# **Customer Experience Management**

CXM Service Metrics

GB962 Addendum A Version 1.1





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#### 1. Introduction

This document is intended to give an overview on the standard Customer Experience Management standardized Service Modeling proposal and the related concepts being introduced in an effort to enable a standardized approach to the CEM measures.

# 1.1. Content and Navigation

This document is intended to be used in conjunction with the Excel worksheet which contains detailed descriptions of each of the Services, Dimensions and Measures.

#### **1.2. Uses**

The CXM Metrics proposal is intended to be a reference for implementers of Customer Experience Management (CXM) solutions. Solutions that expose the standardized Services with defined Measures and Dimensions and described in the document will enable standardized reports and data presentation on top of the CXM data as well as a starting point for farther analysis of CXM data.



# 2. CXM Metrics Structure

This section describes the structure and hierarchy of the proposed CXM metrics.

#### 2.1. CXM Metrics Structure

The Customer Experience Management Metrics are grouped into a series of Logical Services. Each Service represents a Customer-specific construct providing information on the Customer's interaction with that Service.

Each Service Entity (Figure 1 below) provides one or more CEIs and one or more Dimensions. Dimensions may provide additional provisioned attributes allowed Grouping, Filtering and Segmentation of the data.

By allowing additional attributes of dimensions then common attributes like "Billing type" for example can be provisioned for all Subscribers which allows us to Segment the data by "Billing type" or aggregate the results by "Billing type".

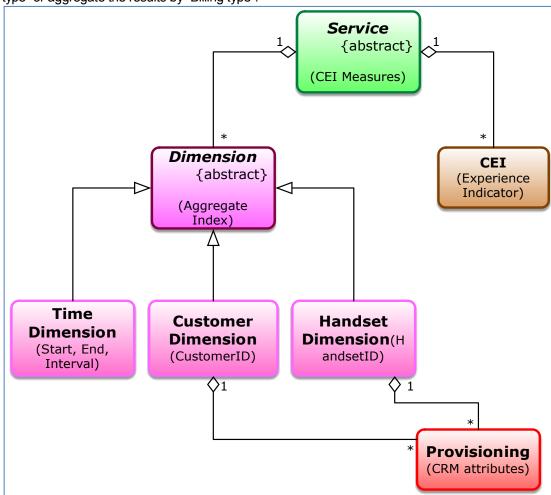


Figure 1 – Service Entities



To simplify the definition of Services in a CXM system we have opted for two common root service types (see Figure 2 below):

- Sessionised Services Where the Service interaction is long-running or stateful (from a Customer perspective)
- Transactional Services Where the Service consists of standalone short interactions.

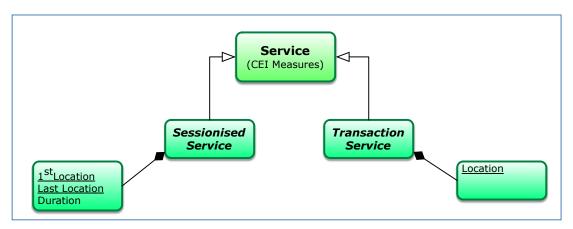


Figure 2 - Service Types

#### 2.2. Inheritance / Site Extensions

It is possible to extend from an existing Service and specify the additional dimensions or measures to be used.

In order to allow this an inheritance model is proposed where Services extend a parent service. Each child service exposes all of the dimensions and measures in the base (existing) service as well as any additional measures or dimensions required.

The extended service may allow different definitions for the available measures.



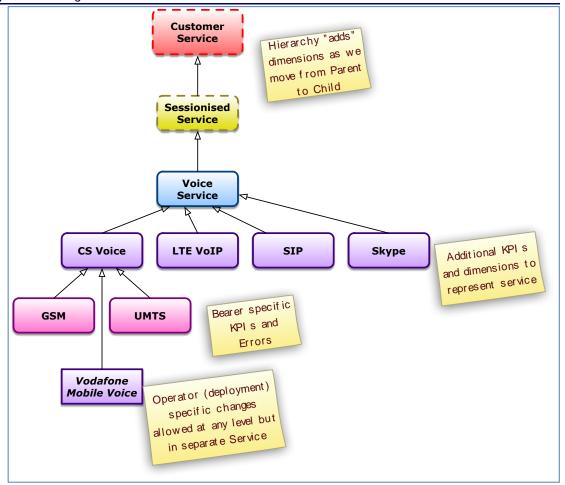


Figure 3 – Service Inheritance Example

In this example (Figure 3) a Generic Voice service is expanded (inherited from) to provide Bearer specific servers (Circuit Switched vs. VoIP) and furthermore to allow for OpCo specific extensions.

#### 2.3. Data Protection

Normally the root Service for all of the CXM Services is "Customer" which records a Customer ID that can be used to uniquely identify a single Subscriber.

In many legal jurisdictions there are restrictions on the persistence of per-Customer CXM metrics. The most common example of this would be storing Subscriber identifiers along with Web URLs for marketing purposes.

In order to represent this in the CXM metrics proposal an alternative parent Service is used in this called "Marketing Service".

In-lieu of a Subscriber identifier this instead records a customer segment, which ensures that the direct link between subscriber and service, is not maintained.



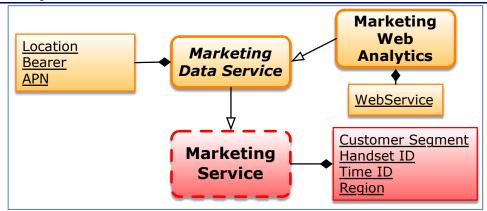


Figure 4 – Marketing Service

Note the same approach may be used in any other cases where it is not permitted to record metrics against individual subscribers directly.

Table 1 - CXM Services

Service Name	Service Description
Sessionised Service	Subclass of the Service Entity to represent all
	Customer Services that are Session-based.
	Adds 1st (Setup) and Last (Tear-down) location
	Dimensions to base Service.
CS Voice Service	Subclass of Voice Service to represent two-
	way Voice (and Video) Circuit-switched calls on a Fixed or Mobile network.
	Includes Video, Emergency, USSD, Fax and
	Data over CS Voice (PPP) Services.
	Adds dimension for Call type.
VoIP Service	Subclass of VoiceService to represent two-way
	Voice (and Video) Packet-switched calls on a
	Fixed or Mobile network.
	Adds dimension for Call type.
PS Access Service	Subclass of SessionisedService to represent a
	complete user Data session, from
	Authentication and address allocation to
	detach.
	Commonly used to represent Mobile data CEM
	CEIs for 2G and 3G data bearer services but
	may also be used for fixed line data bearer (e.g. PPPoE)
	Adds dimensions for Bearer (indicate
	underlying Network type), Direction (user or
	network), Serving Network Element and Error
PS Data Service	Subclass of SessionizedService to represent
	an aggregation of experience for Packet data
	service over a time period.
	Adds dimension for NE (Primary Core Network
	Element User is connected to) and Server
	(Server providing the IP Data Service).



#### Customer Experience Management – CXM Service Metrics

	Adds dimension for Call type.
<b>Browsing Service</b>	Extension to the Packet Data Service to cover
	Web Browsing CEM experience (WAP, HTTP)
Streaming Service	Extension to the Packet Data Service to cover
	Streaming CEM experience (RTSP)
IP Data Service	Extension to Packet Data Service to cover
	generic IP Data Service
Transactional	Transactional Services are defined as Services
Service	where the Customer interacts with the service
	through discrete short events where each event
	does not require context.
MMS Service	Extension to the Messaging Service to cover
	Multi-Media Messages (Picture Messages)
SMS Service	Extension to the SMSCs to cover Short
	Message Service (SMS) messages.



# 3. CXM Metric Classification

# 3.1. Organization

The following diagram shows how the metrics are broken out and organized.

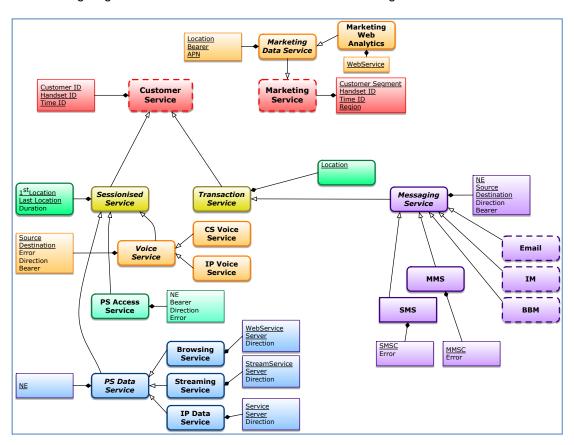


Figure 5 – CXM Metric Classification

#### 3.2. CXM Services

The following Services are being proposed as being part of the default CXM Metrics proposal.

# 3.2. Measure Summary

The following table provides a list of the proposed CXM dimensions and measures organized by Service.



# Table 2 - Summary of CXM Measures

CEM -	Customer	Customer	3gPP Gb,	Unique customer	Dimension
Customer	ID	Service	IuPS, S1-	identifier. Typically	
Service			MME	should be the	
				Customer's IMSI	
				No.	
CEM -	Handset	Customer	3gPP Gb,	Handset Type	Dimension
Customer	ID	Service	IuPS, S1-	identifier. Typically	
Service			MME	should either be	
				the IMEI-TAC or	
				IMEI-TAC-SV value	
CEM -	Time ID	Customer	3gPP Gb,	Timestamp of the	Dimension
Customer		Service	IuPS, S1-	Data Access	
Service			MME	request	
CEM -	First	Customer	3gPP Gb,	Cell Identifier	Dimension
CEM - Sessionized	First Location	Customer Service :	3gPP Gb, IuPS, S1-	Cell Identifier (GSM, UMTS or	Dimension
					Dimension
Sessionized		Service :	IuPS, S1-	(GSM, UMTS or	Dimension
Sessionized		Service : Sessionized	IuPS, S1-	(GSM, UMTS or LTE) recorded at	Dimension
Sessionized		Service : Sessionized	IuPS, S1-	(GSM, UMTS or LTE) recorded at the beginning of	Dimension  Dimension
Sessionized Service	Location	Service : Sessionized Service	IuPS, S1- MME	(GSM, UMTS or LTE) recorded at the beginning of the Session	
Sessionized Service CEM -	Location	Service : Sessionized Service Customer	IuPS, S1- MME	(GSM, UMTS or LTE) recorded at the beginning of the Session Cell Identifier	
Sessionized Service  CEM - Sessionized	Location	Service : Sessionized Service Customer Service :	IuPS, S1- MME 3gPP Gb, IuPS, S1-	(GSM, UMTS or LTE) recorded at the beginning of the Session Cell Identifier (GSM, UMTS or	
Sessionized Service  CEM - Sessionized	Location	Service : Sessionized Service  Customer Service : Sessionized	IuPS, S1- MME 3gPP Gb, IuPS, S1-	(GSM, UMTS or LTE) recorded at the beginning of the Session Cell Identifier (GSM, UMTS or LTE) recorded at	
Sessionized Service  CEM - Sessionized	Location	Service : Sessionized Service  Customer Service : Sessionized	IuPS, S1- MME 3gPP Gb, IuPS, S1-	(GSM, UMTS or LTE) recorded at the beginning of the Session Cell Identifier (GSM, UMTS or LTE) recorded at the end of the	
Sessionized Service  CEM - Sessionized Service	Last Location	Service : Sessionized Service  Customer Service : Sessionized Service	IuPS, S1- MME 3gPP Gb, IuPS, S1- MME	(GSM, UMTS or LTE) recorded at the beginning of the Session  Cell Identifier (GSM, UMTS or LTE) recorded at the end of the Session	Dimension
Sessionized Service  CEM - Sessionized Service  CEM -	Last Location Total	Service : Sessionized Service  Customer Service : Sessionized Service  Customer	IuPS, S1- MME  3gPP Gb, IuPS, S1- MME	(GSM, UMTS or LTE) recorded at the beginning of the Session  Cell Identifier (GSM, UMTS or LTE) recorded at the end of the Session  Total Duration in	Dimension



				period	
CEM - Sessionized Service	Max Duration Session	Customer Service: Sessionized Service	3gPP Gb, IuPS, S1- MME	Maximum Duration in ms of a single Data Access Message during observed period Number of sessions	Measure (Max)
CEM - Sessionized Service	Count	Customer Service: Sessionized Service	3gPP Gb, IuPS, S1- MME	observed during observation period.	Measure (Sum)
CEM - Sessionized Service	Average Duration	Customer Service: Sessionized Service	3gPP Gb, IuPS, S1- MME	Average session duration (ms) during observation period:  = Total Duration / Average Duration	KPI (Mean)
CEN 4	NIE	Contant	2CDD A	Cara in a Niatawa da	Diagramaia
CEM - Voice	NE	Customer Service: Sessionized Service: Voice	3GPP A, IUCS	Serving Network Element Identifier (MSC, SIP NE)	Dimension
CEM - Voice	Bearer	Customer Service: Sessionized Service: Voice	3GPP A, IUCS	Voice Bearer Type (GSM, UMTS, CDMA, VoIP)	Dimension
CEM - Voice	Direction	Customer Service :	3GPP A, IUCS	MS->NW or NW- >MS	Dimension



		Service :			
		Voice			
CEM - Voice	Туре	Customer Service: Sessionized Service: Voice	3GPP A, IUCS	Call Type (Voice, Video, FAX, Emergency, USSD )	Dimension
CEM - Voice	Partial Number	Customer Service: Sessionized Service: Voice	3GPP A, IUCS	Dialed digits / MSISDN match	Dimension
CEM - Voice	Call Attempts	Customer Service: Sessionized Service: Voice	3GPP A, IUCS	Total number of attempted calls	Measure (Sum)
CEM - Voice	Call Success	Customer Service: Sessionized Service: Voice	3GPP A, IUCS	Total number of successfully terminated calls	Measure (Sum)
CEM - Voice	Setup Failures	Customer Service: Sessionized Service: Voice	3GPP A, IUCS	Failures during Setup	Measure (Sum)
CEM - Voice	Dropped Calls	Customer Service: Sessionized Service:	3GPP A, IUCS	Failures during Conversation	Measure (Sum)



		Voice			
CEM -	Call	Customer	3GPP A,	Percentage of	KPI
Voice	Success Rate	Service : Sessionized	IUCS	Successful Calls	(Mean)
		Service :		= Call Successes /	
		Voice		Call Attempts	
CEM -	Dropped	Customer	3GPP A,	Percentage of	KPI
Voice	Call Rate	Service : Sessionized	IUCS	Dropped Calls	(Mean)
		Service : Voice		= Dropped Calls / Call Attempts	
CEM - Voice	Setup Failure Rate	Customer Service: Sessionized	3GPP A, IUCS	Percentage of Setup Fail Calls	KPI (Mean)
		Service :		= Setup Failures /	
		Voice		Call Attempts	
CEM - CS Voice	Error	Customer Service: Sessionized Service:	3GPP A, IUCS	Error Identifier (Error Type + Cause Code)	Dimension
		Voice : CS Voice			
CEM - CS Voice	Handover Attempts		3GPP A, IUCS	Total number of InterCell Handovers	Measure (Sum)
		Voice Customer Service: Sessionized Service: Voice: CS			



		Sessionized		Handovers	
		Service :			
		Voice : CS			
		Voice			
CEM - CS	Inter RAT	Customer	3GPP A,	Number of Inter	Measure
Voice	Handover	Service :	IUCS	RAT Handover	(Sum)
	Attempts	Sessionized		attempted	
		Service :			
		Voice : CS			
		Voice			
CEM - CS	Inter RAT	Customer	3GPP A,	Total Number of	Measure
Voice	Handover	Service :	IUCS	Successful InterRAT	(Sum)
	Successes	Sessionized		Handovers	
		Service :			
		Voice : CS			
		Voice			
CEM - CS	Handover	Customer	3GPP A,	Percentage of	KPI
Voice	Success	Service :	IUCS	Successful Call	(Mean)
	Rate	Sessionized		Handovers	
		Service :			
		Voice : CS		= (Handover	
		Voice		Success / Handover	
				Attempts) * 100	
CEM - CS	Inter RAT	Customer	3GPP A,	Percentage of	KPI
Voice	Handover	Service :	IUCS	Successful Inter-	(Mean)
	Success	Sessionized		technology Call	
	Rate	Service :		Handovers	
		Voice : CS			
		Voice		= (Inter-RAT	
				Handover Success /	
				Inter-RAT Handover	



				Attempts) * 100	
CEM - VoIP Voice	Error	Customer Service: Sessionized Service: Voice: VoIP Voice	SIP, RTP, H.323	Error specific to VoIP (SIP, RTP, H.323)	Dimension
CEM - VoIP Voice	Bytes Sent	Customer Service: Sessionized Service: Voice: VoIP Voice	SIP, RTP, H.323	Number of bytes sent	Measure (Sum)
CEM - VoIP Voice	Bytes Received	Customer Service: Sessionized Service: Voice: VoIP Voice	SIP, RTP, H.323	Number of bytes received	Measure (Sum)
CEM - VoIP Voice	Total Packets	Customer Service: Sessionized Service: Voice: VoIP Voice	SIP, RTP, H.323	Number of Packets	Measure (Sum)
CEM - VoIP Voice	Lost Packets	Customer Service: Sessionized Service: Voice: VoIP	SIP, RTP, H.323	Number of Packets Lost	Measure (Sum)



		Voice			
CEM - VoIP	Max	Customer	SIP, RTP,	Number of Packets	Measure
Voice	Packet	Service :	H.323	Lost in Sequence	(Sum)
	Loss Burst	Sessionized			
		Service :			
		Voice : VoIP			
		Voice			
CEM - VoIP	Out of	Customer	SIP, RTP,	Number of OOS	Measure
Voice	Sequence	Service :	H.323	Packets	(Sum)
	Packets	Sessionized			
		Service :			
		Voice : VoIP			
		Voice			
CEM - VoIP	Duplicate	Customer	SIP, RTP,	Number of	Measure
Voice	Packets	Service :	H.323	Duplicate Packets	(Sum)
		Sessionized			
		Service :			
		Voice : VoIP			
		Voice			
CEM - VoIP	Inter	Customer	SIP, RTP,	Total Time between	Measure
Voice	Packet	Service :	H.323	Packets (ms)	(Sum)
	Time	Sessionized			
		Service :			
		Voice : VoIP			
		Voice			
CEM - VoIP	Max Inter	Customer	SIP, RTP,	Maximum Time	Measure
Voice	Packet	Service :	H.323	between Packets	(Max)
	Time	Sessionized		(ms)	
		Service :			
		Voice : VoIP			
		Voice			



CEM - VoIP Voice	Jitter Bias	Customer Service: Sessionized	SIP, RTP, H.323	Sum of the delay- expected inter- arrival times	Measure (Sum)
		Service : Voice : VoIP Voice			
CEM - VoIP Voice	Lost Packet Rate	Customer Service: Sessionized Service: Voice: VoIP Voice	SIP, RTP, H.323	Percentage of Lost Packets  = (Lost Packets / Total Packets) * 100.0	KPI (Mean)
CEM - VoIP Voice	Duplicate Packet Rate	Customer Service: Sessionized Service: Voice: VoIP Voice	SIP, RTP, H.323	Percentage of Duplicate Packets  = (Duplicate Packets / Total Packets) * 100.0	KPI (Mean)
CEM - VoIP Voice	Out of Sequence Packet Rate	Customer Service: Sessionized Service: Voice: VoIP Voice	SIP, RTP, H.323	Percentage of OOS Packets  = (Out of Sequence Packets / Total Packets) * 100.0	KPI (Mean)
CEM - VoIP Voice	Average Inter packet Time	Customer Service: Sessionized Service: Voice: VoIP Voice	SIP, RTP, H.323	Average Inter- packet time (ms)  = Inter Packet Time / Total Packets	KPI (Mean)



CEM - Data	Network	Customer	3gPP Gb,	Serving Network	Dimension
Access	Element	Service :	IuPS, S1-	Element Identifier	
		Sessionized	MME	(SGSN for GPRS	
		Service :		and UMTS, MME	
		Data Access		for LTE)	
CEM - Data	Bearer	Customer	3gPP Gb,	Bearer Indication	Dimension
Access		Service :	IuPS, S1-	(GPRS, UMTS or	
		Sessionized	MME	LTE)	
		Service :			
		Data Access			
CEM - Data	Direction	Customer	3gPP Gb,	Indicate if the	Dimension
Access		Service :	IuPS, S1-	Request was	
		Sessionized	MME	initiated by the UE	
		Service :		or Network	
		Data Access			
CEM - Data	Access	Customer	3gPP Gb,	Number of	Measure
Access	Request	Service :	IuPS, S1-	Message Requests	(Sum)
		Sessionized	MME	during observed	
		Service :		period	
		Data Access			
CEM - Data	Mobility	Customer	3gPP Gb,	Response Cause	Dimension
Authenticat	Error	Service :	IuPS, S1-	code associated	
ion		Sessionized	MME	with the	
		Service :		Authentication	
		Data Access :		Request	
		Authenticatio			
		n			
CEM - Data	Attach	Customer	3gPP Gb,	Number of Attach	Measure
Authenticat	Attempt	Service :	IuPS, S1-	Attempts Recorded	(Sum)
ion		Sessionized	MME	during the	



		Service : Data Access : Authenticatio n		observed period	
CEM - Data Authenticat	Total Attach	Customer Service :	3gPP Gb, IuPS, S1-	Total Duration of Attach Attempts	Measure (Sum)
ion	Duration	Sessionized Service: Data Access: Authenticatio	MME	Recorded during the observed period in ms	(Sum)
CEM - Data Authenticat ion	Max Attach Duration	Customer Service: Sessionized Service: Data Access: Authenticatio n	3gPP Gb, IuPS, S1- MME	Maximum single Duration of Attach Attempts Recorded during the observed period in ms	Measure (Max)
CEM - Data Authenticat ion	Attach Fail	Customer Service: Sessionized Service: Data Access: Authenticatio n	3gPP Gb, IuPS, S1- MME	Number of Attach Attempts Recorded during the observed period which were unsuccessful (Error Cause or Timeout)	Measure (Sum)
CEM - Data Authenticat ion	Average Attach Duration	Customer Service: Sessionized Service: Data Access: Authenticatio	3gPP Gb, IuPS, S1- MME	Average time for attach (excluding timeouts) in ms:  = Total Attach Duration / Attach	KPI (Mean)



CEM - Data Attach Authentication Success Service : Service : JuPS, S1- successful attach operations:  CEM - Data Session Error Service : Data Access : Data					A 44 a 122 12 4	
Authentication Percentage Percent			n		Attempt	
ion Percentag Sessionized Service : Data Access : Authenticatio n Session  CEM - Data Access Session Sessi	CEM - Data	Attach	Customer	3gPP Gb,	Percentage of	KPI
e Service : Data Access : Authenticatio n  CEM - Data Session Session Error Service : Data Access : Data Access : Data Access : Data Access : Data Session  CEM - Data Session  CEM - Data Access : Data Access : Data Session  CEM - Data Access : Data Session  CEM - Data Access : Data Access : Data Access : Data Session  CEM - Data Access : Data Access : Data Session  CEM - Data Access : Data Session  CEM - Data Access : Data Access : Data Session  CEM - Data Access : Data Access : Data Access : Data Session  CEM - Data Max  Customer Data Session  CEM - Data Max  Customer Session  Service : Data Session  CEM - Data Max  Customer Session Service : Data Session  CEM - Data Max  Customer Session Service : Data Session  CEM - Data Max  Customer Session Service : Data Session Service	Authenticat	Success	Service :	IuPS, S1-	successful attach	(Mean)
Data Access : Authenticatio n Session  CEM - Data Session  CEM - Data Session  CEM - Data Access : D	ion	Percentag	Sessionized	MME	operations:	
Authenticatio n		е	Service :			
CEM - Data Session Point Service : Data Access : Data Acce			Data Access :		= ( Attach Attempt	
CEM - Data Session Error Service : Jups, S1- Session Point Sessionized Session Point Service : Data Access : Data Session Service : Data Access : Data Session Point Service : Data Access : Data Session Point Service : Data Session Point Session Service : Data Session Point Session Service : Data Session Point Session Service : Data Session Point Service : Data S			Authenticatio		- Attach Fail /	
CEM - Data Session Error Service : Jups, S1- Session Point Service : Data Access : Dat			n		Attach Attempt ) *	
Session  Error  Service: Sessionized Service: Data Access: Data Session  CEM - Data Session  Point Name Sessionized Service: Data Access: Data Access: Data Access: Data Access: Data Session  CEM - Data Session  Session  Session  Session  Service: Data Session Service: Data Session Service: Data Session Service: Data Session Service: Data Session Service: Data Session Service: Data Session Service: Data Session  CEM - Data Session  CEM - Data Session Service: Data Serv					100.0	
Session  Error  Service: Sessionized Service: Data Access: Data Session  CEM - Data Session  Point Name Sessionized Service: Data Access: Data Access: Data Access: Data Access: Data Session  CEM - Data Session  Session  Session  Session  Service: Data Session Service: Data Session Service: Data Session Service: Data Session Service: Data Session Service: Data Session Service: Data Session Service: Data Session  CEM - Data Session  CEM - Data Session Service: Data Serv						
Sessionized Service : Data Access : Data Session  CEM - Data Access Session  Point Service : Data Access : Data Session  Point Service : Data Access : Data	CEM - Data	Session	Customer	3gPP Gb,	Response Cause	Dimension
Service : Data Access : Data Session  CEM - Data Session Point Service : Data Session Session Point Service : Data Access : Data Session Session Point Service : Data Access : Data Session  CEM - Data Session Session Service : Data Access : Data Session Service : Data Access : Data Session  CEM - Data Session Service : Data Servi	Session	Error	Service :	IuPS, S1-	code associated	
Data Access : Data Session  CEM - Data Access Session Point Service : IuPS, S1- Data Access : Data Session  CEM - Data Max Customer Session Session Service : Data Session CEM - Data Max Session Service : IuPS, S1- Data Access : Data Session Service : Data Session CEM - Data Max Session Service : IuPS, S1- Of a single Data  Measure (Max)			Sessionized	MME	with the PDP	
CEM - Data			Service :		Session	
CEM - Data   Access   Customer   3gPP Gb,   IuPS, S1-   of the PDP Session   Point   Service :   Data Access :   Data Access :   Data Session   Session   Service :   Duration   Sessionized   Service :   Data Session   Service :   Duration   Sessionized   MME   Observed during   Point   Service :   Data Access :   Data Session   Service :   Data Access :   Data Session   Duration   Service :   Data Access :   Data Session   Service :   Data Session   Data Session   Service :   Data Service :			Data Access :			
Session Point Service: IuPS, S1- of the PDP Session request  Service: Data Access: Data Session  CEM - Data Session Service: IuPS, S1- all Data Sessions  Duration Sessionized Service: Data Access: Data Session  CEM - Data Max Customer Session  CEM - Data Max Session  CEM - Data Max Session  Session Service: Data Session  CEM - Data Max Session  Session Service: Data Session  CEM - Data Max Session  Session Service: IuPS, S1- of a single Data (Max)			Data Session			
Name Sessionized Service : Data Access : Data Session  CEM - Data Total Customer Session  Session Service : Data Access : Data Session  Session Service : Data Access : Data Access : Data Session  Sessionized MME observed during period in ms  CEM - Data Max Customer Session  CEM - Data Session  Session Service : Data Session  CEM - Data Max Customer Service : Data Session  Service : Data Session  CEM - Data Max Customer Service : Data Session  Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session  CEM - Data Max Customer Service : Data Session	CEM - Data	Access	Customer	3gPP Gb,	APN used as part	Dimension
Service : Data Access : Data Session  CEM - Data Session  Session  Session  Session  Sessionized Service : Data Access : Data Sessionized Service : Data Access : Data Access : Data Access : Data Session  CEM - Data  Max  Customer  Session  Service : Data Session  CEM - Data Session  Session  Session  Service : Data Session  CEM - Data Session  Session  Service : Data Session  CEM - Data Session  Service : Data Session  Service : Data Session  Customer  Session  Service : Data Session  Service : Data Session  Customer  Session  Service : Data Session  Service : Data Session  Service : Data Session  Customer  Session  Service : Data Session	Session	Point	Service :	IuPS, S1-	of the PDP Session	
Data Access: Data Session  CEM - Data Session  Session  Duration  Duration  Service: Data Session  Service: Data Access: Data Session  Service: Data Session  CEM - Data  Max  Customer  Session  Service: Data Session  CEM - Data  Session  Session  Service: Data Session  CEM - Data  Max  Customer  Service: Data Session  Service: Data Session  Service: Data Session  Maximum Duration Measure Of a single Data  (Max)		Name	Sessionized	MME	request	
CEM - Data Total Customer 3gPP Gb, Total Duration of All Data Sessions (Sum)  Session Session Service: IuPS, S1- all Data Sessions (Sum)  Duration Sessionized MME observed during period in ms  Data Access: Data Session  CEM - Data Max Customer Session Service: IuPS, S1- of a single Data (Max)			Service :			
CEM - Data   Total   Customer   3gPP Gb,   Total Duration of   Measure   (Sum)			Data Access :			
Session Session Service: IuPS, S1- all Data Sessions observed during period in ms  CEM - Data Max Customer Session Session Session Session Session Service: IuPS, S1- of a single Data (Max)  MME observed during period in ms  Service: Data Session Service: IuPS, S1- of a single Data (Max)			Data Session			
Duration Sessionized Service : Data Access : Data Session Session Session Service : IuPS, S1- Observed during period in ms  Observed during period in ms  Paragraph Period in ms  Session MME Observed during period in ms  Paragraph Period in ms  Service : Data Session  Service : Jups, S1- Of a single Data (Max)	CEM - Data	Total	Customer	3gPP Gb,	Total Duration of	Measure
Service : period in ms  Data Access : Data Session  CEM - Data Max Customer 3gPP Gb, Maximum Duration Measure Session Service : IuPS, S1- of a single Data (Max)	Session	Session	Service :	IuPS, S1-	all Data Sessions	(Sum)
Data Access: Data Session  CEM - Data Max Customer Session Session Customer Service:		Duration	Sessionized	MME	observed during	
Data Access: Data Session  CEM - Data Max Customer Session Session Customer Service:  Service:  Data Access:  Data Access:  Data Session  Sepp Gb, Maximum Duration Measure  (Max)			Service :		period in ms	
CEM - Data Max Customer 3gPP Gb, Maximum Duration Measure Session Service : IuPS, S1- of a single Data (Max)			Data Access :			
Session Service : IuPS, S1- of a single Data (Max)			Data Session			
Session Service : IuPS, S1- of a single Data (Max)	CEM - Data	Max	Customer	3gPP Gb,	Maximum Duration	Measure
	Session	Session			of a single Data	(Max)
Duration   Sessionized   MME   Session observed		Duration	Sessionized	MME	Session observed	·



		Service :		during period in	
		Data Access :		ms	
		Data Session			
CEM - Data	Data	Customer	3gPP Gb,	Number of Data	Measure
Session	Session	Service :	IuPS, S1-	Sessions attempted	(Sum)
	Attempt	Sessionized	MME	during observed	
		Service :		period	
		Data Access :			
		Data Session			
CEM - Data	Data	Customer	3gPP Gb,	Number of Data	Measure
Session	Session	Service :	IuPS, S1-	Sessions that failed	(Sum)
	Setup Fail	Sessionized	MME	(error response or	
		Service :		timeout) before	
		Data Access :		user data was	
		Data Session		transmitted	
CEM - Data	Data	Customer	3gPP Gb,	Number of Data	Measure
Session	Session	Service :	IuPS, S1-	Sessions that failed	(Sum)
	Abnormal	Sessionized	MME	(error response or	
	Terminati	Service :		timeout) after user	
	on	Data Access :		data was	
		Data Session		transmitted	
CEM - Data	Bytes	Customer	3gPP Gb,	Total number of	Measure
Session	Transmitte	Service :	IuPS, S1-	bytes transmitted	(Sum)
	d	Sessionized	MME	for Data Sessions	
		Service :		during observed	
		Data Access :		period.	
		Data Session			
CEM - Data	Bytes	Customer	3gPP Gb,	Total number of	Measure
Session	Received	Service :	IuPS, S1-	bytes received for	(Sum)
		Sessionized	MME	Data Sessions	
		Service :		during observed	



		Data Access : Data Session		period.	
CEM - Data Session	Average Session	Customer Service :	3gPP Gb, IuPS, S1-	Average time for Data Session in ms:	KPI (Mean)
	Duration	Sessionized	MME	T C	
		Service :		= Total Session	
		Data Access :		Duration / Data	
CEM Data	Caraira	Data Session	2 - DD, Cl-	Session Attempt	KDI
CEM - Data	Session	Customer	3gPP Gb,	Percentage of	KPI
Session	Success	Service :	IuPS, S1-	successful data	(Mean)
	Percentag	Sessionized Service:	MME	sessions operations:	
	е			- ( Data Sassian	
		Data Access : Data Session		= ( Data Session	
		Data Session		Attempt - Data Session Fail / Data	
				Session Attempt ) *	
				100.0	
				100.0	
CEM - Data	Server	Customer	Gn, Gi, Gp	Network Element	Dimension
					Difficusion
Usage		Service :	·	Identifier (HTTP,	Dimension
Usage		Service : Sessionized			Dimension
Usage			·	Identifier (HTTP,	Difficusion
Usage		Sessionized	·	Identifier (HTTP,	Difficusion
Usage CEM - Data	Bearer	Sessionized Service :	Gn, Gi, Gp	Identifier (HTTP,	Dimension
Ū	Bearer	Sessionized Service : Data Usage	Gn, Gi, Gp	Identifier (HTTP, RTP etc Server)	
CEM - Data	Bearer	Sessionized Service: Data Usage Customer	Gn, Gi, Gp	Identifier (HTTP, RTP etc Server) Bearer (GPRS,	
CEM - Data	Bearer	Sessionized Service: Data Usage Customer Service:	Gn, Gi, Gp	Identifier (HTTP, RTP etc Server) Bearer (GPRS,	
CEM - Data	Bearer	Sessionized Service: Data Usage Customer Service: Sessionized	Gn, Gi, Gp	Identifier (HTTP, RTP etc Server) Bearer (GPRS,	
CEM - Data	Bearer	Sessionized Service: Data Usage Customer Service: Sessionized Service:	Gn, Gi, Gp	Identifier (HTTP, RTP etc Server) Bearer (GPRS,	
CEM - Data Usage		Sessionized Service: Data Usage Customer Service: Sessionized Service: Data Usage	·	Identifier (HTTP, RTP etc Server)  Bearer (GPRS, UMTS, LTE)	Dimension



		Service :			
		Data Usage			
CEM - Data	APN	Customer	Gn, Gi, Gp	Access Point Name	Dimension
Usage		Service :		for APN associated	
		Sessionized		with Session	
		Service :			
		Data Usage			
CEM - Data	Bytes Sent	Customer	Gn, Gi, Gp	Total number of	Measure
Usage		Service :		bytes sent for all	(Sum)
		Sessionized		Data Usage in	
		Service :		recorded period.	
		Data Usage			
CEM - Data	Bytes	Customer	Gn, Gi, Gp	Total number of	Measure
Usage	Received	Service :		bytes received for	(Sum)
		Sessionized		all Data Usage in	
		Service :		recorded period.	
		Data Usage			
CEM - Data	Active	Customer	Gn, Gi, Gp	Active time is ms	Measure
Usage	Usage	Service :		where data is being	(Sum)
	Time	Sessionized		received or	
		Service :		transmitted for all	
		Data Usage		data usage in	
				recorded period.	
CEM - Data	Average	Customer	Gn, Gi, Gp	Average	KPI
Usage	Throughp	Service :		throughput	(Mean)
	ut	Sessionized		(bytes/second) for	
		Service :		all data usage in	
		Data Usage		recorded period.	
				·	
				= ( Bytes Received	
				+ Bytes Sent /	



				Active Usage Time * 1000 )	
CEM - Web Service	Protocol	Customer Service: Sessionized Service: Data Usage: Web Service	Gn, Gi, Gp	Protocol Type (HTTP, WAP, FTP)	Dimension
CEM - Web Service	Web Service ID	Customer Service: Sessionized Service: Data Usage: Web Service	Gn, Gi, Gp	Normalized URL Full URI normalized according to Operator rules and standard processing. e.g. from RFC 1738 <protocol>://<prefi x="">.<host>.<tld>: <port>/<path1>/&lt; Path2&gt;/ We could take: <host>.<tld>/PA TH1 as a default normalization OPTIONAL</tld></host></path1></port></tld></host></prefi></protocol>	Dimension [Optional]
CEM - Web Service	User Agent	Customer Service: Sessionized Service:	Gn, Gi, Gp	Normalized User Agent. User Agent reduced into an enumeration of	Dimension [Optional]



		Data Usage : Web Service		common Browser/Client User Agent fields if known. OPTIONAL	
CEM - Web Service	Total Get Time	Customer Service: Sessionized Service: Data Usage: Web Service	Gn, Gi, Gp	Total time (ms) servicing GET Requests	Measure (Sum)
CEM - Web Service	Get End To End Time	Customer Service: Sessionized Service: Data Usage: Web Service	Gn, Gi, Gp	Total time (ms) to service initial GET Requests including setup Time	Measure (Sum)
CEM - Web Service	Server Setup Time	Customer Service: Sessionized Service: Data Usage: Web Service	Gn, Gi, Gp	Total Server Setup time (ms) for the GET requests	Measure (Sum)
CEM - Web Service	TTFB	Customer Service: Sessionized Service: Data Usage: Web Service	Gn, Gi, Gp	Sum of the Times to First Byte (ms) from each request in observed period.	Measure (Sum)
CEM - Web	Maximum	Customer	Gn, Gi, Gp	Largest TTFB (ms)	Measure



Service	TTFB	Service :		recorded from	(Max)
00.1.00		Sessionized		requests observed	(
		Service :		during period.	
		Data Usage :			
		Web Service			
CEM - Web	Post	Customer	Gn, Gi, Gp	Number of Post	Measure
Service	Attempts	Service :		Attempts	(Sum)
		Sessionized		,	(2 2)
		Service :			
		Data Usage :			
		Web Service			
CEM - Web	Post	Customer	Gn, Gi, Gp	Number of	Measure
Service	Successes	Service :	·	Successful Post	(Sum)
		Sessionized		Requests	
		Service :			
		Data Usage :			
		Web Service			
CEM - Web	Total Post	Customer	Gn, Gi, Gp	Total time (ms)	Measure
Service	Time	Service :		servicing POST	(Sum)
		Sessionized		Requests	
		Service :			
		Data Usage :			
		Web Service			
CEM - Web	Total Get	Customer	Gn, Gi, Gp	Total time (ms)	Measure
Service	Time	Service :		servicing GET	(Sum)
		Sessionized		Requests	
		Service :			
		Data Usage :			
		Web Service			
CEM - Web	Get	Customer	Gn, Gi, Gp	Number of HTTP	Measure
Service	Attempts	Service :		Get Requests	(Sum)



		C = == := := := := := :			
		Sessionized			
		Service :			
		Data Usage :			
		Web Service			
CEM - Web	Get	Customer	Gn, Gi, Gp	Number of	Measure
Service	Successes	Service :		Successful HTTP	(Sum)
		Sessionized		Get Requests	
		Service :			
		Data Usage :			
		Web Service			
CEM - Web	Get	Customer	Gn, Gi, Gp	Average HTTP GET	KPI
Service	Success	Service :		success percentage	(Mean)
	Rate	Sessionized			
		Service :		= ( Get Successes /	
		Data Usage :		Get Attempts ) *	
		Web Service		100	
CEM - Web	Post	Customer	Gn, Gi, Gp	Average HTTP	KPI
Service	Success	Service :		POST success	(Mean)
	Rate	Sessionized		percentage	
		Service :			
		Data Usage :		= ( Post Successes	
		Web Service		/ Post Attempts ) *	
				100	
CEM - Web	Average	Customer	Gn, Gi, Gp	Average HTTP	KPI
Service	Download	Service :		download rate	(Mean)
	Rate	Sessionized		(bytes/sec)	
		Service :			
		Data Usage :		= ( Bytes Received	
		Web Service		/ Total Get Time *	
				1000)	
CEM - Web	Average	Customer	Gn, Gi, Gp	Average HTTP	KPI



Service	Upload Rate	Service : Sessionized Service : Data Usage : Web Service		upload rate (bytes/sec) = ( Bytes Transmitted / Total Post Time * 1000 )	(Mean)
CEM - Streaming Service	Protocol	Customer Service: Sessionized Service: Data Usage: Streaming Service	Gn, Gi, Gp	Protocol Type (RTSP)	Dimension
CEM - Streaming Service	Server	Customer Service: Sessionized Service: Data Usage: Streaming Service	Gn, Gi, Gp	Server ID (IP address or FDN) of serving node.	Dimension
CEM - Streaming Service	Total Content Duration	Customer Service: Sessionized Service: Data Usage: Streaming Service	Gn, Gi, Gp	Total time (ms) of Content Streaming	Measure (Sum)
CEM - Streaming Service	Max Content Duration	Customer Service : Sessionized	Gn, Gi, Gp	Max time (ms) of Content Streaming	Measure (Max)



CEM - Streaming Service	Min Content Duration	Service: Data Usage: Streaming Service Customer Service: Sessionized Service: Data Usage: Streaming Service	Gn, Gi, Gp	Min time (ms) of Content Streaming	Measure (Min)
CEM - Streaming Service	Quality Score	Customer Service: Sessionized Service: Data Usage: Streaming Service	Gn, Gi, Gp	Aggregation of the RTCP Quality Scores	Measure (Sum)
CEM - Streaming Service	Total Session Time	Customer Service: Sessionized Service: Data Usage: Streaming Service	Gn, Gi, Gp	Total Duration (ms) of Streaming Session	Measure (Sum)
CEM - Streaming Service	Total TTFB	Customer Service: Sessionized Service: Data Usage: Streaming	Gn, Gi, Gp	Sum of the Times to First Byte	Measure (Sum)



		Service			
CEM -	Error	Customer	Gn, Gi, Gp	Final recorded error	Dimension
Streaming		Service :		(Error Type plus	
Service		Sessionized		cause code)	
		Service :			
		Data Usage :			
		Streaming			
		Service			
CEM -	Bytes	Customer	Gn, Gi, Gp	Total number of	Measure
Streaming		Service :		Bytes streamed	(Sum)
Service		Sessionized			
		Service :			
		Data Usage :			
		Streaming			
		Service			
CEM -	Packets	Customer	Gn, Gi, Gp	Total number of	Measure
Streaming		Service :		Packets streamed	(Sum)
Service		Sessionized			
		Service :			
		Data Usage :			
		Streaming			
		Service			
CEM -	Failures	Customer	Gn, Gi, Gp	Number of	Measure
Streaming		Service :		Streaming Failures	(Sum)
Service		Sessionized			
		Service :			
		Data Usage :			
		Streaming			
		Service			
CEM -	Time Jitter	Customer	Gn, Gi, Gp	Time of Session	Measure
Streaming	Bad	Service :		(ms) where Jitter	(Sum)



Service		Sessionized		was outside	
Service					
		Service :		acceptable quality	
		Data Usage :			
		Streaming			
		Service			
CEM -	Time	Customer	Gn, Gi, Gp	Time of Session	Measure
Streaming	Packet	Service :		(ms) where Packet	(Sum)
Service	Loss Low	Sessionized		loss is low (L1/L2)	
		Service :			
		Data Usage :			
		Streaming			
		Service			
CEM -	Time	Customer	Gn, Gi, Gp	Time of Session	Measure
Streaming	Packet	Service :		(ms) where Packet	(Sum)
Service	Loss	Sessionized		loss is moderate	, ,
	Medium	Service :		(L3/L4/L5)	
		Data Usage :		( - , , , - ,	
		Streaming			
		Service			
CEM -	Time	Customer	Gn, Gi, Gp	Time of Session	Measure
Streaming	Packet	Service :	оп, о, ор	(ms) where Packet	(Sum)
Service	Loss High	Sessionized		loss is moderate	(Sulli)
Service	LUSS TIIGH	Service :			
				(L6/L7)	
		Data Usage :			
		Streaming			
	_	Service			
CEM -	Setup	Customer	Gn, Gi, Gp	Number of RTSP	Measure
Streaming	Attempts	Service :		Streams attempted	(Sum)
Service		Sessionized		to be Initiated	
		Service :			
		Data Usage :			



		Ctroomino			
		Streaming			
		Service			
CEM -	Setup	Customer	Gn, Gi, Gp	Number of Streams	Measure
Streaming	Success	Service :		successfully	(Sum)
Service		Sessionized		Initiated	
		Service :			
		Data Usage :			
		Streaming			
		Service			
CEM -	Teardown	Customer	Gn, Gi, Gp	Number of Stream	Measure
Streaming	Attempts	Service :		Teardown requests	(Sum)
Service		Sessionized			
		Service :			
		Data Usage :			
		Streaming			
		Service			
CEM -	Teardown	Customer	Gn, Gi, Gp	Number of Stream	Measure
Streaming	Successes	Service :		Teardown	(Sum)
Service		Sessionized		successes	
		Service :			
		Data Usage :			
		Streaming			
		Service			
CEM -	Play	Customer	Gn, Gi, Gp	Number of Play	Measure
Streaming	Attempts	Service :		Requests	(Sum)
Service		Sessionized			
		Service :			
		Data Usage :			
		Streaming			
		Service			
CEM -	Play	Customer	Gn, Gi, Gp	Number of	Measure



Streaming	Successes	Service :		Successful Play	(Sum)
Service	Successes	Sessionized		requests	(Surri)
Service		Service :		requests	
		Data Usage :			
		Streaming			
		Service			
CEM -	Play	Customer	Gn, Gi, Gp	Time where Session	Measure
Streaming	Duration	Service :	dii, di, dp	is Playing (ms)	(Sum)
Service	Duration	Sessionized		is riaying (ms)	(Sulli)
Service		Service :			
		Data Usage :			
		Streaming			
	_	Service			
CEM -	Average	Customer	Gn, Gi, Gp	Average duration	KPI
Streaming	Play	Service :		of Play (ms)	(Mean)
Service	Duration	Sessionized			
		Service :		= ( Play Duration /	
		Data Usage :		Play Attempts )	
		Streaming			
		Service			
CEM -	Play	Customer	Gn, Gi, Gp	Success percentage	KPI
Streaming	Success	Service :		for play requests	(Mean)
Service	Rate	Sessionized			
		Service :		= ( Play Successes	
		Data Usage :		/ Play Attempts ) *	
		Streaming		100.0	
		Service			
CEM -	Setup	Customer	Gn, Gi, Gp	Success percentage	KPI
Streaming	Success	Service :		for setup requests	(Mean)
Service	Rate	Sessionized			
		Service :		= ( Setup	



		Data Usage : Streaming Service		Successes / Setup Attempts ) * 100.0	
CEM - Streaming Service	Average Quality Score	Customer Service: Sessionized Service: Data Usage: Streaming Service	Gn, Gi, Gp	Average Quality score value  = ( Quality Score / Play Attempts )	KPI (Mean)
CEM - Customer Data Utilization Service	Service ID	Customer Service: Sessionized Service: Data Usage: Data Utilization Service	Gn, Gi, Gp	Service Identifier	Dimension
CEM - Customer Data Utilization Service	Protocol ID	Customer Service: Sessionized Service: Data Usage: Data Utilization Service	Gn, Gi, Gp	Protocol Identifier	Dimension
CEM - Customer Data Utilization	Classificati	Customer Service: Sessionized Service:	Gn, Gi, Gp	Optional additional Service grouping	Dimension [Optional]



Service		Data Usage : Data Utilization Service			
CEM - Customer Data Utilization Service	Effective Bytes Down	Customer Service: Sessionized Service: Data Usage: Data Utilization	Gn, Gi, Gp	Effective bytes downloaded	Measure (Sum)
CEM - Customer Data Utilization Service	Effective Bytes Up	Service  Customer  Service: Sessionized  Service: Data Usage: Data Utilization  Service	Gn, Gi, Gp	Effective bytes uploaded	Measure (Sum)
CEM - Customer Data Utilization Service	TCP Flow Attempt	Customer Service: Sessionized Service: Data Usage: Data Utilization Service	Gn, Gi, Gp	The cumulative number of TCP connection establishment attempts in the aggregation period	Measure (Sum)
CEM - Customer Data	TCP Flow Success	Customer Service: Sessionized	Gn, Gi, Gp	Number of Successful Flows for TCP traffic only	Measure (Sum)



Utilization		Service :			
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	TCP Flow	Customer	Gn, Gi, Gp	Successful	KPI
Customer	Success	Service :	·	Percentage of	(Mean)
Data	Rate	Sessionized		Flows for TCP	
Utilization		Service :		traffic only	
Service		Data Usage :		·	
		Data		= ( TCP Flow	
		Utilization		Success / TCP Flow	
		Service		Attempt ) * 100.0	
CEM -	TCP Bytes	Customer	Gn, Gi, Gp	Number of Bytes	Measure
Customer	Down	Service :		Received for TCP	(Sum)
Data		Sessionized		traffic only	
Utilization		Service :			
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	TCP Bytes	Customer	Gn, Gi, Gp	Number of Bytes	Measure
Customer	Up	Service :		Transmitted for	(Sum)
Data		Sessionized		TCP traffic only	
Utilization		Service :			
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	TCP	Customer	Gn, Gi, Gp	Total number of	Measure
Customer	Volume	Service :		TCP bytes	(Sum)



5.				1 1 1 1 1 1	
Data	Throughp	Sessionized		downloaded that	
Utilization	ut Bytes	Service :		exceed 10ms in	
Service	Down	Data Usage :		duration	
		Data			
		Utilization			
		Service			
CEM -	TCP	Customer	Gn, Gi, Gp	Total number of	Measure
Customer	Volume	Service :		TCP bytes	(Sum)
Data	Throughp	Sessionized		uploaded that	
Utilization	ut Bytes	Service :		exceed 10ms in	
Service	Up	Data Usage :		duration	
		Data			
		Utilization			
		Service			
CEM -	Total	Customer	Gn, Gi, Gp	Total number of	Measure
Customer	Bytes	Service :		bytes downloaded	(Sum)
Data	Down	Sessionized		that exceed 10ms	
Utilization		Service :		in duration	
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	Total	Customer	Gn, Gi, Gp	Total number of	Measure
Customer	Bytes Up	Service :	·	bytes uploaded	(Sum)
Data	, .	Sessionized		that exceed 10ms	
Utilization		Service :		in duration	
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	Total	Customer	Gn, Gi, Gp	Total number of	KPI (SUM)



Customer	Bytes	Service :		bytes uploaded	
	bytes	Sessionized		and downloaded	
Data					
Utilization		Service :		that exceed 10ms	
Service		Data Usage :		in duration	
		Data			
		Utilization		= Total Bytes Down	
		Service		+ Total Bytes Up	
CEM -	Average	Customer	Gn, Gi, Gp	Average Effective	KPI (SUM)
Customer	Throughp	Service :		Throughput	
Data	ut	Sessionized		(bytes/sec)	
Utilization		Service :			
Service		Data Usage :		= ( TotalBytesDown	
		Data		+ TotalBytesUp -	
		Utilization		TunnelBytesUp -	
		Service		TunnelBytesDown )	
				/FlowDuration *	
				1000	
CEM -	Flow	Customer	Gn, Gi, Gp	Total duration for	Measure
Customer	Duration	Service :		events with bytes	(Sum)
Data		Sessionized		up or downloaded	
Utilization		Service :		·	
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	Flow	Customer	Gn, Gi, Gp	Total number of	Measure
Customer	Attempts	Service :	<b>,</b> , , ,	flow attempts	(Sum)
Data	'	Sessionized		'	, ,
Utilization		Service :			
Service		Data Usage :			
		Data			



		Utilization			
		Service			
CEM -	Average	Customer	Gn, Gi, Gp	Average Latency	KPI
Customer	Latency	Service :		(ms) recorded for	(Mean)
Data		Sessionized		TCP traffic	
Utilization		Service :			
Service		Data Usage :		= TotalSetupTime /	
		Data		TCPFlowSuccess	
		Utilization			
		Service			
CEM -	Flow	Customer	Gn, Gi, Gp	Total number of	Measure
Customer	Successes	Service :		successful flow	(Sum)
Data		Sessionized		attempts	
Utilization		Service :			
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	Flow	Customer	Gn, Gi, Gp	Flow success	KPI
Customer	Success	Service :		percentage	(Mean)
Data	Rate	Sessionized			
Utilization		Service :		= Flow Success /	
Service		Data Usage :		Flow Attempt	
		Data			
		Utilization			
		Service			
CEM -	Average	Customer	Gn, Gi, Gp	Flow average	KPI
Customer	Flow	Service :		duration (ms)	(Mean)
Data	Duration	Sessionized			
Utilization		Service :		= Flow Duration /	
Service		Data Usage :		Flow Attempt	



		Data			
		Utilization			
		Service			
CEM -	Total	Customer	Gn, Gi, Gp	Sum of Client and	Measure
Customer	Setup	Service :		Server setup Time	(Sum)
Data	Time	Sessionized		(ms)	
Utilization		Service :			
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	Retransmi	Customer	Gn, Gi, Gp	Total number of	Measure
Customer	t Bytes	Service :		bytes retransmitted	(Sum)
Data	Down	Sessionized		on download of	
Utilization		Service :		Service	
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	Retransmi	Customer	Gn, Gi, Gp	Total number of	Measure
Customer	t Bytes Up	Service :		bytes retransmitted	(Sum)
Data		Sessionized		on upload of	
Utilization		Service :		Service	
Service		Data Usage :			
		Data			
		Utilization			
		Service			
CEM -	Retransmi	Customer	Gn, Gi, Gp	Average	KPI
Customer	t Rate	Service :		retransmission	(Mean)
Data		Sessionized		percentage	
Utilization		Service :			



Service		Data Usage : Data Utilization Service		= ( Retransmit Bytes Up+ Retransmit Bytes Down ) / ( Total Bytes Up+ Total Bytes Down - Tunnel Bytes Up - Tunnel Bytes Down ) * 100.0	
CEM - Customer Data Utilization Service	Tunnel Bytes Down	Customer Service: Sessionized Service: Data Usage: Data Utilization Service	Gn, Gi, Gp	Total number of bytes on download	Measure (Sum)
CEM - Customer Data Utilization Service	Tunnel Bytes Up	Customer Service: Sessionized Service: Data Usage: Data Utilization Service	Gn, Gi, Gp	Total number of bytes on upload	Measure (Sum)
CEM - Transaction al Service	Location	Customer Service: Transactional Service	3gPP Gb, IuPS, S1- MME	Network Location Identifier (ID+Type) where Session started	Dimension



CEM -	NE	Customer	Gn, Gi, Gp	Network Element	Dimension
Messaging		Service :		ID (SMSC, MMC)	
Service		Transactional			
		Service :			
		Messaging			
		Service			
CEM -	Error	Customer	Gn, Gi, Gp	Messaging Error	Dimension
Messaging		Service :		(Cause Code +	
Service		Transactional		Type)	
		Service :			
		Messaging			
		Service			
CEM -	Туре	Customer	Gn, Gi, Gp	Messaging Type	Dimension
Messaging		Service :		(MMS, SMS,)	
Service		Transactional			
		Service :			
		Messaging			
		Service			
CEM -	Direction	Customer	Gn, Gi, Gp	MS->NW or NW-	Dimension
Messaging		Service :		>MS	
Service		Transactional			
		Service :			
		Messaging			
		Service			
CEM -	Service	Customer	Gn, Gi, Gp	Service ID for	Dimension
Messaging		Service :		SMS/MMS short	[Optional]
Service		Transactional		code	
		Service :			
		Messaging			
		Service			
CEM -	Total	Customer	Gn, Gi, Gp	Total Duration in	Measure



	5 ··	C :		C 14	(6)
Messaging	Duration	Service :		ms for Message	(Sum)
Service		Transactional		send / receive	
		Service :		operations	
		Messaging			
		Service			
CEM -	Max	Customer	Gn, Gi, Gp	Max Duration in ms	Measure
Messaging	Duration	Service :		for longest	(Max)
Service		Transactional		Message send /	
		Service :		receive operations	
		Messaging			
		Service			
CEM -	Attempt	Customer	Gn, Gi, Gp	Number of	Measure
Messaging		Service :		Message Attempts	(Sum)
Service		Transactional			
		Service :			
		Messaging			
		Service			
CEM -	Success	Customer	Gn, Gi, Gp	Number of	Measure
Messaging		Service :		Message Successes	(Sum)
Service		Transactional			
		Service :			
		Messaging			
		Service			
CEM -	Total Size	Customer	Gn, Gi, Gp	Total Message Size	Measure
Messaging		Service :		(bytes)	(Sum)
Service		Transactional			
		Service :			
		Messaging			
		Service			
CEM -	Success	Customer	Gn, Gi, Gp	Message Success	KPI
Messaging	Rate	Service :		Percentage	(Mean)



Service	Transactional		
	Service :	= ( Attempt /	
	Messaging	Success ) * 100.0	
	Service		



# 4. Administrative Appendix

This Appendix provides additional background material about the TM Forum and this document. In general, sections may be included or omitted as desired, however a Document History must always be included.

### 4.1. About this document

This document is Addendum A to the GB962 Customer Experience Guide Book.

### 4.2. Document History

#### **4.2.1. Document Version History**

Version Number	Date Modified	Modified by:	Description of changes
0.1	13-Aug-12	Colm Costelloe Wei Dong	First Draft
1.0	4-Oct-2012	Mary Amalfitano	Submitted for Final Team Review.
1.1	8-Nov-12	Alicja Kawecki	Minor cosmetic corrections prior to web posting and Member Evaluation

#### 4.2.2. Release History

Release Number	Date Modified	Modified by:	Description of changes
1.0	4-Oct-2012	Mary Amalfitano	First Release

# 4.3. Acknowledgments

This document was prepared by the members of the TM Forum Customer Experience team. The TM Forum would like to thank the following people for contributing their time and expertise to the production of this document.

Shai Shamir, Team leader, Amdocs