the time when the calls has been ended (BYE has been received). Total communication duration time for terminating unregistered calls. The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtOrigCommDurationInitial	Total call duration of initial calls for originating calls. Starts when originating MMTel AS has received INVITE message, stops on final negative response or established session released (BYE). The CSCF IP address is used as key. Counter on MTAS node.

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MtasMmtTermCommDurationInitial	Total call duration of initial calls for terminating calls. Starts when terminating MMTEL AS sends 180 or 200 if no 180 (for initial terminating INVITE), stops on final negative response or established session released (BYE). The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtOrigUnregCommDurationInitial	Total call duration of initial calls for originating unregistered calls. Starts when originating MMTEL AS sends 180 or 200 if no 180 (for initial originating unregistered INVITE), stops on final negative response or established session released (BYE). The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtTermUnregCommDurationInit	Total call duration of initial calls for terminating unregistered calls. Starts when terminating MMTEL AS sends 180 or 200 if no 180 (for initial terminating unregistered INVITE), stops on final negative response or established session released (BYE). The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtOrigServiceDuration	Total time from the time when an Originating call has received initial INVITE message to the time when all set of originating services has been executed and either the INVITE is passed to outgoing dialog or is responded on incoming dialog. The CSCF IP address is used as key. The counter is incremented with the time taken for execution of all originating services configured for particular user. Counter on MTAS node.
MtasMmtTermServiceDuration	Total time from the time when an Terminating call has received initial INVITE message to the time when all set of originating services has been executed and either the INVITE is passed to outgoing dialog or is responded on incoming dialog. The CSCF IP address is used as key. The counter is incremented with the time taken for execution of all terminating services configured for particular user. Counter on MTAS node.
MtasMmtOrigUnregServiceDuration	Total time from the time when an Originating call has received initial INVITE message to the time when all

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	set of terminating unregistered services has been executed and either the INVITE is passed to outgoing dialog or is responded on incoming dialog. The CSCF IP address is used as key. The counter is incremented with the time taken for execution of all originating services configured for unregistered user. Counter on MTAS node.
MtasMmtTermUnregServiceDuration	Total time from the time when an Terminating call has received initial INVITE message to the time when all set of terminating unregistered services has been executed and either the INVITE is passed to outgoing dialog or is responded on incoming dialog. The CSCF IP address is used as key. The counter is incremented with the time taken for execution of all terminating services configured for unregistered user. Counter on MTAS node.
MtasMmtInitOrigSessOk	The accumulated number of MMTEL session attempts, in the originating MTAS, which was either answered, not answered, or was rejected by a service due to operator or user configuration. The counter is keyed on the CSCF IP address. Counter on MTAS node.
MtasMmtInitTermSessOk	The accumulated number of MMTEL session attempts, in the terminating MTAS, which was either answered, not answered, or was rejected by a service due to operator or user configuration. The counter is keyed on the CSCF IP address. Counter on MTAS node.
MtasMmtInitOrigUnregSessOk	The accumulated number of MMTEL session attempts, in the originating MTAS, to an unregistered PUI, which was either answered, not answered, or was rejected by a service due to operator or user configuration. The counter is keyed on the CSCF IP address. Counter on MTAS node.
MtasMmtInitTermUnregSessOk	The accumulated number of MMTEL session attempts, in the terminating MTAS, to an unregistered PUI, which was either answered, not answered, or was rejected by a service due to operator or user configuration. The counter is keyed on the CSCF IP

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	address. Counter on MTAS node.
MtasMmtOrigCommDurationAlert	Total call duration of alerting calls for originating calls. Starts when originating MMTel AS sends 180 or 200 if no 180 (for initial originating INVITE), stops on final negative response or established session released (BYE). The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtOrigUnregCommDurationAlert	Total call duration of alerting calls for originating unregistered calls. Starts when originating MMTel AS sends 180 or 200 if no 180 (for initial originating unregistered INVITE), stops on final negative response or established session released (BYE). The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtTermCommDurationAlert	Total call duration of alerting calls for terminating calls. Starts when terminating MMTel AS sends 180 or 200 if no 180 (for initial terminating INVITE), stops on final negative response or established session released (BYE). The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtTermUnregCommDurationAlert	Total call duration of alerting calls for terminating unregistered calls. Starts when terminating MMTel AS sends 180 or 200 if no 180 (for initial terminating unregistered INVITE), stops on final negative response or established session released (BYE). The CSCF IP address is used as key. Counter on MTAS node.
MtasMmtOrigNetworkSuccessSessionEstablish	The accumulated number of successful MMTel session establishments counted by the originating MTAS. The response code (180 or 200) or string "sum" is used as key. One instance of the counter shall count sum of all events causing the counter to increment in case with key="sum". The counter is incremented when sending 180 message on initial INVITE or when sending 200 OK (INVITE) if no 180 message has been sent.
MtasMmtTermNetworkSuccessSessionEstablish	The accumulated number of successful MMTel session establishments counted by the terminating MTAS. The response code (180 or 200) or string "sum" is

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	used as key. One instance of the counter shall count sum of all events causing the counter to increment in case with key="sum". The counter is incremented when sending 180 message on initial INVITE or when sending 200 OK (INVITE) if no 180 message has been sent.
MtasMmtOrigUnregNetworkSuccessSessionEstablish	The accumulated number of successful MMTel session establishments counted by the unregistered originating MTAS. The response code (180 or 200) or string "sum" is used as key. One instance of the counter shall count sum of all events causing the counter to increment in case with key="sum". The counter is incremented when sending 180 message on initial INVITE or when sending 200 OK (INVITE) if no 180 message has been sent.
MtasMmtTermUnregNetworkSuccessSessionEstablish	The accumulated number of successful MMTel session establishments counted by the unregistered terminating MTAS. The response code (180 or 200) or string 'sum' is used as key. One instance of the counter shall count sum of all events causing the counter to increment in case with key="sum". The counter is incremented when sending 180 message on initial INVITE or when sending 200 OK (INVITE) if no 180 message has been sent.
MtasMmtOrigSessEarlyCancel	The accumulated number of early cancelled MMTel INVITEs, counted by the originating MTAS. The counter is keyed on the CSCF IP address and the session cancel reason. The counter is incremented when receiving the CANCEL message before a 180 Ringing is received. Counter on MTAS node.
MtasMmtTermSessEarlyCancel	The accumulated number of early cancelled MMTel INVITEs, counted by the terminating MTAS. The counter is keyed on the CSCF IP address and the session cancel reason. The counter is incremented when receiving the CANCEL message before a 180 Ringing is received. Counter on MTAS node.
MtasMmtOrigUnregSessEarlyCancel	The accumulated number of early

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	cancelled MMTel INVITEs, counted by the originating unregistered MTAS. The counter is keyed on the CSCF IP address and the session cancel reason. The counter is incremented when receiving the CANCEL message before a 180 Ringing received. Counter on MTAS node.
MtasMmtTermUnregSessEarlyCancel	The accumulated number of early cancelled MMTel INVITEs, counted by the terminating unregistered MTAS. The counter is keyed on the CSCF IP address and the session cancel reason. The counter is incremented when receiving the CANCEL message before a 180 Ringing received. Counter on MTAS node.
MtasMmtOrigFailedAttempt	The accumulated number of failed MMTel INVITEs, counted by the originating MTAS. The CSCF IP address is used as key. The counter is incremented when receiving 3xx/4xx/5xx/6xx messages. Counter on MTAS node.
MtasMmtInitOrigSessNOKI	The accumulated number of MMTel session attempts, in the originating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address. Counter on MTAS node.
MtasMmtOrigUnregFailedAttempt	The accumulated number of failed MMTel INVITEs made to unregistered PUIs, counted by the originating MTAS. The CSCF IP address is used as key. The counter is incremented when receiving 3xx/4xx/5xx/6xx messages. Counter on MTAS node.
MtasMmtInitOrigUnregSessNOKI	The total number of MMTel call attempts, in originating MTAS from an unregistered user, which was rejected due to node internal reasons. The counter is keyed with CSCF IP address. Counter on MTAS node.
MtasMmtTermFailedAttempt	The accumulated number of failed MMTel INVITEs made to registered PUIs, counted by the terminating MTAS. The CSCF IP address is used as key. The counter is incremented when receiving 3xx/4xx/5xx/6xx messages. Counter on MTAS node.

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MtasMmtInitTermSessNOkl	The accumulated number of MMTEL session attempts, in the terminating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address. Counter on MTAS node.
MtasMmtTermUnregFailedAttempt	The accumulated number of failed MMTEL INVITEs made to unregistered PULs, counted by the terminating MTAS. The CSCF IP address is used as key. The counter is incremented when receiving 3xx/4xx/5xx/6xx messages. Counter on MTAS node.
MtasMmtInitTermUnregSessNOkl	The total number of MMTEL call attempts, in terminating MTAS from an unregistered user, which was rejected due to node internal reasons. The counter is keyed with CSCF IP address. Counter on MTAS node.
Mtas3ptyCommDuration	Total time from the time when a 3pty call is established to the time when the 3pty originator leaves the call. The CSCF IP address is used as key. Counter on MTAS node.
Mtas3ptyCreationOk	The number of successfully created 3PTY calls. Counter on MTAS node.
MtasConfCommDuration	Total time from the time when the Conference Focus is created to the time when the Focus is ended. The CSCF IP address is used as key. Counter on MTAS node.
MtasPxOrigCommDuration	Total time from the time when Parlay X enabled Originating calls has received 200 (INVITE) message to the time when the call has been ended (BYE has been received). Total communication duration time for originating calls. The CSCF IP address is used as key. Counter on MTAS node.
MtasPxOrigAsSuccessSessionEstablish	The counter is incremented when receiving 18x message or when receiving 2xx (INVITE) if no 18x message has been received, related to an initial INVITE, by a Parlay X enabled session in originating MTAS. The response code (18x or 2xx) is used as key. Counter on MTAS node.
MtasPxOrigNetworkSuccessSessionEstablish	The counter is incremented when sending 18x message or when sending 2xx (INVITE) if no 18x

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	message has been sent, related to an initial INVITE, by a Parlay X enabled session in originating MTAS. The response code (18x or 2xx) is used as key. Counter on MTAS node.
MtasPxTermCommDuration	Total time from the time when Parlay X enabled Terminating calls has received 200 (INVITE) message to the time when the calls has been ended (BYE has been received). Total communication duration time for terminating calls. The CSCF IP address is used as key. Counter on MTAS node.
MtasPxTermAsSuccessSessionEstablish	The counter is incremented when receiving 18x message or when receiving 2xx (INVITE) if no 18x message has been received, related to an initial INVITE, by a Parlay X enabled session in terminating MTAS. The response code (18x or 2xx) is used as key. Counter on MTAS node.
MtasPxTermNetworkSuccessSessionEstablish	The counter is incremented when sending 18x message or when sending 2xx (INVITE) if no 18x message has been sent, related to an initial INVITE, by a Parlay X enabled session in terminating MTAS. The response code (18x or 2xx) is used as key. Counter on MTAS node.

Reference [1]

4.1.2 MMTel Use Cases

T = measured/reported time in seconds

4.1.2.1 Registration procedure

Equation 21. IMS MTAS Initial Registrations [per second]

$$IMSMTASInitial\ Registrations = \left(\frac{MtasSubsDataInitialRegOk + MtasSubsDataAutoRegOk}{T} \right)$$

Equation 22. IMS MTAS Re-registration [per second]

$$IMSMTAS\ Re\ Registrations = \left(\frac{MtasSubsDataReregOk}{T} \right)$$

Equation 23. IMS MTAS De-registration [per second]

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$$IMSMTASDeRegistrations = \left(\frac{MtasSubsDataDeregOk}{T} \right)$$

Counter Name	Definition
Registration Procedures	
MtasSubsDataInitialRegOk	The number of initial registration procedures that were completed successfully. Counter on MTAS node.
MtasSubsDataAutoRegOk	The number of automatically performed registrations that were completed successfully. Counter on MTAS node.
MtasSubsDataReregOk	The number of reregistration procedures that were completed successfully. Counter on MTAS node.
MtasSubsDataDeregOk	The number of deregistration procedures that were completed successfully. Counter on MTAS node.

Reference [1].

4.1.2.2 Sh reference point

Equation 24. IMS MMTel AS Notification of change [per second]

$$IMSMMTelASNotifChange = \left(\frac{MtasShNotifOk}{T} \right)$$

Equation 25. IMS MMTel AS Update User conf data [per second]

$$IMSMMTelASUpdateUserConfData = \left(\frac{MtasShUpdateOk}{T} \right)$$

MtasShPullOk

Equation 26. IMS MMTel AS Pull User conf data [per second]

$$IMSMMTelASPullUserConfData = \left(\frac{MtasShPullOk}{T} \right)$$

Equation 27. IMS MMTel AS Sh-Subs-Notif operations [per second]

$$IMSMMTelASSubsNotif = \left(\frac{MtasShSubsNotifOk}{T} \right)$$

Counter Name	Definition
Sh reference point	

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Counter Name	Definition
MtasShNotifOk	The number of Sh-Notif requests that were processed successfully. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format: <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>. Counter on MTAS node.
MtasShUpdateOk	The number of Sh-Update operations that were completed successfully. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format: <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>. Counter on MTAS node.
MtasShPullOk	The number of Sh-Pull operations that were completed successfully. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format: <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>. Counter on MTAS node.
MtasShSubsNotifOk	The number of Sh-Subs-Notif operations that were completed successfully. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format: <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>. Counter on MTAS node.

Reference [1].

4.1.2.3 CAI3G provisioning

Equation 28. IMS MTAS Update User conf data (MTAS-CAI3G) [per second]

$$IMSMTASUpdateUserConfDataCAI3G = \left(\frac{MtasXdmsCai3gSetOk}{T} \right)$$

Equation 29. IMS MTAS Add User conf data (MTAS-CAI3G) [per second]

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$$IMSMTASAddUserConfDataCAI3G = \left(\frac{MtasXdmsCai3gCreateOk}{T} \right)$$

Equation 30. IMS MTAS Delete User conf data (MTAS-CAI3G) [per second]

$$IMSMTASDeleteUserConfDataCAI3G = \left(\frac{MtasXdmsCai3gDeleteOk}{T} \right)$$

Equation 31. IMS MTAS Read User conf data (MTAS-CAI3G) [per second]

$$IMSMTASReadUserConfDataCAI3G = \left(\frac{MtasXdmsCai3gGetOk}{T} \right)$$

Counter Name	Definition
CAI3G provisiong	
MtasXdmsCai3gSetOk	Contains the number of provisioning CAI3G Set requests that resulted in a successful response. The counter is keyed on the IP address of CAI3G Manager. Counter on MTAS node.
MtasXdmsCai3gCreateOk	Contains the number of provisioning CAI3G Create requests that resulted in a successful response. The counter is keyed on the IP address of CAI3G Manager. Counter on MTAS node.
MtasXdmsCai3gDeleteOk	Contains the number of CAI3G Delete requests that resulted in a successful response. Counter on MTAS node.
MtasXdmsCai3gGetOk	Contains the number of CAI3G Get requests that resulted in a successful response. Counter on MTAS node.

Reference [1].

4.1.2.4 Session procedures (QoS)

Equation 32. IMS MMTel AS Originating Session Set-up Attempts [per second]

$$IMSMMTelASOrgSessSetupAtt = \frac{(MtasFuncInitOrigSessOk + MtasFuncInitOrigSessNokI + MtasFuncInitOrigSessNokE)}{T}$$

Equation 33. IMS MMTel AS Terminating Session Set-up Attempts [per second]

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$$\frac{IMSMMTelASTermSessSetupAtt = (MtasFuncInitTermSessOk + MtasFuncInitTermSessNOkI + MtasFuncInitTermSessNOkE)}{T}$$

Equation 34. IMS MMTel AS Unregistered Originating Session Set-up Attempts[per second]

$$\frac{IMSMMTelASUnregSessSetupAtt = (MtasFuncInitOrigUnregSessOk + MtasFuncInitOrigUnregSessNOkI + MtasFuncInitOrigUnregSessNOkE)}{T}$$

Equation 35. IMS MMTel AS Unregistered Terminating Session Set-up Attempts[per second]

$$\frac{IMSMMTelASUnregTermSessSetupAtt = (MtasFuncInitTermUnregSessOk + MtasFuncInitTermSessNOkI + MtasFuncInitTermSessNOkE)}{T}$$

Equation 36. IMS MMTel AS Unanswered Call Originating AS [per second]

$$\frac{IMSMMTelASUnansweredCallOrigAS = (MtasMmtOrigFailedAttemptCause(key : 486) + MtasMmtOrigUnregFailedAttemptCause(key : 486) + MtasMmtOrigFailedAttemptCause(key : 408) + MtasMmtOrigUnregFailedAttemptCause(key : 408))}{T}$$

The IMSMMTelASUnansweredCallOrigAS is the sum of registered and un-registered originating call attempts which got 486, Busy Here and 408 Request Timeout (No Reply) response codes.

Equation 37. IMS MMTel AS Unanswered Call Terminating AS [per second]

$$\frac{IMSMMTelASUnansweredCallTermAS = (MtasMmtTermFailedAttemptCause(key : 486) + MtasMmtTermUnregFailedAttemptCause(key : 486) + MtasMmtTermFailedAttemptCause(key : 408) + MtasMmtTermUnregFailedAttemptCause(key : 408))}{T}$$

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The IMSMMTelASUnansweredCallTermAS is the sum of registered and un-registered terminating call attempts which got 486, Busy Here and 408 Request Timeout (No Reply) response codes.

Equation 38. IMS MMTel AS Long Duration Call Expired [per second]

$$\text{IMSMMTelASLongDurationCallExpired} = \frac{\text{MtasMmtLongDurationCallOk}}{T}$$

The number of times long duration supervision timer expired successfully and session was terminated. Long Duration Call Supervision service is handled on the originating and terminating MTAS node. Long Duration Call Supervision service is defined and configured by operator.

SIP Trunking AS Session Set-up Procedures

Equation 39. IMS ST AS Originating Session Set-up Attempts [per second]

$$\text{IMSSTASOrgSessSetupAttempts} = \frac{(\text{MtasStOrigSuccAttempt} + \text{MtasStOrigFailedAttempt})}{T}$$

Equation 40. IMS ST AS Terminating Session Set-up Attempts [per second]

$$\text{IMSSTASTermSessSetupAttempts} = \frac{(\text{MtasStTermSuccAttempt} + \text{MtasStTermFailedAttempt})}{T}$$

Service Centralization and Continuity (SCC) Session Set-up Procedures

Equation 41. IMS SCC AS Originating Service from CS Set-up Attempts[per second]

$$\text{IMSSCCASOrgServCSSetupAtt} = \frac{(\text{MtasSccInitOrigSessCsOk} + \text{MtasSccInitOrigSessCsNOkE} + \text{MtasSccInitOrigSessCsNOkI} + \text{MtasSccInitOrigUnregSessCsOk} + \text{MtasSccInitOrigUnregSessCsNOkE} + \text{MtasSccInitOrigUnregSessCsNOkI})}{T}$$

Equation 42. IMS SCC AS Originating Service from PS Set-up Attempts[per second]

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$$\begin{aligned}
 &IMSSCCASOrgServPSSetupAtt = \\
 & (MtasSccInitOrigSessPsOk + MtasSccInitOrigSessPsNOkE + \\
 & MtasSccInitOrigSessPsNokI + MtasSccInitOrigUnregSessPsOk + \\
 & MtasSccInitOrigUnregSessPsNOkE + MtasSccInitOrigUnregSessPsNokI) \\
 & \quad \quad \quad T
 \end{aligned}$$

Equation 43. IMS SCC AS Terminating Service Set-up Attempts[per second]

$$\begin{aligned}
 &IMSSCCASTermServSetupAtt = \\
 & (MtasSccInitTermSessOk + MtasSccInitTermSessNOkE + \\
 & MtasSccInitTermSessNokI + MtasSccInitTermUnregSessOk + \\
 & MtasSccInitTermUnregSessNOkE + MtasSccInitTermUnregSessNokI) \\
 & \quad \quad \quad T
 \end{aligned}$$

Service Completion Procedures

Equation 44. IMS MTAS Originating Session Completion Attempts[per second]

$$\begin{aligned}
 &IMSMTASOrgSessCompAttempts = \\
 & (MtasFuncTermOrigSessOk + MtasFuncTermOrigSessNokI + \\
 & MtasFuncTermOrigSessNOkE) \\
 & \quad \quad \quad T
 \end{aligned}$$

Equation 45. IMS MTAS Terminating Session Completion Attempts[per second]

$$\begin{aligned}
 &IMSMTASTermSessCompAttempts = \\
 & (MtasFuncTermTermSessOk + MtasFuncTermTermSessNokI + \\
 & MtasFuncTermTermSessNOkE) \\
 & \quad \quad \quad T
 \end{aligned}$$

Equation 46. IMS MMTelAS Priority Session Setup Attempts[per second]

$$\begin{aligned}
 &IMSMMTelASPr ioSessSetupAttempts = \\
 & \quad \quad \quad \frac{MtasPriorityCallWpsRequested}{T}
 \end{aligned}$$

The IMSMMTelASPr ioSessSetupAttempts counts the occurrence of when an execute permission is requested from load regulation, for processing an incoming INVITE, which has a valid SIP Resource-priority header with wps namespace, and is handled by MTAS Resource Priority Handling function.

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Equation 47. IMS MMTelAS Subscribe Session Setup Attempts[per second]

$$\frac{IMSMMTelASSubscribeSessSetupAttempts}{T} =$$

Equation 48. IMS MMTelAS Dialog Event Notifier Subscribe Session Setup Attempts[per second]

$$\frac{IMSMMTelASSubscribeSessSetupAttempts}{T} = \frac{(MtasDenSubsSessOk + MtasDenSubsSessNOkE + MtasDenSubsSessNOkI)}{T}$$

Note: DEN = Dialog Event Notifier service.

Counter Name	Definition
Session procedures	
MtasFuncInitOrigSessOk	The accumulated number of session attempts, in the originating MTAS, which was either answered, not answered or was rejected by a service due to operator or user configuration. Counter on MTAS node.
MtasFuncInitOrigSessNOkI	The accumulated number of session attempts, in the originating MTAS, which did not become stable due to node internal reasons. The counter is incremented by 1 if the INVITE was rejected due to processor, memory shortage or by other node internal reason. Counter on MTAS node.

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Counter Name	Definition
MtasFuncInitOrigSessNOkE	<p>The accumulated number of session attempts, in the originating MTAS, which did not become stable due to node external reasons.</p> <p>The counter is incremented by 1 in the originating MTAS, if the INVITE-ACK transaction did not conclude successfully or receiving a 4xx, 5xx, or 6xx as the final response, or any signaling transactions to external nodes failed or timed out and the configuration of the MTAS required the interaction with the external node to be successful in order to proceed the session. The counter will only be stepped for one of the reasons (once, that is) for a particular session setup.</p> <p>Counter on MTAS node.</p>
MtasFuncInitTermSessOk	<p>The accumulated number of session attempts, in the terminating MTAS, which was either answered, not answered or was rejected by a service due to operator or user configuration.</p> <p>Counter on MTAS node.</p>
MtasFuncInitTermSessNOkI	<p>The accumulated number of session attempts, in the terminating MTAS, which was rejected due to node internal reasons. The counter is incremented by 1 if the INVITE was rejected due to processor, memory shortage or by other node internal reason</p> <p>Counter on MTAS node.</p>
MtasFuncInitTermSessNOkE	<p>The accumulated number of session attempts, in the terminating MTAS, which was rejected due to node external reasons. The counter is incremented by 1 in the terminating MTAS if; the INVITE-ACK transaction did not conclude successfully or any signaling transactions to external nodes failed or timed out and the configuration of the MTAS required the interaction with the external node to be successful in order to proceed the session. The counter will only be stepped for one of the reasons (once, that is) for a particular session setup.</p> <p>Counter on MTAS node.</p>
MtasFuncInitOrigUnregSessOk	<p>The total number of call attempts, in the originating MTAS from an unregistered user, which were either answered, not answered or were rejected by a service due to operator or user configuration. Incremented by 1 in the originating MTAS when the INVITE-ACK transaction has concluded after receiving the final response or when the INVITE was rejected by a service due to operator or user configuration.</p> <p>Counter on MTAS node.</p>

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Counter Name	Definition
MtasFuncInitOrigUnregSessNOKI	The total number of call attempts, in originating MTAS from an unregistered user, which were rejected due to node internal reasons. The counter is incremented by 1 if the INVITE was rejected due to processor, memory shortage or by other node internal reason. Counter on MTAS node.
MtasFuncInitOrigUnregSessNOKE	The total number of call attempts, in originating unregistered MTAS, which were rejected due to node external reasons. Incremented by 1 in originating MTAS if; The INVITE-ACK transaction did not conclude successfully or any signaling transactions towards external nodes failed or timed out and the configuration of MTAS required the interaction with the external node to be successful in order to proceed the call. The counter will only be stepped for one of the reasons (i.e. once) for a particular call setup. Counter on MTAS node.
MtasFuncInitTermUnregSessOk	The accumulated number of session attempts, in the terminating MTAS, to an unregistered Public User Identity (PUI), which was either answered, not answered, or was rejected by a service due to operator or user configuration. Counter on MTAS node.
MtasFuncInitTermSessNOKI	The accumulated number of session attempts, in the terminating MTAS, which was rejected due to node internal reasons. The counter is incremented by 1 if the INVITE was rejected due to processor, memory shortage or by other node internal reason. Counter on MTAS node.
MtasFuncInitTermSessNOKE	The accumulated number of session attempts, in the terminating MTAS, which was rejected due to node external reasons. The counter is incremented by 1 in the terminating MTAS if; the INVITE-ACK transaction did not conclude successfully or any signaling transactions to external nodes failed or timed out and the configuration of the MTAS required the interaction with the external node to be successful in order to proceed the session. The counter will only be stepped for one of the reasons (once, that is) for a particular session setup. Counter on MTAS node.
MtasMmtOrigFailedAttemptCause	The accumulated number of failed MMTel INVITEs, counted by the originating MTAS. The cause code and reason is used as key. Counter on MTAS node.

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Counter Name	Definition
MtasMmtOrigUnregFailedAttemptCause	Number of received 3xx/4xx/5xx/6xx messages, by the originating unregistered MTAS. The counter is keyed with Status-code from 3xx-6xx response and Reason phrase. Counter on MTAS node.
MtasMmtTermFailedAttemptCause	The accumulated number of failed MMTEL INVITES made to registered PUIs, counted by the terminating MTAS. The cause code and reason is used as key. Counter on MTAS node.
MtasMmtTermUnregFailedAttemptCause	The accumulated number of failed MMTEL INVITES made to unregistered PUIs, counted by the terminating MTAS. The cause code and reason is used as key. Counter on MTAS node.
MtasMmtLongDurationCallOk	The number of times long duration supervision timer expired successfully. Counter on MTAS node.
MtasStOrigSuccAttempt	The number of INVITES successfully sent, counted by the originating ST AS. The counter is incremented when receiving the 180 Ringing message or when receiving the 200 OK message if no 180 Ringing message has been received. Counter on MTAS node.
MtasStOrigFailedAttempt	Counters for counting the total number of received 3xx/4xx/5xx/6xx messages in originating ST AS. Counter on MTAS node.
MtasStTermSuccAttempt	The number of INVITES successfully sent, counted by the terminating ST AS. The counter is incremented when receiving the 180 Ringing message or when receiving the 200 OK message if no 180 Ringing message has been received. Counter on MTAS node.
MtasStTermFailedAttempt	Counters for counting the total number of received 3xx/4xx/5xx/6xx messages in terminating ST AS. Counter on MTAS node.
MtasScclnitOrigSessCsOk	The accumulated number of SCC session attempts from the CS access domain, in the originating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy. Counter on MTAS node.

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Counter Name	Definition
MtasScclnitOrigSessCsNOkE	The accumulated number of SCC session attempts from the CS access domain, in the originating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to external reasons, for example invalid feature tag, too many media components in SDP. Counter on MTAS node.
MtasScclnitOrigSessCsNOkI	The accumulated number of SCC session attempts from the CS access domain, in the originating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage. Counter on MTAS node.
MtasScclnitOrigSessPsOk	The accumulated number of SCC session attempts from the PS access domain, in the originating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy. Counter on MTAS node.
MtasScclnitOrigSessPsNOkE	The accumulated number of SCC session attempts from the PS access domain, in the originating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to external reasons, for example invalid feature tag, too many media components in SDP, ICS UE signalling over Gm when attached to CS is not supported. Counter on MTAS node.
MtasScclnitOrigSessPsNOkI	The accumulated number of SCC session attempts from the PS access domain, in the originating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage. Counter on MTAS node.

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Counter Name	Definition
MtasScclnitOrigUnregSessCsOk	<p>The accumulated number of SCC session attempts from an unregistered user in the CS access domain, in the originating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy.</p> <p>Counter on MTAS node.</p>
MtasScclnitOrigUnregSessCsNOkE	<p>The accumulated number of SCC session attempts from an unregistered user on the CS access domain, in the originating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE was rejected due to external reasons, for example invalid feature tag, too many media components in SDP. Incremented by 1 when the SCC AS rejects an INVITE unregistered from the CS domain due to external reasons, e.g. request not supported by SCC AS</p> <p>Counter on MTAS node.</p>
MtasScclnitOrigUnregSessCsNOkI	<p>The accumulated number of SCC session attempts from an unregistered user in the CS access domain, in the originating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage.</p> <p>Counter on MTAS node.</p>
MtasScclnitOrigUnregSessPsOk	<p>The accumulated number of SCC session attempts from an unregistered user on the PS access domain, in the originating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy.</p> <p>Counter on MTAS node.</p>

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Counter Name	Definition
MtasScclnitOrigUnregSessPsNOkE	<p>The accumulated number of SCC session attempts from an unregistered user in the PS access domain, in the originating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE was rejected due to external reasons, for example invalid feature tag, too many media components in SDP, ICS UE signalling over Gm when attached to CS is not supported.</p> <p>Counter on MTAS node.</p>
MtasScclnitOrigUnregSessPsNOkI	<p>The accumulated number of SCC session attempts from an unregistered user in the PS access domain, in the originating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage.</p> <p>Counter on MTAS node.</p>
MtasScclnitTermSessOk	<p>The accumulated number of SCC session attempts, in the terminating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy.</p> <p>Counter on MTAS node.</p>
MtasScclnitTermSessNOkE	<p>The accumulated number of SCC session attempts, in the terminating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address.</p> <p>The counter is incremented by 1 in the terminating MTAS if; the INVITE-ACK transaction did not conclude successfully or any signaling transactions to external nodes failed or timed out and the configuration of the MTAS required the interaction with the external node to be successful in order to proceed the session. The counter will only be stepped for one of the reasons (once, that is) for a particular session.</p> <p>Counter on MTAS node.</p>

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Counter Name	Definition
MtasScclnitTermSessNOkl	The accumulated number of SCC session attempts, in the terminating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage. Counter on MTAS node.
MtasScclnitTermUnregSessOk	The accumulated number of SCC session attempts, in the terminating MTAS to an unregistered user, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy. Counter on MTAS node.
MtasScclnitTermUnregSessNOkE	The accumulated number of SCC session attempts, in the terminating MTAS to an unregistered user, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address. The counter is incremented by 1 in the terminating MTAS if; the INVITE-ACK transaction did not conclude successfully or any signaling transactions to external nodes failed or timed out and the configuration of the MTAS required the interaction with the external node to be successful in order to proceed the session. The counter will only be stepped for one of the reasons (once, that is) for a particular session. Counter on MTAS node.
MtasScclnitTermUnregSessNOkl	The accumulated number of SCC session attempts, in the terminating MTAS to an unregistered user, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage. Counter on MTAS node.
Session completion procedures	

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Counter Name	Definition
MtasFuncTermOrigSessOk	The accumulated number of sessions, in the originating MTAS, terminated successfully without any internal or external error reasons. The counter is incremented by 1 in the originating MTAS when a session that incremented the MtasFuncInitOrigSessOk counter has concluded the BYE method successfully and neither the MtasFuncTermOrigSessNOkE nor the MtasFuncTermOrigSessNOkI counter has been incremented. Counter on MTAS node.
MtasFuncTermOrigSessNOkI	The accumulated number of sessions, in the originating MTAS, terminated prematurely by the MTAS due to internal reasons. The counter is incremented by 1 in the originating MTAS when a session that incremented the MtasFuncInitOrigSessOk counter has concluded the BYE method successfully and the BYE was initiated from the MTAS due to internal reasons. Counter on MTAS node.
MtasFuncTermOrigSessNOkE	The accumulated number of sessions, in the originating MTAS, terminated prematurely by the MTAS due to external reasons. The counter is incremented by 1 in the originating MTAS when a session that incremented the MtasFuncInitOrigSessOk counter has concluded the BYE method successfully and the BYE was initiated from the MTAS due to external reasons. Counter on MTAS node.
MtasFuncTermTermSessOk	The accumulated number of sessions, in the terminating MTAS, terminated successfully without any internal or external reasons. The counter is incremented by 1 in the terminating MTAS when a session that incremented the MtasFuncInitTermSessOk counter has concluded the BYE method successfully and neither the MtasFuncTermTermSessNOkE nor the MtasFuncTermTermSessNOkI counter has been incremented. Counter on MTAS node.
MtasFuncTermTermSessNOkE	The accumulated number of sessions, in the terminating MTAS, terminated prematurely by the MTAS due to external reasons. The counter is incremented by 1 in the terminating MTAS when a session that incremented the MtasFuncInitTermSessOk counter has concluded the BYE method successfully and the BYE was initiated from the MTAS due to external reasons. Counter on MTAS node.

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Counter Name	Definition
MtasFuncTermTermSessNOkl	The accumulated number of sessions, in the terminating MTAS, terminated prematurely by the MTAS due to internal reasons. The counter is incremented by 1 in the terminating MTAS when a session that incremented the MtasFuncInitTermSessOk counter has concluded the BYE method successfully and the BYE was initiated from the MTAS due to internal reasons. Counter on MTAS node.
Priority Session Setup	
MtasPriorityCallWpsRequested	The counter accumulates number of load regulation requests at dialog setup, using parameter mapped from SIP Resource-priority header 'wps' namespace (RFC 4412). The counter is keyed on wps resource value. The counter is incremented by 1 when an execute permission is requested from TSP load regulation, for processing an incoming INVITE, which has a valid SIP Resource-priority header with wps namespace, and is handled by MTAS Resource Priority Handling function. Counter on MTAS node.
Subscribe sessions	
MtasMmtSubsSessAttempt	The accumulated number of out-of-dialog subscription session creation attempts within the MMTel AS. The counter is incremented by 1 in the originating MMTel AS when receiving an initial out-of-dialog SUBSCRIBE. Counter on MTAS node.
MtasDenSubsSessOk	The accumulated number of successfully created 'dialog' event package subscription sessions. The counter is incremented by 1 by the Dialog Event Notifier service when 200 OK is sent to the SUBSCRIBE request of a 'dialog' event package subscription. Counter on MTAS node.
MtasDenSubsSessNOkE	The accumulated number of unsuccessfully created 'dialog' event package subscription sessions due to node external reasons. The counter is incremented by 1 by the Dialog Event Notifier service when responding to the SUBSCRIBE request of a 'dialog' event package subscription failed due to node external reasons. Counter on MTAS node.

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Counter Name	Definition
MtasDenSubsSessNOkl	The accumulated number of unsuccessfully created 'dialog' event package subscription sessions due to node internal reasons. The counter is incremented by 1 by the Dialog Event Notifier service when responding to the SUBSCRIBE request of a 'dialog' event package subscription failed due to node internal reasons. Counter on MTAS node.

Reference [1].

4.1.2.5 Communication Diversion

Equation 49. IMS MMTel AS Communication Diversions [per second]

$$IMSMMTelASCallUnregUserTermAS = \left(\frac{MtasCDivNumberOfCdivOk}{T} \right)$$

Counter Name	Definition
Communication Diversion	
MtasCDivNumberOfCdivOk	A performance measurement (PM) counter that is incremented each time Communication Diversion (CDiv) successfully establishes communication following diversion of an incoming communication. There is one counter for the entire node. The counter is keyed by type of diversion: CFU, CFB, CFNR, CFNL, CDar, CDwr, CFNRc, DND CF. Counter on MTAS node.

Reference [1].

4.1.2.6 Communication Barring

Equation 50. IMS MMTel AS Outgoing Communication Barring (OCB) [per second]

$$IMSMMTelASOutCommBarred = \left(\frac{MtasCBOCBBarred}{T} \right)$$

Equation 51. IMS MMTel AS Incoming Communication Barring (ICB) [per second]

$$IMSMMTelASInCommBarred = \left(\frac{MtasCBICBBarred}{T} \right)$$

Equation 52. IMS MMTel AS Outgoing Communication Barring Media (OCB) [per second]

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$$IMSMMTelASOutCommBarredMedia = \left(\frac{MtasCBOCBBarredMedia}{T} \right)$$

Equation 53. IMS MMTel AS Incoming Communication Barring Media (ICB) [per second]

$$IMSMMTelASInCommBarredMedia = \left(\frac{MtasCBICBBarredMedia}{T} \right)$$

Counter Name	Definition
Communication Barring	
MtasCBOCBBarred	The number of barred outgoing communications. Counter on MTAS node.
MtasCBICBBarred	A performance measurement (PM) counter that is incremented each time Incoming Communication Barring (ICB) successfully bars an incoming communication. There is one counter for the entire node. In the case where Do Not Disturb Communication Barring (DNDCB) successfully bars an incoming communication, this counter is incremented by 1 and is keyed with "DNDCB". Counter on MTAS node.
MtasCBICBBarredMedia	A performance measurement (PM) counter that is incremented when Communication Barring service successfully bars a Media Renegotiation due to ICB rules. The counter is keyed with the name of the SIP event that trigger Communication Barring service in those cases when charging event is generated. This includes INVITE, UPDATE and RR (reliable response) on an established session. The PM is incremented without a key for scenarios with Communication Barring on early session - scenarios that do not generate charging events. There is one counter for the entire node. The counter is incremented when Communication Barring service blocks Media Renegotiation in UPDATE or re-INVITE on early or confirmed sessions. The counter is also incremented when Communication Barring service blocks individual media streams in SDP offers in reliable responses.

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Counter Name	Definition
MtasCBOCBBarredMedia	<p>A performance measurement (PM) counter that is incremented when Communication Barring service successfully bars a Media Renegotiation due to OCB rules. The counter is keyed with the name of the SIP event that triggered Communication Barring service in those cases when charging event is generated. This includes INVITE, UPDATE and RR (reliable response) on an established session. The PM is incremented without a key for scenarios with Communication Barring on early session - scenarios that do not generate charging events. There is one counter for the entire node.</p> <p>The counter is incremented when Communication Barring service blocks Media Renegotiation in UPDATE or re-INVITE on early or confirmed sessions. The counter is also incremented when Communication Barring service blocks individual media streams in SDP offers in reliable responses.</p>

Reference [1].

4.1.2.7 Service Settings via Feature Access Codes

Equation 54. IMS MMTel AS Settings via Feature Access Codes [per second]

$$IMSMMTelASSettingsFeatAccCodes = \frac{\sum_{\text{Codem}} (MtasSSCodesActxxxOk + MtasSSCodesDeactxxxOk + MtasSSCodesIntxxxOk)}{T}$$

The number of service settings via Feature Access Codes is the sum of all activations, deactivations and interrogations for all Feature Access Codes.

Reference[1].

4.1.2.8 Supplementary Service Code (SSC) Invocations

Equation 55. IMS MMTel AS Supplementary Service Code Invocation [per second]

$$IMSMMTelASSSCInvocations = \frac{(MtasGenSscInvOk + MtasGenSscInvNOkE + MtasGenSscInvNOkI)}{T}$$

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Counter Name	Definition
MtasGenSscInVok	The number of successful invocations for Generic SSC service. Counter on MTAS node.
MtasGenSscInVNOkE	The number of invocations failed for Generic SSC service due to error in interworking node. Counter on MTAS node.
MtasGenSscInVNOkI	The number of invocations failed for Generic SSC service due to internal MTAS fault. Counter on MTAS node.

Reference [1].

4.1.2.9 Abbreviated Dialing Function

Equation 56. IMS MMTel AS Abbreviated Dialing Function Invocations [per second]

$$IMSMMTelASAbbrDialFuncInvocations = \frac{(MtasAbDialOk + MtasAbDialNOk)}{T}$$

Counter Name	Definition
Abbreviated Dialing Function	
MtasAbDialOk	The total number of successful invocation of the Abbreviated Dialing function. Counter on MTAS node.
MtasAbDialNOk	The total number of unsuccessful invocation of the Abbreviated Dialing function. Counter on MTAS node.

Reference [1].

4.1.2.10 Conference Service

Equation 57. IMS MMTel AS Conference Service Invocations [per second]

$$IMSMMTelASConfServInvocations = \frac{(MtasConfCreationOk + MtasConfDialOutOk)}{T}$$

Counter Name	Definition
Conference Service	

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Counter Name	Definition
MtasConfCreationOk	The number of successfully created conference sessions. Counter on MTAS node.
MtasConfDialOutOk	The number of successfully joined conference participants through dial-out. Counter on MTAS node.

Reference [1].

4.1.2.11 Stream Service

Equation 58. IMS MMTel AS Audio Stream operations [per second]

$$IMSMMTelASAudioStreams = \frac{(MtasMmtAudioStreamSetup + MtasMmtAudioStreamAdded + MtasMmtAudioStreamDropped)}{T}$$

Equation 59. IMS MMTel AS Video Stream operations [per second]

$$IMSMMTelASVideoStreams = \frac{(MtasMmtVideoStreamSetup + MtasMmtVideoStreamAdded + MtasMmtVideoStreamDropped)}{T}$$

Equation 60. IMS MMTel AS Fax Stream operations [per second]

$$IMSMMTelASFaxStreams = \frac{(MtasMmtFaxStreamSetup + MtasMmtFaxStreamAdded + MtasMmtFaxStreamDropped)}{T}$$

Equation 61. IMS MMTel AS Message Stream operations [per second]

$$IMSMMTelASMessageStreams = \frac{(MtasMmtMessageStreamSetup + MtasMmtMessageStreamAdded + MtasMmtMessageStreamDropped)}{T}$$

Equation 62. IMS MMTel AS Real-time Text operations [per second]

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$$\begin{aligned}
 &IMSMMTelAS\ Re\ altimeText = \\
 & (MtasMmtTextStreamSetup + MtasMmtTextStreamAdded + \\
 & MtasMmtTextStreamDropped) \\
 & \quad \quad \quad T
 \end{aligned}$$

Counter Name	Definition
Stream Service	
MtasMmtAudioStreamSetup	The number of initial audio streams. Counter on MTAS node.
MtasMmtAudioStreamAdded	The number of added audio streams after initial setup. Counter on MTAS node.
MtasMmtAudioStreamDropped	The number of dropped audio streams after initial setup. Counter on MTAS node
MtasMmtVideoStreamSetup	The number of initial video streams. Counter on MTAS node.
MtasMmtVideoStreamAdded	The number of added video streams after the initial setup. Counter on MTAS node.
MtasMmtVideoStreamDropped	The number of dropped video streams after the initial setup. Counter on MTAS node
MtasMmtFaxStreamSetup	The number of initial fax streams. Counter on MTAS node.
MtasMmtFaxStreamAdded	The number of added fax streams after the initial setup. Counter on MTAS node.
MtasMmtFaxStreamDropped	The number of dropped fax streams after the initial setup. Counter on MTAS node
MtasMmtMessageStreamSetup	The number of initial message streams. Counter on MTAS node.
MtasMmtMessageStreamAdded	The number of added message streams after initial setup. Counter on MTAS node.
MtasMmtMessageStreamDropped	The number of dropped message streams after initial setup. Counter on MTAS node
MtasMmtTextStreamSetup	The number of initial text streams. Counter on MTAS node.
MtasMmtTextStreamAdded	The number of added text streams after initial setup. Counter on MTAS node.
MtasMmtTextStreamDropped	The number of dropped text streams after initial setup. Counter on MTAS node.

Reference [1].

4.1.2.12 Hold/Resume

Equation 63. IMS MMTel AS Hold/Resume Operations [per second]

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$$IMSMMTelASHoldResumeOperations = \frac{(MtasHoldInitiatedHold + MtasHoldInitiatedResume)}{T}$$

Counter Name	Definition
Hold/Resume	
MtasHoldInitiatedHold	The number of initiated Hold in the MTAS for invoking UA. Counter on MTAS node.
MtasHoldInitiatedResume	The number of initiated Resumes in the MTAS for invoking UA. Counter on MTAS node.

Reference [1].

4.1.2.13 AS Interworking

Equation 64. IMS MMTel AS Interworking Invocations [per second]

$$IMSMMTelASASIWInvocations = \frac{(MtasAsIwDivInvRec + MtasAsIwInvRecHistAdd + MtasAsInvSentDivAdd)}{T}$$

Counter Name	Definition
AS Interworking	
MtasAsIwDivInvRec	Counts the total number of INVITE requests received which contain Diversion headers. This counter is incremented regardless of the value of mtasAsIwAdministrativeState. Counter on MTAS node.
MtasAsIwInvRecHistAdd	Counts the total number of INVITE Requests received which contain Diversion headers for which History-Info header entries have been created. Counter on MTAS node.
MtasAsInvSentDivAdd	Counts the total number of INVITE Requests sent which contain History-Info header entries for which Diversion headers have been created. Counter on MTAS node.

Reference [1].

4.1.2.14 Identity Presentations and Identity Presentation Restrictions

Equation 65. IMS MMTel AS Calling Name Identification Presentation (CNIP) Services [per second]

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$$IMSMMTelASCNIP = \frac{(MtasIdPresCnip)}{T}$$

Equation 66. IMS MMTel AS Originating CNIP Successful Invocations [per second]

$$IMSMMTelASSuccOrgCNIP = \frac{MtasIdPresOCnip}{T}$$

Equation 67. IMS MMTel AS CNIP Present Callers Name [per second]

$$IMSMMTelASCNIP PresentName = \frac{MtasIdPresCnipPresentName}{T}$$

Equation 68. IMS MMTel AS CNIP Restrict Callers Name [per second]

$$IMSMMTelASCNIP Restrictname = \frac{MtasIdPresCnipRestrictName}{T}$$

Equation 69. IMS MMTel AS Originating Identity Presentations (OIP) [per second]

$$IMSMMTelASOIP Pres = \frac{(MtasIdPresOip + MtasIdPresOirOverride)}{T}$$

Equation 70. IMS MMTel AS Originating Identity Presentation (OIP) Restrictions [per second]

$$IMSMMTelASOIP Pres Restricted = \frac{(MtasIdPresOipIdRestAll + MtasIdPresOipIdRestSome)}{T}$$

Equation 71. IMS MMTel AS Originating Identity Restriction (OIR) Presentation Enabled [per second]

$$IMSMMTelASOIR PresEnabled = \frac{(MtasIdPresOirIdPres + MtasIdPresOirTempIdPres + MtasIdPresOirSscTempIdPres)}{T}$$

Equation 72. IMS MMTel AS Originating Identity Restrictions (OIR) Presentation Restricted [per second]

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$$\begin{aligned}
 &IMSMMTelASOIR Pres Restricted = \\
 & (MtasIdPresOirPerm + \\
 & MtasIdPresOirIdRestAll + MtasIdPresOirIdRestSome + \\
 & MtasIdPresOirTempIdRest + MtasIdPresOirSscTempIdRest) \\
 & \quad \quad \quad T
 \end{aligned}$$

Equation 73. IMS MMTel AS Terminating Identity Presentations (TIP) [per second]

$$IMSMMTelASTIP Pres = \frac{(MtasIdPresTip + MtasIdPresTirOverride)}{T}$$

Equation 74. IMS MMTel AS Terminating Identity Presentation (TIP) Restrictions [per second]

$$IMSMMTelASTIP Pres Restricted = \frac{MtasIdPresTipIdRestAll}{T}$$

Equation 75. IMS MMTel AS Terminating Identity Restriction (TIR) Presentation Enabled [per second]

$$IMSMMTelASTermId Pres = \frac{(MtasIdPresTirIdPres + MtasIdPresTirTempIdPres)}{T}$$

Equation 76. IMS MMTel AS Terminating Identity Restrictions (TIR) Presentation Restricted [per second]

$$\begin{aligned}
 &IMSMMTelASTermId Pres Restricted = \\
 & (MtasIdPresTirPerm + MtasIdPresTirIdRestAll + \\
 & MtasIdPresTirTempIdRest) \\
 & \quad \quad \quad T
 \end{aligned}$$

Counter Name	Definition
Identity Presentation	
MtasIdPresCnip	The number of invocations of the CNIP service. Counter on MTAS node.
MtasIdPresOCnip	The number of invocations of the OCNIP service. Counter on MTAS node.
MtasIdPresCnipPresentName	The number of CNIP external query responses containing a caller displayname that is allowed to be presented. Counter on MTAS node.

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Counter Name	Definition
MtasIdPresCnipRestrictName	The number of CNIP external query responses indicating that presentation of the caller's name is restricted. Counter on MTAS node.
Originating Identity Presentation (OIP)	
MtasIdPresOip	The number of OIP invocations when the caller identity is presented. Counter on MTAS node.
MtasIdPresOirOverride	The number of invocations of OIP with OIR override Counter on MTAS node.
MtasIdPresOipIdRestAll	The number of OIP invocations where the caller identity is restricted throughout the entire call setup phase. Counter on MTAS node.
MtasIdPresOipIdRestSome	The number of OIP invocations where the caller identity is restricted in some message(s) and not in others during the call setup phase. Counter on MTAS node.
Originating Identity Restriction (OIR)	
MtasIdPresOirPerm	The number of invocations of OIR in permanent mode. Counter on MTAS node.
MtasIdPresOirIdPres	The number of invocations of OIR in temporary mode, default Restrict Identity, and identity presentation is allowed by Privacy header value "none" in the INVITE. Counter on MTAS node.
MtasIdPresOirIdRestAll	The number of invocations of OIR in temporary mode, default Not Restricted, when the user restricts identity presentation throughout the call-setup phase. Counter on MTAS node.
MtasIdPresOirIdRestSome	The number of invocations of OIR in temporary mode, default Not Restricted, when the user restricts identity presentation in some message(s) but not in all. Counter on MTAS node.
MtasIdPresOirTempIdPres	The number of invocations of OIR in temporary mode, default Identity Not Restricted, when the identity is always presented. Counter on MTAS node.
MtasIdPresOirSscTempIdPres	The number of invocations of OIR in temporary mode, default Identity Not Restricted, when the identity is always presented. Counter on MTAS node.
MtasIdPresOirTempIdRest	The number of invocations of OIR in temporary mode, default Identity Restricted, when the identity is never presented. Counter on MTAS node.

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Counter Name	Definition
MtasIdPresOirSscTempldRest	The number of invocations of OIR in temporary mode where an Ad Hoc Supplementary Service Code is used to disable identity presentation Counter on MTAS node.
Terminating Identity Presentation (TIP)	
MtasIdPresTip	The number of TIP invocations when the callee identity is presented. Counter on MTAS node.
MtasIdPresTirOverride	The number of successful invocations of TIP with TIR Override. Counter on MTAS node.
MtasIdPresTipIdRestAll	The number of TIP invocations when the callee identity is restricted throughout the call setup phase. Counter on MTAS node.
MtasIdPresTipIdRestSome	The number of TIP invocations when the callee identity is restricted in some but not all messages during the call setup phase. Counter on MTAS node.
Terminating Identity Restriction (TIR)	
MtasIdPresTirPerm	The number of invocations with TIR in permanent mode. Counter on MTAS node.
MtasIdPresTirIdPres	The number invocations of TIR in temporary mode, default Identity Not Restricted, when presentation of the identity is always done. Counter on MTAS node.
MtasIdPresTirIdRestAll	The number of invocations of TIR in temporary mode, default Identity Not Restricted, when the user has restricted identity presentation throughout the entire call setup phase. Counter on MTAS node.
MtasIdPresTirIdRestSome	The number of invocations of TIR in temporary mode, default Identity Not Restricted, when the user has restricted identity presentation in some but not all messages during the call setup phase.
MtasIdPresTirTempldPres	The number of invocations of TIR in temporary mode, default Identity Not Restricted, when the user does not restrict identity presentation by Privacy header. Counter on MTAS node.
MtasIdPresTirTempldRest	The number of invocations of TIR in temporary mode, default Identity Restricted, when the user never allows identity presentation by Privacy header. Counter on MTAS node.

Reference [1].

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4.1.2.15 Communication Waiting

Equation 77. IMS MMTel AS Communication Waiting Attempts [per second]

$$IMSMMTelASCommWaitAttempts = \frac{MtasCwUsed}{T}$$

Counter Name	Definition
Call Waiting	
MtasCwAccepted	Number of waiting communications that have been accepted by Communication Waiting subscribers. Counter on MTAS node.
MtasCwUsed	Number of times the Communication Waiting has been used by Communication Waiting Subscribers. Counter on MTAS node.
MtasCwTimeout	Number of waiting communications that have exceeded the timeout on the alerting phase. Counter on MTAS node.

Reference [1].

4.1.2.16 Carrier Select Service

Equation 78. IMS MMTel AS Carrier Select Virtual Carrier Call Attempts [per second]

$$IMSMMTelASCSVirtualCarrierCalls = \frac{MtasCsVirtualCarrierCalls}{T}$$

Equation 79. IMS MMTel AS Carrier Select Real Carrier Call Attempts [per second]

$$IMSMMTelASCSRealCarrierCalls = \frac{MtasCsRealCarrierCalls}{T}$$

Equation 80. IMS MMTel AS Carrier Pre-select Virtual Carrier Call Attempts [per second]

$$IMSMMTelASCPSVirtualCarrierCalls = \frac{MtasCpsVirtualCarrierCalls}{T}$$

Equation 81. IMS MMTel AS Carrier Pre-select Real Carrier Call Attempts [per second]

$$IMSMMTelASCPSRealCarrierCalls = \frac{MtasCpsRealCarrierCalls}{T}$$

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Counter Name	Definition
Carrier Select	
MtasCsVirtualCarrierCalls	This counter is the accumulated number of communication attempts, where the originating or transit MTAS applied the Carrier Select service, and selected a virtual carrier. Counter on MTAS node.
MtasCsRealCarrierCalls	This counter is the accumulated number of communication attempts, where the originating or transit MTAS applied the Carrier Select service, and selected a real carrier. Counter on MTAS node.
MtasCpsVirtualCarrierCalls	This counter is the accumulated number of communication attempts, where the originating or transit MTAS applied the Carrier Pre Select service, and selected a virtual carrier. Counter on MTAS node.
MtasCpsRealCarrierCalls	This counter is the accumulated number of communication attempts, where the originating or transit MTAS applied the Carrier Pre Select service, and selected a real carrier. Counter on MTAS node.

Reference [1].

4.1.2.17 Playing of Announcement Service

Equation 82. IMS MMTel AS Playing of Announcements Attempts [per second]

IMSMMTelASAnnouncements =

(MtasMrfcInitiatedAnnOk + MtasMrfcInitiatedAnnNOKI +
MtasMrfcInitiatedAnnNOkE)

T

Counter Name	Definition
MtasMrfcInitiatedAnnOk	The number of successfully initiated playing of announcement. The counter is keyed on announcement code. Counter on MTAS node
MtasMrfcInitiatedAnnNOKI	The number of unsuccessfully initiated playing of announcement due to internal error in MTAS. The counter is keyed on announcement code. Counter on MTAS node.

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Counter Name	Definition
MtasMrfcInitiatedAnnNOkE	The number of unsuccessfully initiated playing of announcement. The counter is keyed on announcement code. Counter on MTAS node.

Reference [1].

4.1.2.18 Dial Tone Management Service

Equation 83. IMS MMTel AS Dial Tone Management NOTIFY Attempts [per second]

$$\begin{aligned}
 &IMSMTSDTMNotifyAttempts = \\
 & (MtasDtmNotifyOk + MtasDtmNotifyNOkI + \\
 & MtasDtmNotifyNOkE) \\
 & \quad \quad \quad T
 \end{aligned}$$

Counter Name	Definition
Dial Tone Management (DTM)	
MtasDtmNotifyOk	MtasDtmNotifyOk contains the count of the total number of NOTIFY messages sent for dial tone pattern. Counter on MTAS node.
MtasDtmNotifyNOkI	MtasDtmNotifyNOkI contains the count of the total number of unsuccessful NOTIFY messages sent for dial tone pattern. Counter on MTAS node.
MtasDtmNotifyNOkE	MtasDtmNotifyNOkE contains the count of the total number of successful NOTIFY (dial-tone-pattern) messages sent, that get no reply or a failure response. If the failure is due to absence of a valid DTM license, the counter is keyed by "LICENSES". Counter on MTAS node.

Reference [1].

4.1.2.19 Call Admission Control (CAC) Service

Equation 84. IMS MMTel AS User Call Admission Control (CAC) Rejects [per second]

$$\begin{aligned}
 &IMSMMTelASUserCACRejects = \\
 & (MtasUCacOrigRejected + MtasUCacTermRejected) \\
 & \quad \quad \quad T
 \end{aligned}$$

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Note: Originating and Terminating User Call Admission Control (CAC) Rejects

Equation 85. IMS MMTel AS Group Call Admission Control (CAC) Rejects [per second]

$$IMSMMTelASGroupCAC \text{ Re } jects = \frac{(MtasGCacOrigRejected + MtasGCacTermRejected)}{T}$$

Note: Originating and Terminating Group Call Admission Control (CAC) Rejects.

Counter Name	Definition
Call Admission Control Service	
MtasUCacOrigRejected	The total number of originating session initiations that were rejected by the User Call Admission Control service.
MtasUCacTermRejected	The total number of terminating session initiations that were rejected by the User Call Admission Control service.
MtasGCacOrigRejected	The total number of originating session initiations that were rejected by the Group Call Admission Control service.
MtasGCacTermRejected	The total number of terminating session initiations that were rejected by the Group Call Admission Control service.

Reference [1].

4.1.2.20 Advice of Charge Service

Equation 86. IMS MMTel AS Advice of Charge Start (AoC-S) Attempts [per second]

$$IMSMMTelASAOCSstartAttempts = \frac{(MtasAocStartOk + MtasAocStartNokI + MtasAocStartNokE)}{T}$$

Equation 87. IMS MMTel AS Advice of Charge During (AoC-D) Attempts [per second]

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$$\frac{IMSMMTelASAOCDuringAttempts = (MtasAocDuringOk + MtasAocDuringNOkI + MtasAocDuringNOkE)}{T}$$

Equation 88. IMS MMTel AS Advice of Charge End (AoC-E) Attempts [per second]

$$\frac{IMSMMTelASAOCEndAttempts = (MtasAocEndOk + MtasAocEndNOkI + MtasAocEndNOkE)}{T}$$

Counter Name	Definition
Advice of Charge	
MtasAocStartOk	The Advice of Charge-Start (AoC-S) service type has been successfully executed at the start of a communication. Counter on MTAS node.
MtasAocStartNOkI	Due to an internal error, MTAS failed provide the required AoC-S tariff data at communication set-up. Counter on MTAS node.
MtasAocStartNOkE	MTAS failed to provide the required AoC-S tariff data at communication set-up due to an external error. An external error includes the receipt of an incomplete tariff or a missing tariff. Counter on MTAS node.
MtasAocDuringOk	The Advice of Charge-During (AoC-D) service type indicating the cost incurred to date has been successfully executed. Counter on MTAS node.
MtasAocDuringNOkI	The Advice of Charge-During (AoC-D) service type indicating the cost incurred to date, fails to complete, due to an external error. Counter on MTAS node.
MtasAocDuringNOkE	The Advice of Charge-During (AoC-D) service type indicating the cost incurred to date, fails to complete, due to an external error. Counter on MTAS node.
MtasAocEndOk	The Advice of Charge-End (AoC-E) service type indicating the cost of an event has been successfully executed. Counter on MTAS node.

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Counter Name	Definition
MtasAocEndNOkl	The Advice of Charge-End (AoC-E) service type indicating the cost, fails to complete, due to an internal error. Counter on MTAS node.
MtasAocEndNOkE	The Advice of Charge-End (AoC-E) service type indicating the cost, fails to complete, due to an external error. Counter on MTAS node.

Reference [1].

4.1.2.21 Communication Completion

Equation 89. IMS MMTel AS Communication Completion Busy Subscriber (CCBS) Invocation Attempts [per second]

$$IMSMMTelASCCBSInvocationAttempts = \frac{(MtasCcbsInvocationOrigOk)}{T}$$

Equation 90. IMS MMTel AS Communication Completion No Reply (CCNR) Invocation Attempts [per second]

$$IMSMMTelASCCNRInvocationAttempts = \frac{(MtasCcnrInvocationOrigOk)}{T}$$

Counter Name	Definition
MtasCcbsInvocationOrigOk	The total number of successful originating Call Completion BusySubscriber (CCBS) invocations. Counter on MTAS node.
MtasCcnrInvocationOrigOk	The total number of successful originating Call Completion No Reply (CCNR) invocations. Counter on MTAS node.

Reference [1].

4.1.2.22 Communication Completion Not Logged-in (CCNL)

Equation 91. IMS MMTel AS Originating Communication Completion Not Logged-in Success [per second]

$$IMSMMTelASOrigCCNLSuccess = \frac{(MtasCcnlOrigSuccess)}{T}$$

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Equation 92. IMS MMTel AS Terminating Communication Completion Not Logged-in Success [per second]

$$IMSMMTelASTermCCNLSuccess = \frac{(MtasCcnlTermSuccess)}{T}$$

Counter Name	Definition
MtasCcnlOrigSuccess	The total number of successful originating CCNL invocations. Counter on MTAS node.
MtasCcnlTermSuccess	The total number of successful terminating CCNL invocations. Counter on MTAS node.

Reference [1].

4.1.2.23 Flexible Communication Distribution

Equation 93. IMS MMTel AS Flexible Communication Distribution (FCD) Invocation Attempts [per second]

$$IMSMMTelASFCDInvocationAttempts = \frac{(MtasFcdOk)}{T}$$

Counter Name	Definition
MtasFcdOk	The number of successful FCD invocations. The counter is keyed by the conditions of the matching rule or with DEFAULT if no such exist (unconditional case). Counter on MTAS node.

Reference [1].

4.1.2.24 Short Number Dialing

Equation 94. IMS MMTel AS Originating Short Number Dialing (SND) Invocation Attempts [per second]

$$IMSMMTelASOrgSNDInvocationAttempts = \frac{MtasSndOrigSuccAttempt}{T}$$

Equation 95. IMS MMTel AS Terminating Short Number Dialing (SND) Invocation Attempts [per second]

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$$\frac{IMSMMTelASTermSNDInvocationAttempts}{T} =$$

Counter Name	Definition
MtasSndOrigSuccAttempt	Number of received 180 Ringing message or received 2xx (INVITE) if no 180 Ringing message has been received, by the originating MTAS. Counter on MTAS node.
MtasSndTermSuccAttempt	Number of received 180 Ringing message or received 2xx (INVITE) if no 180 Ringing message has been received, by the terminating MTAS. Counter on MTAS node.

Reference [1].

4.1.2.25 Service Centralization and Continuity (SCC)

Equation 96. IMS SCC AS Originating Service from CS Attempts [per second]

$$\frac{IMSSCCASCSOrigInvocationAttempts}{T} =$$

$$\frac{(MtasSccInitOrigSessCsOk + MtasSccInitOrigSessCsNOkE + MtasSccInitOrigSessCsNokI)}{T}$$

Equation 97. IMS SCC AS Originating Service from PS Attempts [per second]

$$\frac{IMSSCCASPSOrigInvocationAttempts}{T} =$$

$$\frac{(MtasSccInitOrigSessPsOk + MtasSccInitOrigSessPsNOkE + MtasSccInitOrigSessPsNokI)}{T}$$

Equation 98. IMS SCC AS Originating Unregistered Service from CS Attempts [per second]

$$\frac{IMSSCCASCSOrigUnregInvocationAttempts}{T} =$$

$$\frac{(MtasSccInitOrigUnregSessCsOk + MtasSccInitOrigUnregSessCsNOkE + MtasSccInitOrigUnregSessCsNokI)}{T}$$

Equation 99. IMS SCC AS Originating Unregistered Service from PS Attempts [per second]

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$$\frac{IMSSCCASPSOrigUnregInvocationAttempts = (MtasSccInitOrigUnregSessPsOk + MtasSccInitOrigUnregSessPsNOkE + MtasSccInitOrigUnregSessPsNOkI)}{T}$$

Equation 100. IMS SCC AS Terminating Service Attempts [per second]

$$\frac{IMSSCCASTermInvocationAttempts = (MtasSccInitTermSessOk + MtasSccInitTermSessNOkE + MtasSccInitTermSessNOkI)}{T}$$

Equation 101. IMS SCC AS Terminating Unregistered Service Attempts [per second]

$$\frac{IMSSCCASTermUnregInvocationAttempts = (MtasSccInitTermUnregSessOk + MtasSccInitTermUnregSessNOkE + MtasSccInitTermUnregSessNOkI)}{T}$$

Equation 102. IMS SCC AS Terminating Service to VoLTE CS UE Attempts [per second]

$$\frac{IMSSCCASCSTermInvocationAttempts = (MtasSccTermCsSuccAttempt + MtasSccTermCsFailedAttempt)}{T}$$

Equation 103. IMS SCC AS Terminating Service to VoLTE PS UE Attempts [per second]

$$\frac{IMSSCCASPsTermInvocationAttempts = (MtasSccTermPsSuccAttempt + MtasSccTermPsFailedAttempt)}{T}$$

Equation 104. IMS SCC AS Terminating Unregistered Service to VoLTE CS UE Attempts [per second]

$$\frac{IMSSCCASCSTermUnregInvocationAttempts = (MtasSccTermUnregCsSuccAttempt + MtasSccTermUnregCsFailedAttempt)}{T}$$

Equation 105. IMS SCC AS Terminating Unregistered Service to VoLTE PS UE Attempts [per second]

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$$\frac{IMSSCCASPsTermUnregInvocationAttempts = (MtasSccTermUnregPsSuccAttempt + MtasSccTermUnregPsFailedAttempt)}{T}$$

Counter Name	Definition
MtasScclnitOrigSessCsOk	The accumulated number of SCC session attempts from the CS access domain, in the originating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy. Counter on MTAS node.
MtasScclnitOrigSessCsNOkE	The accumulated number of SCC session attempts from the CS access domain, in the originating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to external reasons, for example invalid feature tag, too many media components in SDP.. Counter on MTAS node.
MtasScclnitOrigSessCsNOkI	The accumulated number of SCC session attempts from the CS access domain, in the originating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage. Counter on MTAS node.
MtasScclnitOrigSessPsOk	The accumulated number of SCC session attempts from the PS access domain, in the originating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy. Counter on MTAS node.

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Counter Name	Definition
MtasScclnitOrigSessPsNOkE	The accumulated number of SCC session attempts from the PS access domain, in the originating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to external reasons, for example invalid feature tag, too many media components in SDP, ICS UE signalling over Gm when attached to CS is not supported. Counter on MTAS node.
MtasScclnitOrigSessPsNOkI	The accumulated number of SCC session attempts from the PS access domain, in the originating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage. Counter on MTAS node.
MtasScclnitOrigUnregSessCsOk	The accumulated number of SCC session attempts from an unregistered user in the CS access domain, in the originating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy. Counter on MTAS node.
MtasScclnitOrigUnregSessCsNOkE	The accumulated number of SCC session attempts from an unregistered user on the CS access domain, in the originating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address. Incremented by 1 when the INVITE was rejected due to external reasons, for example invalid feature tag, too many media components in SDP. Incremented by 1 when the SCC AS rejects an INVITE unregistered from the CS domain due to external reasons, e.g. request not supported by SCC AS Counter on MTAS node.

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Counter Name	Definition
MtasScclnitOrigUnregSessCsNOKI	<p>The accumulated number of SCC session attempts from an unregistered user in the CS access domain, in the originating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage.</p> <p>Counter on MTAS node.</p>
MtasScclnitOrigUnregSessPsOk	<p>The accumulated number of SCC session attempts from an unregistered user on the PS access domain, in the originating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy.</p> <p>Counter on MTAS node.</p>
MtasScclnitOrigUnregSessPsNOkE	<p>The accumulated number of SCC session attempts from an unregistered user in the PS access domain, in the originating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE was rejected due to external reasons, for example invalid feature tag, too many media components in SDP, ICS UE signalling over Gm when attached to CS is not supported.</p> <p>Counter on MTAS node.</p>
MtasScclnitOrigUnregSessPsNOKI	<p>The accumulated number of SCC session attempts from an unregistered user in the PS access domain, in the originating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage.</p> <p>Counter on MTAS node.</p>

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Counter Name	Definition
MtasScclnitTermSessOk	<p>The accumulated number of SCC session attempts, in the terminating MTAS, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy.</p> <p>Counter on MTAS node.</p>
MtasScclnitTermSessNOKE	<p>The accumulated number of SCC session attempts, in the terminating MTAS, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address.</p> <p>The counter is incremented by 1 in the terminating MTAS if; the INVITE-ACK transaction did not conclude successfully or any signaling transactions to external nodes failed or timed out and the configuration of the MTAS required the interaction with the external node to be successful in order to proceed the session. The counter will only be stepped for one of the reasons (once, that is) for a particular session.</p> <p>Counter on MTAS node.</p>
MtasScclnitTermSessNOKI	<p>The accumulated number of SCC session attempts, in the terminating MTAS, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage.</p> <p>Counter on MTAS node.</p>
MtasScclnitTermUnregSessOk	<p>The accumulated number of SCC session attempts, in the terminating MTAS to an unregistered user, which was either answered, not answered, or was rejected by a service due to operator policy. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE-ACK transaction has concluded after the final response or when the INVITE was rejected by a service due to operator policy.</p> <p>Counter on MTAS node.</p>

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Counter Name	Definition
MtasScclnitTermUnregSessNOkE	<p>The accumulated number of SCC session attempts, in the terminating MTAS to an unregistered user, which was rejected due to node external reasons. The counter is keyed on the CSCF IP address.</p> <p>The counter is incremented by 1 in the terminating MTAS if; the INVITE-ACK transaction did not conclude successfully or any signaling transactions to external nodes failed or timed out and the configuration of the MTAS required the interaction with the external node to be successful in order to proceed the session. The counter will only be stepped for one of the reasons (once, that is) for a particular session.</p> <p>Counter on MTAS node.</p>
MtasScclnitTermUnregSessNOkI	<p>The accumulated number of SCC session attempts, in the terminating MTAS to an unregistered user, which was rejected due to node internal reasons. The counter is keyed on the CSCF IP address.</p> <p>Incremented by 1 when the INVITE was rejected due to internal reasons, for example processor or memory shortage.</p> <p>Counter on MTAS node.</p>
MtasSccTermCsSuccAttempt	<p>The accumulated number of terminating INVITE requests from SCC AS that were successfully responded by a VoLTE UE on the CS access domain.</p> <p>The counter is incremented when receiving the 180 Ringing message or when receiving the 200 OK message if no 180 Ringing message has been received.</p> <p>Counter on MTAS node.</p>
MtasSccTermCsFailedAttempt	<p>The accumulated number of terminating registered INVITE requests to VoLTE UE on CS domain that were rejected. The CSCF IP address is used as key.</p> <p>The counter is incremented when receiving 3xx/4xx/5xx/6xx message.</p> <p>Counter on MTAS node.</p>
MtasSccTermPsSuccAttempt	<p>The accumulated number of terminating INVITE requests from SCC AS that were successfully responded by a VoLTE UE on the PS access domain. The CSCF IP address is used as key.</p> <p>The counter is incremented when receiving the 180 Ringing message or when receiving the 200 OK message if no 180 Ringing message has been received.</p> <p>Counter on MTAS node.</p>

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Counter Name	Definition
MtasSccTermPsFailedAttempt	This counter is the accumulated number of terminating initial INVITE requests to VoLTE UE on CS domain that were rejected. The CSCF IP address is used as key. The counter is incremented when receiving 3xx/4xx/5xx/6xx message. Counter on MTAS node.
MtasSccTermUnregCsSuccAttempt	The accumulated number of terminating unregistered INVITE requests from SCC AS that were successfully responded by a VoLTE UE on the CS access domain. The CSCF IP address is used as key. The counter is incremented when receiving the 180 Ringing message or when receiving the 200 OK message if no 180 Ringing message has been received. Counter on MTAS node.
MtasSccTermUnregCsFailedAttempt	The accumulated number of terminating unregistered INVITE requests to VoLTE UE on CS domain that were rejected. The CSCF IP address is used as key. The counter is incremented when receiving 3xx/4xx/5xx/6xx message. Counter on MTAS node.
MtasSccTermUnregPsSuccAttempt	The accumulated number of terminating unregistered INVITE requests from SCC AS that were successfully responded by a VoLTE UE on the PS access domain. The CSCF IP address is used as key. The counter is incremented when receiving the 180 Ringing message or when receiving the 200 OK message if no 180 Ringing message has been received. Counter on MTAS node.
MtasSccTermUnregPsFailedAttempt	The accumulated number of terminating unregistered INVITE requests from SCC AS that were successfully responded by a VoLTE UE on the PS access domain. The CSCF IP address is used as key. The counter is incremented when receiving the 180 Ringing message or when receiving the 200 OK message if no 180 Ringing message has been received. Counter on MTAS node.

Reference [1].

4.1.2.26 Single Radio Voice Call Continuity (SRVCC)

Equation 106. IMS SCC AS Single Radio Voice Call Continuity (SRVCC) Invocation Attempts [per second]

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$$\frac{IMSSCCASSRVCCInvocationAttempts = (MtasSrvccTransferOk + MtasSrvccTransferNOkE + MtasSrvccTransferNOkI)}{T}$$

Equation 107. IMS SCC AS SR-VCC Access Transfer Attempts[per second]

$$\frac{IMSSCCASSRVCCAccessTransferAttempts = (MtasSrvccActiveAttempt + MtasSrvccAlertingAttempt + MtasSrvccPreAlertingAttempt + MtasSrvccMidcallAttempt)}{T}$$

Counter Name	Definition
MtasSrvccTransferOk	The number of successful access transfers using Single Radio Voice Call Continuity. Counter on MTAS node.
MtasSrvccTransferNOkE	The number of unsuccessful (due to node external error) access transfers attempts using Single Radio Voice Call Continuity. Counter on MTAS node.
MtasSrvccTransferNOkI	The number of unsuccessful (due to node internal error) access transfers attempts using Single Radio Voice Call Continuity. Counter on MTAS node.
MtasSrvccActiveAttempt	The number of SRVCC access transfer attempts of session in Active state. The counter is incremented when an INVITE due to STN-SR is received and the target session is in active state. Counter on MTAS node.
MtasSrvccAlertingAttempt	The number of SRVCC access transfer attempts of session in Alerting state. The counter is incremented when an INVITE due to ATU-STI is received and the target session is in alerting state. Counter on MTAS node.
MtasSrvccPreAlertingAttempt	The number of SRVCC access transfer attempts of session in pre-Alerting state. The counter is incremented when an INVITE due to ATU-STI is received and the target session is in pre-alerting state. Counter on MTAS node.

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Counter Name	Definition
MtasSrvccMidcallAttempt	The number of SRVCC Mid-call access transfer attempts. The counter is incremented when an access transfer INVITE is received, SCC AS applies SRVCC Mid-call and transfers a Held call or an additional call. Counter on MTAS node

Reference [1].

4.1.2.27 Customer Alerting Tones (CAT)

Equation 108. IMS MMTel AS Customer Alerting Tones (CAT) Invocation Attempts [per second]

$$\text{IMSMMTelASCATInvocationAttempts} = \frac{(\text{MtasCatSignalOk} + \text{MtasCatSignalNOkE} + \text{MtasCatSignalNOKI})}{T}$$

Counter Name	Definition
MtasCatSignalOk	The number of successful Customized Alerting Tones sending requests to the external CAT server. Key is CAT server IP address or FQDN. Counter on MTAS node.
MtasCatSignalNOkE	The number of Customized Alerting Tones sending requests that failed due to external reasons. The counter is incremented when a non-200 response is received from the CAT-S or the request time outs. Key is CAT server IP address or FQDN. Counter on MTAS node.
MtasCatSignalNOKI	The number of Customized Alerting Tones sending requests that failed due to internal reasons. Key is CAT server IP address or FQDN. Counter on MTAS node.

Reference [1].

4.1.2.28 Session Transfer to Own Device (STOD)

Transfer to Own Device (STOD) Call Push Service

Equation 109. IMS MMTel AS Session Transfer to Own Device (STOD) Invocation Attempts [per second]

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IMSMMTelASSTODInvocationAttempts =

MtasStodAttempt

T

Transfer to Own Device (STOD) Call Pull Service

Equation 110. IMS MMTel AS Session Transfer to Own Device (STOD) Call Pull Invocation Attempts [per second]

IMSMMTelASSTODCallPullInvocationAttempts =

(*MtasStodCallPullOk* + *MtasStodCallPullFailure* +

MtasStodCallPullNOkE + *MtasStodCallPullNOKI*)

T

Counter Name	Definition
<i>MtasStodAttempt</i>	The total number of STOD invocations. Counter on MTAS node.
<i>MtasStodCallPullOk</i>	The number of successful Call Pull attempts. The counter is incremented by 1 when the Call Pull invocation is successful. Counter on MTAS node.
<i>MtasStodCallPullFailure</i>	The number of unsuccessful Call Pull attempts due to Call pull policies or unfulfilled preconditions. The counter is incremented by 1 when the invocation of Call Pull failed due to enabled Call pull policies or due to service preconditions check. Counter on MTAS node.
<i>MtasStodCallPullNOkE</i>	The number of unsuccessful Call Pull attempts due to system external errors. The counter is incremented by 1 when the invocation of the Call Pull failed due to an error in the interworking node. Counter on MTAS node.
<i>MtasStodCallPullNOKI</i>	The number of unsuccessful Call Pull attempts due to system internal errors. Counter on MTAS node.

Reference [1].

4.1.2.29

Parlay-X

Equation 111. IMS MMTel AS Parlay-X Request Received [per second]

IMSMMTelASPxReceived = $\frac{\text{MtasPxReceivedRequests}}{T}$

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Equation 112. IMS MMTel AS Parlay-X Request Sent [per second]

$$IMSMMTelASPxSent = \frac{MtasPxSentRequests}{T}$$

Note: Service Parlay-X Session requests may be calculated per Parlay-X server or for the MTAS node.

Counter Name	Definition
MtasPxReceivedRequests	The counter is incremented when receiving a Parlay X Request in MTAS. Key is Parlay-X server. Counter on MTAS node.
MtasPxSentRequests	The number of times Parlay X requests are sent to the Parlay X application. Counter on MTAS node.

Reference [1].

4.1.2.30 Call Return (CR)

Equation 113. IMS MMTel AS Call Return Service Attempts [per second]

$$IMSMMTelASCRAttempts = \frac{(MtasCrInvAnnOk + MtasCrInvNOkE + MtasCrInvNOkI)}{T}$$

Counter Name	Definition
MtasCrInvAnnOk	This counter is the accumulated number of successful Call Return (CR) with announcement attempts. Counter on MTAS node.
MtasCrInvNOkE	This counter is the accumulated number of unsuccessful Call Return (CR) with no announcement attempts (due to node external error). Incremented by 1 when when an INVITE request is NOT sent by MTAS due to a node external error after the caller has invoked the CR service. Counter on MTAS node.

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Counter Name	Definition
MtasCrInwNOKI	This counter is the accumulated number of unsuccessful Call Return (CR) with no announcement attempts (due to node internal error). Incremented by 1 when when an INVITE request is NOT sent by MTAS due to a node internal error after the caller has invoked the CR service. Counter on MTAS node.

Reference [1].

4.1.2.31 Closed User Group (CUG)

Equation 114. IMS MMTel AS Closed User Group (CUG) Service Attempts [per second]

$$IMSMMTelASCUGAttempts = \frac{(MtasCugOk + MtasCugRejected)}{T}$$

Counter Name	Definition
MtasCugOk	The number of successful calls in a Closed User Group. Counter on MTAS node.
MtasCugRejected	The number of INVITEs rejected by the Closed User Group (CUG) service. Counter on MTAS node.

Reference [1].

4.1.2.32 Operator Controlled Transfer (OCT)

Equation 115. IMS MMTel AS Operator Controlled Transfer (OCT) Service Attempts [per second]

$$IMSMMTelASOCTAttempts = \frac{MtasOctTransferAttempt}{T}$$

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Counter Name	Definition
MtasOctTransferAttempt	This counter is the accumulated number of call attempt to the target of Operator Controlled Transfer (OCT). The counter is keyed on the phone number to the Operator Transferor. Incremented by 1 when when an INVITE request is sent by MTAS to the target of Operator Controlled Transfer (OCT). Counter on MTAS node.

Reference [1].

4.1.2.33 Ring Back Tone (RBT) Requests

Equation 116. IMS MMTel AS Ring Back Tone Requests [per second]

$$\text{IMSMMTelASRBT Requests} = \frac{(\text{MtasRbtOk} + \text{MtasRbtNOkE} + \text{MtasRbtNOkI})}{T}$$

Counter Name	Definition
MtasRbtOk	The number of successful Ring Back Tones sending requests to the MRFP. Counter on MTAS node.
MtasRbtNOkE	The number of Ring Back Tones sending requests that failed due to external reasons. Counter on MTAS node.
MtasRbtNOkI	The number of Ring Back Tones sending requests that failed due to internal reasons. The counter is incremented when an initial request to the eMRFP is failed due to MTAS internal failure. Counter on MTAS node.

Reference [1].

4.1.2.34 CAMEL Application Part (CAP) Requests

Equation 117. IMS SCC AS CAP Requests [per second]

$$\text{IMSSCCASCAP Requests} = \frac{(\text{MtasSdsCapInitDPok} + \text{MtasSdsCapInitDPNOkE} + \text{MtasSdsCapInitDPNOkI})}{T}$$

Counter Name	Definition
MtasSdsCapInitDPok	This counter is the accumulated number of CAMEL Application Part (CAP) InitialDP requests processed successfully. Counter on MTAS node.

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Counter Name	Definition
MtasSdsCapInitDPNOkE	This counter is the accumulated number of CAMEL Application Part (CAP) InitialDP requests that failed because the request message was faulty, for example missing mandatory parameter or parameter having unknown value. Counter on MTAS node.
MtasSdsCapInitDPNOkI	This counter is the accumulated number of CAMEL Application Part (CAP) InitialDP requests that failed because of problems internal to the SCC AS, an IMRN could not be allocated, for example because of no free IMRN. Counter on MTAS node.

Reference [1].

4.1.3 MMTel Interface Summary

T = measured/reported time in seconds

Equation 118. IMS MTAS Number of Dh Requests [per second]

$$IMS_{MtasNumberDh\ Requests} = \frac{(MtasShRedirect + MtasShRedirectFailed)}{T}$$

Equation 119. IMS MTAS Number of Sh Requests [per second]

$$IMS_{MtasNumberSh\ Requests} = \frac{(MtasShPullOk + MtasShSubsNotifOk + MtasShNotifOk + MtasShUpdateOk)}{T}$$

Note: Formula is expressed per key on Stack instance and HSS destination host name, or HSS realm, could also summarize all directions.

Equation 120. IMS MTAS Number of SIP Requests [per second]

$$IMS_{MtasNumberSIP\ Requests} = \frac{(MtasSipSummaryInRequests + MtasSipSummaryOutRequests)}{T}$$

Equation 121. IMS SCC-AS SIP Orig Requests [per second]

$$IMS_{SCCASOrgSIP\ Requests} = \frac{(MtasSipSccOrigRequestIn + MtasSipSccOrigRequestOut)}{T}$$

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Equation 122. IMS SCC-AS SIP Term Requests [per second]

$$\text{IMSSCCASTermSIP Requests} = \frac{(\text{MtasSipSccTermRequestIn} + \text{MtasSipSccTermResponseOut})}{T}$$

Equation 123. IMS MTAS Number of Charging Requests [per second]

$$\text{IMSMtasNumberCharging Requests} = \frac{(2 * \text{MtasChargingAcrStartOk} + \text{MtasChargingAcrInterimOk} + \text{MtasChargingBackupStart} + \text{MtasChargingBackupInterim} + \text{MtasChargingBackupStop} + \text{MtasChargingAcrEventOk} + 2 * \text{MtasChargingCcrInitOk} + \text{MtasChargingCcrUpdateOk} + \text{MtasChargingCcrFailover} + \text{MtasChargingRttiOk})}{T}$$

Comment: For each MtasChargingAcrStartOk, there is a MtasChargingAcrStop and for each MtasChargingCcrInitOk, there will be a MtasChargingCcrTerm for which there are no counters, therefore the MtasChargingAcrStartOk and MtasChargingCcrInitOk values are doubled.
Note: Formula is expressed per key on charging destination (destination realm or destination host), could also summarize all destinations.

Equation 124. IMS MTAS Number of ACR Storage Requests [per second]

$$\text{IMSMtasNumberAcrStorage Requests} = \frac{\text{MtasChargingAcrStorageEvent} + \text{MtasChargingAcrStorageInterim} + (\text{MtasChargingAcrStorageStart} + \text{MtasChargingAcrStorageStop})}{T}$$

Equation 125. IMS MTAS Number of XDMS (Ut) Requests [per second]

$$\text{IMSMtasNumberXDMSUt Requests} = \frac{(\text{MtasXdmsXcapGetOk} + \text{MtasXdmsXcapPutOk} + \text{MtasXdmsXcapDeleteOk})}{T}$$

Equation 126. IMS MTAS Number of CA3G Requests [per second]

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$$\begin{aligned}
 & \text{IMSMtasNumberCAI3G Requests} = \\
 & (\text{MtasXdmsCai3gLoginOk} + \text{MtasXdmsCai3gCreateOk} + \\
 & \text{MtasXdmsCai3gDeleteOk} + \text{MtasXdmsCai3gGetOk} + \\
 & \text{MtasXdmsCai3gSetOk} + \text{MtasXdmsCai3gValidateCreateOk} + \\
 & \text{MtasXdmsCai3gValidateSetOk}) \\
 & \hline
 & T
 \end{aligned}$$

Equation 127. IMS MTAS Number of XDMS CCMP Conf Requests [per second]

$$\begin{aligned}
 & \text{IMSMtasNumberXDMSCCMPConf Requests} = \\
 & (\text{MtasXdmsCcmpConfCreateOk} + \\
 & \text{MtasXdmsCcmpConfDeleteOk} + \\
 & \text{MtasXdmsCcmpConfRetrieveOk} + \\
 & \text{MtasXdmsCcmpConfUpdateOk}) \\
 & \hline
 & T
 \end{aligned}$$

CCMP Centralized Conferencing Manipulation Protocol

Equation 128. IMS MTAS Number of XDMS CCMP User Requests [per second]

$$\begin{aligned}
 & \text{IMSMtasNumberXDMSCCMPUser Requests} = \\
 & (\text{MtasXdmsCcmpUserCreateOk} + \\
 & \text{MtasXdmsCcmpUserDeleteOk} + \\
 & \text{MtasXdmsCcmpUserUpdateOk}) \\
 & \hline
 & T
 \end{aligned}$$

CCMP Centralized Conferencing Manipulation Protocol

Equation 129. IMS MTAS Number of H.248 Requests to MRFP [per second]

$$\begin{aligned}
 & \text{IMSMtasNumberH248 RequestsToMRFP} = \\
 & (\text{MtasMrfpOkAddReq} + \text{MtasMrfpOkModifyReq} + \\
 & \text{MtasMrfpOkSubtractReq} + \text{MtasMrfpOkAuditReq}) \\
 & \hline
 & T
 \end{aligned}$$

Note: Formula is expressed per key on MRFP ID, could also summarize all MRFP destinations.

Equation 130. IMS MTAS Number of H.248 Requests from MRFP [per second]

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$$\frac{IMSMtasNumberH248RequestsFromMRFP = (MtasMrfpOkNotifyReq + MtasMrfpOkServiceChangeReq)}{T}$$

Note: Formula is expressed per key on MRFP ID, could also summarize all MRFP destinations.

Equation 131. IMS MMTel AS Number of SIP INVITE requests sent to external MRFC [per second]

$$\frac{IMSMMTelASNumberInvitesToExtMRFC = MtasExtMrfcInviteOk}{T}$$

Note: Formula is expressed per key on Contact header field, could also summarize all contacts.

Equation 132. IMS MMTel AS Number of Media Server Control Markup Language (MSCML) requests sent to external MRFC [per second]

$$\frac{IMSMMTelASNumberMSCMLReqToExtMRFC = (MtasExtMrfcRequestOk + MtasExtMrfcRequestNOk)}{T}$$

Equation 133. IMS MMTel AS Number of Parlay X requests sent to Parlay X application [per second]

$$\frac{IMSMMTelASNumberParlayXRequests = MtasPxSentRequests}{T}$$

Note: Formula is expressed per key on interface request name, could also summarize interfaces.

Note: Equation 100, 101 and 102 are not available in virtualized MTAS.

Counter Name	Definition
MtasShRedirect	The number of Sh-Redirect (Dh) operations that were completed successfully. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>.. Counter on MTAS node.

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Counter Name	Definition
MtasShRedirectFailed	The number of failed Sh-Redirect (Dh) operations. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>. Counter on MTAS node.
MtasShPullOk	The number of Sh-Pull operations that were completed successfully. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format: <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>. Counter on MTAS node.
MtasShSubsNotifOk	The number of Sh-Subs-Notif operations that were completed successfully. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format: <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>.
MtasShNotifOk	The number of Sh-Notif requests that were processed successfully. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format: <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>. Counter on MTAS node.
MtasShUpdateOk	The number of Sh-Update operations that were completed successfully. The counter is keyed on the Stack instance and either HSS destination host name (taken from the Request message) or HSS origin host name (taken from the Answer message). The format: <Stack_instance>;<Destination_Host> or <Stack_instance>;<Origin-Host>. Counter on MTAS node.
MtasSipSummaryInRequests	The total number of SIP requests received, including retransmissions. Counter on MTAS node.

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Counter Name	Definition
MtasSipSummaryOutRequests	The total number of SIP request messages sent out (originated and relayed) by the SIP entity. Where a particular message is sent more than once, for example as a retransmission, or as a result of forking, each transmission is counted separately. Counter on MTAS node.
MtasSipSccOrigRequestIn	This counter is the total number of SIP requests received in originating SCC AS, including retransmissions. The counter is keyed on request method. Counter on MTAS node.
MtasSipSccOrigRequestOut	This counter is the the total number of SIP request messages sent out by the originating SCC AS. Where a particular message is sent more than once, for example, as a retransmission or as a result of forking, each transmission is counted separately. The counter is keyed on request method. Counter on MTAS node.
MtasSipSccTermRequestIn	This counter is the total number of SIP requests received in terminating SCC AS, including retransmissions. The counter is keyed on request method. Counter on MTAS node.
MtasSipSccTermRequestOut	This counter is the total number of SIP request messages sent out by the terminating SCC AS. Where a particular message is sent more than once, for example, as a retransmission or as a result of forking, each transmission is counted separately. The counter is keyed on request method. Counter on MTAS node.
MtasChargingAcrStartOk	The number of successfully initiated accounting sessions. Keyed on charging destination (destination realm or destination host). Counter on MTAS node.
MtasChargingAcrInterimOk	The number of successful ACR Interim requests. Keyed on charging destination (destination realm or destination host). Counter on MTAS node.
MtasChargingAcrEventOk	Number of successfully handled ACR (Event Record) messages. The counter is keyed on the charging destination (destination realm or destination host). Counter on MTAS node.
MtasChargingBackupStart	The number of charging start requests sent to backup. Keyed on charging destination (destination realm or destination host). Counter on MTAS node.

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Counter Name	Definition
MtasChargingBackupInterim	The number of charging interim requests sent to backup. Keyed on charging destination (destination realm or destination host). Counter on MTAS node.
MtasChargingBackupStop	The number of charging stop requests sent to backup. Keyed on charging destination (destination realm or destination host). Counter on MTAS node.
MtasChargingCcrInitOk	The number of successfully initiated online charging sessions. Keyed on charging destination (destination realm or destination host). Counter on MTAS node.
MtasChargingCcrUpdateOk	The number of successful CCR Update Requests. Keyed on charging destination (destination realm or destination host). Counter on MTAS node.
MtasChargingCcrFailover	The number of online charging sessions that could not use the charging server in the primary realm, and failed over to the secondary realm. Keyed on charging destination (destination realm or destination host). Counter on MTAS node.
MtasChargingRttiOk	Real-Time Transfer of Tariff Information (RTTI) has been signalled backward to MTAS and successfully provided into the Online Charging System (OCS). The counter is keyed on the DestinationRealm. Counter on MTAS node.
MtasChargingAcrStorageEvent	The number of charging event requests sent for storage. The counter is keyed on the charging destination (destination realm or destination host). The counter is incremented by 1 when a charging event request is sent for ACR storage. Counter on MTAS node.
MtasChargingAcrStorageInterim	The number of charging interim requests sent for storage. The counter is keyed on the charging destination (destination realm or destination host). The counter is incremented by 1 when a charging interim request is sent for storage. Counter on MTAS node.
MtasChargingAcrStorageStart	The number of charging start requests sent for storage. The counter is keyed on the charging destination (destination realm or destination host). The counter is incremented by 1 when a charging start request is sent for ACR storage. Counter on MTAS node.

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Counter Name	Definition
MtasChargingAcrStorageStop	The number of charging stop requests sent for storage. The counter is keyed on the charging destination (destination realm or destination host). The counter is incremented by 1 when a charging stop request is sent for ACR storage. Counter on MTAS node.
MtasXdmsXcapGetOk	Contains the number of Ut interface XCAP GET requests that resulted in a successful response. Counter on MTAS node.
MtasXdmsXcapPutOk	Contains the number of Ut interface XCAP PUT requests that resulted in a successful response. Counter on MTAS node.
MtasXdmsXcapDeleteOk	Contains the number of Ut interface XCAP DELETE requests that resulted in a successful response. Counter on MTAS node.
MtasXdmsCai3gLoginOk	Contains the number of CAI3G Login requests that resulted in a successful response. Counter on MTAS node.
MtasXdmsCai3gCreateOk	Contains the number of provisioning CAI3G Create requests that resulted in a successful response. The counter is keyed on the IP address of CAI3G Manager. Counter on MTAS node.
MtasXdmsCai3gDeleteOk	Contains the number of CAI3G Delete requests that resulted in a successful response. Counter on MTAS node.
MtasXdmsCai3gGetOk	Contains the number of CAI3G Get requests that resulted in a successful response. Counter on MTAS node.
MtasXdmsCai3gSetOk	Contains the number of provisioning CAI3G Set requests that resulted in a successful response. The counter is keyed on the IP address of CAI3G Manager. Counter on MTAS node.
MtasXdmsCai3gValidateCreateOk	Contains the number of Validate CAI3G Create requests that resulted in a successful or unsuccessful, because of not correct document, response. The counter is keyed on the IP address of CAI3G Manager. Counter on MTAS node.
MtasXdmsCai3gValidateSetOk	Contains the number of Validate CAI3G Set requests that resulted in a successful or unsuccessful, because of not correct document, response. The counter is keyed on the IP address of CAI3G Manager. Counter on MTAS node.
MtasXdmsCcnpConfCreateOk	Contains the number of CCMP confRequest operation create, that resulted in a successful response.

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Counter Name	Definition
MtasXdmsCcmpConfDeleteOk	Contains the number of CCMP confRequest operation delete, that resulted in a successful response.
MtasXdmsCcmpConfRetreiveOk	Contains the number of CCMP confRequest operation retrieve, that resulted in a successful response.
MtasXdmsCcmpConfUpdateOk	Contains the number of CCMP confRequest operation update, that resulted in a successful response.
MtasXdmsCcmpUserCreateOk	Contains the number of CCMP UserRequest operation create, that resulted in a successful response.
MtasXdmsCcmpUserDeleteOk	Contains the number of CCMP UserRequest operation delete, that resulted in a successful response.
MtasXdmsCcmpUserUpdateOk	Contains the number of CCMP UserRequest operation update, that resulted in a successful response.
MtasMrfpOkAddReq	Successfully sent AddRequest commands to an external MRFP peer. Keyed on MRFP ID. Counter on MTAS node.
MtasMrfpOkNotifyReq	The number of correct NotifyRequest commands received from an external MRFP peer. Keyed on MRFP ID. Counter on MTAS node.
MtasMrfpOkModifyReq	The number of successfully sent ModifyRequest commands to an MRFP peer. Keyed on MRFP ID. Counter on MTAS node.
MtasMrfpOkSubtractReq	The number of successfully sent SubtractRequest commands to an MRFP peer. Keyed on MRFP ID. Counter on MTAS node.
MtasMrfpOkAuditReq	The number of successfully sent AuditRequest commands to an MRFP peer. Keyed on MRFP ID. Counter on MTAS node.
MtasMrfpOkServiceChangeReq	The number of successfully received ServiceChange commands to an MRFP peer. Keyed on MRFP ID. Counter on MTAS node.
MtasExtMrfcInviteOk	The number of times a SIP INVITE sent to external MRFC is OK. The counter is keyed on the Contact header field received in 200 OK (INVITE). Counter on MTAS node.
MtasExtMrfcInviteRejected	The number of times a SIP INVITE sent to external MRFC is rejected. Counter on MTAS node.
MtasExtMrfcRequestOk	The number of times a Media Server Control Markup Language (MSCML) request is successfully executed by the external MRFC.
MtasExtMrfcRequestNok	The number of times a Media Server Control Markup Language (MSCML) request is not executed by the external MRFC.

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Counter Name	Definition
MtasPxSentRequests	The number of times Parlay X requests are sent to the Parlay X application. Counter on MTAS node.

Note: The CCMP related counters are not available in virtualized MTAS. These are MtasXdmsCcmpConfCreateOk, MtasXdmsCcmpConfDeleteOk, MtasXdmsCcmpConfRetreiveOk, MtasXdmsCcmpConfUpdateOk, MtasXdmsCcmpUserCreateOk, MtasXdmsCcmpUserDeleteOk, MtasXdmsCcmpUserUpdateOk.

Reference [1].

5 IMS SIP Signaling

SIP being the signalling protocol in IMS is the single most important protocol. The IMS Signaling formulas are supporting quality supervision of IMS signalling.

5.1 IMS MTAS SIP Signalling Summary

IMS MTAS Signalling Summary indicators give an overall summary of SIP signaling in the MTAS node.

5.1.1 IMS MTAS SIP Client (Outgoing traffic)

T = measured/reported time in seconds

Equation 134. IMS MTAS SIP Requests Sent [per second]

$$IMSMTASSIPRequestsSent = \frac{MtasSipSummaryOutRequests}{T}$$

Equation 135. IMS MTAS SIP Responses Received [per second]

$$IMSMTASSIPResponsesReceived = \frac{MtasSipSummaryInResponses}{T}$$

5.1.2 IMS MTAS SIP Server (Incoming traffic)

Equation 136. IMS MTAS SIP Requests Received [per second]

$$IMSMTASSIPRequestsReceived = \frac{MtasSipSummaryInRequests}{T}$$

Equation 137. IMS MTAS SIP Responses Sent [per second]

$$IMSMTASSIPResponsesSent = \frac{MtasSipSummaryOutResponses}{T}$$

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5.1.3 IMS SCC-AS SIP Client (Outgoing traffic)

T = measured/reported time in seconds

Equation 138. IMS SCC-AS SIP Requests Sent [per second]

$$IMSSCCASSIPClient\ RequestSent = \frac{(MtasSipSccOrigRequestOut + MtasSipSccTermRequestOut)}{T}$$

Equation 139. IMS SCC-AS SIP Responses Received [per second]

$$IMSSCCASSIPClient\ Responses\ Received = \frac{(MtasSipSccOrigResponseIn + MtasSipSccTermResponseIn)}{T}$$

5.1.4 IMS SCC-AS SIP Server (Incoming traffic)

Equation 140. IMS SCC-AS SIP Requests Received [per second]

$$IMSSCCASSIPServer\ Req\ Received = \frac{(MtasSipSccOrigRequestIn + MtasSipSccTermRequestIn)}{T}$$

Equation 141. IMS SCC-AS SIP Responses Sent [per second]

$$IMSSCCASSIPServer\ ResponseSent = \frac{(MtasSipSccOrigResponseOut + MtasSipSccTermResponseOut)}{T}$$

5.1.5 IMS MTAS GLS SIP Client (Incoming traffic)

T = measured/reported time in seconds

Equation 142. IMS MTAS GLS Requests Received [per second]

$$IMSMTASGLSSIP\ ReqIn = \frac{(MtasSipGlsRequestIn)}{T}$$

Equation 143. IMS MTAS GLS Responses Sent [per second]

$$IMSMTASGLSSIP\ RespOut = \frac{(MtasSipGlsResponseOut)}{T}$$

5.1.6 IMS MTAS GLS SIP Server (Outgoing traffic)

T = measured/reported time in seconds

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Equation 144. IMS MTAS GLS Requests Sent [per second]

$$IMSMTASGLSSIP\ ReqOut = \frac{MtasSipOrigGlsRequestOut}{T}$$

Equation 145. IMS MTAS GLS Responses Received [per second]

$$IMSMTASGLSSIP\ RespIn = \frac{(MtasSipOrigGlsResponseIn)}{T}$$

Counter Name	Definition
MtasSipSummaryOutRequests	<p>The total number of SIP request messages sent out (originated and relayed) by the SIP entity. Where a particular message is sent more than once, for example as a retransmission, or as a result of forking, each transmission is counted separately. Counter on MTAS node.</p> <p>The counter does not necessarily reflect the sum of all MtasSipXXXRequestOut counters (as they are stepped further down the processing chain)</p>
MtasSipSummaryInResponses	<p>The total number of SIP responses received, including retransmissions. Counter on MTAS node.</p> <p>The counter does not necessarily reflect the sum of all MtasSipXXXResponseIn counters (as they are stepped further down the processing chain)</p>
MtasSipSummaryInRequests	<p>The total number of SIP requests received, including retransmissions. Counter on MTAS node.</p> <p>The counter does not necessarily reflect the sum of all MtasSipXXXRequestIn counters (as they are stepped further down the processing chain)</p>
MtasSipSummaryOutResponses	<p>The total number of SIP responses sent (originated and relayed), including retransmissions. Counter on MTAS node.</p> <p>The counter does not necessarily reflect the sum of all MtasSipXXXResponseOut counters (as they are stepped further down the processing chain)</p>

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Counter Name	Definition
MtasSipSccOrigRequestIn	This counter is the total number of SIP requests received in originating SCC AS, including retransmissions. The counter is keyed on request method. Counter on MTAS node.
MtasSipSccOrigResponseIn	This counter is the total number of SIP responses messages received by the originating SCC AS. Counter on MTAS node.
MtasSipSccOrigRequestOut	This counter is the the total number of SIP request messages sent out by the originating SCC AS. Where a particular message is sent more than once, for example, as a retransmission or as a result of forking, each transmission is counted separately. The counter is keyed on request method. Counter on MTAS node.
MtasSipSccOrigResponseOut	This counter is the total number of SIP response messages sent out by the originating SCC AS. Counter on MTAS node.
MtasSipSccTermRequestIn	This counter is the total number of SIP requests received in terminating SCC AS, including retransmissions. The counter is keyed on request method. Counter on MTAS node. Counter on MTAS node.
MtasSipSccTermResponseIn	This counter is the total number of SIP responses messages received by the terminating SCC AS. Counter on MTAS node.
MtasSipSccTermRequestOut	This counter is the total number of SIP request messages sent out by the terminating SCC AS. Where a particular message is sent more than once, for example, as a retransmission or as a result of forking, each transmission is counted separately. The counter is keyed on request method. Counter on MTAS node.
MtasSipSccTermResponseOut	This counter is the total number of SIP response messages sent out by the terminating SCC AS. Counter on MTAS node.
MtasSipGlsRequestIn	The number of SIP responses received from the GLS. Counter on MTAS node.
MtasSipGlsResponseOut	The number of SIP responses sent from the GLS. Counter on MTAS node.

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Counter Name	Definition
MtasSipOrigGlsRequestOut	The number of SIP requests sent to the GLS. Counter on MTAS node.
MtasSipOrigGlsResponseIn	The number of SIP responses received from the GLS. Counter on MTAS node.

Reference [1].

6 References

[1] MTAS Performance Measurements, 1/1553-AVA 901 29/9 **
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** See the Customer or Support library for the Application System in question