# MAPS<sup>™</sup> UMTS for luCS, luH Interfaces Emulator

(IuCS Emulation over IP and ATM; and IuH Emulation over IP)



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### MAPS<sup>™</sup> UMTS for luCS Interfaces





MAPS<sup>™</sup> UMTS-IuCs and IuH Emulator Generate up to 20,000 Subscribers Up to 2000 Simultaneous Calls



MAPS<sup>™</sup> UMTS-luCS and luH Emulator HD RTP Generator Hardware (w/ 2 x 10G cards; w/ 4 x 1G cards ) Generate up to 20,000 Subscribers 20,000 Simultaneous Calls (with RTP Traffic)



# Highlights

- Simulates RNC, MSC, Home NodeB (HnB) and Home NodeB Gateway (HN GW) entities
- Generates and process all Mobility Management, Session Management, RANAP, ALCAP, and DTAP messages over SSCOP
- User controlled access to RANAP, and DTAP signaling messages over SCTP
- Ready scripts for Mobile Originating, Mobile Terminating, Location Updating procedures for quick testing
- Supports RAB Assignment, Authentication, TMSI Reallocation, Encryption, and other optional procedures
- SSCOP links over which RANAP and ALCAP signaling will be carried further for making calls
- SSCOP Server (GL's WCS based server module) provides SSCOP, AAL5 and AAL2 layer services
- Supports various traffic types including Tone, Digits and File playback over AAL2
- Supports traffic over lu UP protocol layer and also over normal RTP sessions (requires additional licenses)
- All Codec supported including G.711, G.711 App II with VAD, G.729, G.726, G.726 with VAD, GSM, AMR NB and WB, EVRC, SMV, iLBC, SPEEX NB and WB, G722, and G722.1. Visit <u>Voice</u> <u>Codecs</u> webpage for more comprehensive information



#### Hardware Platforms



OC3/OC12 PCIe Card LightSpeed1000™



#### OC3/OC12 Portable USB LightSpeed1000™



HD RTP Generator Hardware (w/ 2 x 10G cards; w/ 4 x 1G cards )



# **UMTS IuCS IP Protocol Stack**

		Supported Protocols	Specification Used
			IuCS IP Interface
Control Plane	llsor	SCCP	Q.713, CCITT (ITU-T) Blue Book
CC   MM   RR   SMS   SS	Plane	MTP3	Q.703, ITU-T Blue Book
RANAP	IuUP	RANAP	3GPP TS 25.413 V9.1.0
SCCP	RTP		
M3UA		MM / CC	3GPP TS 24.008 V5.16.0 (2006-06)
SCTP	UDP	DD	
IP	IP	KR	3GFF 13 04.18 V0.13.0
MAC	MAC	SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0
UMTS luCS over IP			GSM 03.38 Version 7.2.0 Release 1998
		lu-UP (User Plane)	3GPP TS 25.415
		SCTP	RFC4960



### UMTS IuCS ATM Protocol Stack

CC   MM   RR	
ALCAP	
MTP3B	
SSCF-NNI	Codec
SSCOP	lu UP
AAL5	AAL2
ATM	ATM
luCS A	ATM

Supported Protocols	Specification Used
lu	CS ATM Interface
SSCOP	ITU-T Q.2110
MTP3b	ITU-T Recommendation Q.2210
AAL Type 2 (ALCAP)	ITU-T Recommendation Q.2630.1
RANAP	3GPP TS 25.413 V9.1.0
MM / CC	3GPP TS 24.008 V5.16.0 (2006-06)
RR	3GPP TS 04.18 V8.13.0
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998
Iu-UP Iu User Plane Interface	3GPP TS 25.415



# **Location Updating (LU) Call Flow**

**Call Simulation over IP** 





### **Mobile Originating Call Procedure**

**Call Simulation over IP** 





### **Mobile Terminating Call Procedure**





### Mobile to Mobile SMS Call Procedure

**Call Simulation over IP** 





### **Supplementary Service Call Flow**

**Call Simulation over IP** 





#### **Relocation Call Procedure**

#### **Call Simulation over IP**





#### **MO Call Procedure**

#### **Call Simulation over ATM**





#### **MT Call Procedure**

#### **Call Simulation over ATM**





#### **Testbed Configuration**

MAPS (Message Automation Protocol Simulation) RN	C (UMTS IUCS 3GPP SCTP) - [Test	estbed Setup - TestBedDefault] -	- 0 X
E Configurations Emulator Reports Editor Debu	g Tools Windows Help		- 8 ×
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📨 🔒 🔣 🔛 🔛			0
Config	Value ^		
RNC Configurations		M3UATerminationType	
<ul> <li>M3UA Termination Type</li> </ul>	IPSP	Select Option	
<ul> <li>Enable RTP Simulation</li> </ul>	Enable		
<ul> <li>RTP Hardware Interface Type</li> </ul>	PC NIC	IPSP 💌	
<ul> <li>SCTP Mode</li> </ul>	client		
I RNC	1		
La RNC 1			
<ul> <li>RNC IP Address</li> </ul>	192.168.13.34		
<ul> <li>MGW IP Address</li> </ul>	192.168.13.34		
<ul> <li>RNC Port</li> </ul>	2905		
PLMN Identifiers			
<ul> <li>M3UA Parameters</li> </ul>			
<ul> <li>RNC Point Code</li> </ul>	1.1.2		
<ul> <li>Signaling Link Selection</li> </ul>	1		
Network Indicator	National		
<ul> <li>KNC Address Indicator</li> <li>N2UA Partice Context in Context</li> </ul>	National		
MSUA Routing Context Indicator	Absent		
M3UA Notiong Context	Abreat		
M2UA Network Appearance Indiacator	12		
MSC Parameters	14		
- MSC IP Address	192,168,13,28		
- MSC Port	2905		
<ul> <li>MSC Point Code</li> </ul>	222		
MSC Address Indicator	International		
HD RTP Media Configuration			
<ul> <li>End User Configurations</li> </ul>	MS_Profiles.xml		
<ul> <li>CSV File Name</li> </ul>	MS_Profiles_IMSI.CSV		
<ul> <li>Enable SMS Ratio For CSV</li> </ul>	False		
Ratio of SMS Calls	30 %	V Start Edit	



#### **Profile Configuration**





#### **Call Simulation over IuCS IP**

#### **SMS over Voice Call Simulation**





#### **Call Simulation over IuCS ATM**

#### **Call Control MO Procedure**

MAPS (Message Automation Protocol Simulation) RNC (UMTS IUCS 3GPP ATM) - [Call Generation - Ur	ntitled] – 🗇 🗙					
🌜 Configurations Emulator Reports Editor Windows Help	_ <i>8</i> ×	]				
			Call Co	ntrol MT Proc	edure	
					oddio	
Sr No Script Name Profile Call Info Script Execution Status Events Events Profile Result Total Iterations Completed	Iterations ^	<u>GL</u>	MAPS (Message Automation Prote	ocol Simulation) MSC (UMTS IUCS 3GPP /	ATM) - [Call Generation - Untitled]	- 🗆 ×
1 CallControl_M0.g/s Profile0001 MSI: 301700000 Start Call Released None Pass 1 1 2 CallControl_M0.d/s Profile0002 Start		🀇 Konfigurations Emulator Report	ts Editor Windows Help			_ <i>5</i> ×
3 CallControl_M0.gls Profile0003 Start None Unknown 1 0	Ý	🖳 💭 🍘 🔣 🧇 MS	PG 🕜 😣 🛛 🔹 🖌			
Add Delete Insert Refresh Start Start All Stop Stop All Abort All						
Save Column Width						
MAPS DUT MTP3b Layer	= ^ ^	Sr No Script Name Pr	rofile Call Info Sc	ript Execution Status Ev	vents Events Result Total Iterations Complete	ad Iterations
InitialUE-Message, CM SERVICE REQUEST 17.09.00 007000 Sub-service field	= 0000 Internatic	2 Call Control MT.gls	Profile0001 [MSI:,90170000000624,]	Abort HAB Assignment Completed	None Unknown 1	0
CC connection confirm	= 2.2.2(10 0000	3 Call Control MT.gls	Profile0003	Start	None Unknown 1	0
17:09:00.051000	= 0001 (1)	4 Call Control MT.gls	Profile0004	Start	None Unknown 1	0
DirectTransfer, AUTHENTICATION REQUEST	= x01000009020203034.	Add Delete Incert	Refrech Start All	Stop Stop All Abort Abort All		
DirectTransfer, AUTHENTICATION RESPONSE	= 00000001 CR connect =					
Source Local Reference Parameter	=	Save Column Width		n <b>.</b>		
Trop:00.101000 Protocol Class Parameter	= (1000000)	MAPS		MTP3b Layer		^
DirectTransfer, TMSI REALLOCATION COMPLETE TADA 00 101000 Class	=0010 Class 2	Derive		0000 Service Indicator 0000 Sub-service field	=0011 Sttp = 0000 International network	
1,000,000 Pointer to Manatory Parameter	= ParmO offset x02	raying,	15:15:36.361000	0001 DPC	= 2.2.2(00010010010000)	
Urectifanster, LM SERVILE ALLEPI 17.09.00.150000 000B Pointer to optional parameters	= x05 (5)	InitialUE-Message, PAG	ING RESPONSE	0002 OPC	$\Gamma = 1.1.1(01000000100010)$	
DirectTransfer, SETUP Called Party Address Called Party Addres Called Party Addres Called Party Addres Called Part	= mandatory parameter		15:15:36.45900L	Pdu	= x090003070B044312108E04C309088E23000	18401F000C
17.05.00.151000 000C Parameter length	= 3	CC connection	confirm	========== SCCP Layer =======		
Directi ranster, CALL PHUELEDING 17:09:00.201000 Address Indicators	= làddress cr			0005 Message Type	= 00001001 UDT unidata	
RAB-AssignmentRequest. 000D SSN Indicators	=0. Address do	Direct ransfer, AUTHENTI	15:15:36.46500C	Protocol Class Parameters		
1/09/00.201000 Global Title Indicators	=0000 No global	DirectTransfer, AUTHENTIC	CATION RESPONSE	0006 Class	=0000 Class 0	
Establish Request	= 0 Address is		1 5:1 5:36.50900C	0006 Message Handling (Class 0 and	1 only) = 0000 No Special Options	
Establish Confirm Optional Variable Length Parameters	=	DirectTransfer, TMSI REALL(	DCATION COMMAND	0007 Pointer to Mandatory Parameter	= ParmU offset xU3 (3) = Perml offset x07 (7)	
Calling Party Address	= optional parameter			0009 Pointer to Mandatory Parameter	= Parm2 offset xOB (11)	
RAB-AssignmentResponse, 17.09:00.252000	= 3	Direct Fransfer, TMSFREALLU	15:15:36.53500C	Mandatory Variable Length Parame	eters =	
DirectTransfer_ALERTING	-	DirectTransfer.	SETUP	Called Party Address	= mandatory parameter = 4	
7,09,00, 302000 U012 SSN Load Indicators	=0. Address d(		■15:15:36.53500C	Address Indicators	=	
DirectTransfer, CONNECT 00012 Global Title Indicators	=0000 No global	DirectTransfer, CALL	CONFIRMED 15:15:36 559000	000B Point Code Indicators	=l Address contains signalling	point cc
DirectTransfer CONNECTACKNOWLEDGE 0012 Nati Tuti Indicators	= .1 Route on : = 1 Address i:		13.13.30.333000	000B SSN Indicators	=1. Address contains subsystem r = 0000 No global title included	number
77.09.00.376000 0013 Signalling Point Code	= 2.2.2(000100100:	RAB-Assignment	Hequest, 15:15:36.559000	000B Routing Indicators	= .1 Route on SSN	
DirectTransfer, DISCONNECT	= optional parameter = OF	Establish Be	auest	000B Natl/Intl Indicators	= 0 Address is international	
DirectTransfer RELEASE 0016 Parameter length	= 72		15:15:36.585000	000C Signalling Point Code	= 2.2.2(00010010010000)	<b>v</b>
17:11:00.447000 SCCP user data	= x001340440000060000	<	>	<	- IOCOTITO RANAP(Wacional Necwork SSN)	>
DirectTransfer, RELEASE COMPLETE 17,11:00 448000	= 100		Funct Carlie A Carlet Flow	,		
PARAP PDU	= CHOICE	Scripts A Message Sequence A	Event Conrig A Script Flow			
17:11:00.498000 Extension Lity Marker Choice Index	= 0					
Iu-ReleaseComplete, ProcedureCode	= INTEGER					
PICD shared Contents	= 19 1d-InitialUE-Me: = ENUMERATOR					
17.11:00.548000 Contents	= 1 ignore(1)					
RLC release complete Value	= Open Type = 68					
Tritiou 94000 V Extensibility Marker	= 0 🗸					
	>					
Scripts Message Sequence / Event Config / Script Flow /						

# **Events Log**

📶 MAPS (Message Auto	mation Protocol Simulation) MSC (UMTS IUCS 3GPP	SCTP) - (Events)			-	
😂 Configurations Emi	ulator Reports Editor Debug Tools Windows	Help				- 8 ×
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Event Log Error Events	Captured Errors					
Date/Time	Captured Events	Call Trace Id	Script Name	Script Id		
2018-12-28 12:26:36.863000	SCTP Up On ConnectionId = 1005		Check_SCTP_Status.gls	ProtScriptId-40-7481902-689		
2018-12-28 12:28:36.863000	ASP UP Sent	1005	M3UA.gls	ProfScriptId-42-7483736-689		
2018-12-28 12:28:36.883000	ASP Acknowledged	1005	M3UA.gls	ProtScriptId-42-7483736-689		
2018-12-28 12:26:36.883000	AS Status Notified	1005	M3UA.gls	ProtScriptId-42-7483736-689		
2018-12-28 12:26:36.899000	ASP Active Ack Received	1005	M3UA.gls	ProtScriptId-42-7483736-689		
2018-12-28 12:26:36.899000	AS Status Notified	1005	M3UA.gls	ProtScriptId-42-7483735-689		
2018-12-28 12:26:36.899000	M3UA Up On ConnectionId = 1005		Check_SCTP_Status.gls	ProtScriptId-40-7481902-689		
2018-12-28 12:26:36.901000	Subsystem-Status-Test	1005	SCMG.gls	ProtScriptId-43-7483772-689		
2018-12-28 12:26:36.902000	Subsystem-Allowed	1005	SCMG.gls	ProfScriptId-43-7483772-689		
2018-12-28 12:26:36.916000	Subsystem-Allowed	1005	SCMG.gls	ProfScriptId-43-7483772-689		
2018-12-28 12:28:54.500000	Location Update Requested		luCS.gls	ProtScriptId-44-7501373-689		
2018-12-28 12:26:54.500000	CC Connection Confirmed		luCS.gls	ProtScriptId-44-7501373-689		
2018-12-28 12:26:54:501000	MM Connection Requested	IMSI:,001013014041741,T	luCS_Callgls	ProfScriptId-44-7501373-689		
2018-12-28 12:26:54:501000	Authentication Requested	IMSI:,001013014041741,T	luCS_Callgls	ProtScriptId-44-7501373-689		
2018-12-28 12:26:54:521000	Authentication is Successful	IMSI:,001013014041741,T	luCS_Callgls	ProtScriptId-44-7501373-689		
2018-12-28 12:26:54.521000	Ciphering Requested	IMSI: ,001013014041741,T	luCS_Call.gls	ProtScriptId-44-7501373-689		
2018-12-28 12:26:54.544000	Ciphering Complete	IMSI:,001013014041741,T	luCS_Call.gls	ProtScriptId-44-7501373-689		
2018-12-28 12:28:54.547000	Location Update Completed	IMSI:,001013014041741,T	luCS_Call.gls	ProfScriptId-44-7501373-689		
2018-12-28 12:26:54.591000	SCCP Release Initiated		luCS.gls	ProfScriptId-44-7501373-689		
2018-12-28 12:26:57.059000	RTP Stats Querv Script started		RTP Stats Display.gls	PtolScriptId-41-7483513-689		
- Save Even						
Clear Captur	e Events to file					
	Initialisat	ion Error E	vents 🛛 🕲	Captured Errors 🛛 😑 Lir	nk Status I	Jp=1 Down: 🏑



#### **Bulk Call Generation using CSV Profiles**

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	Script Name	Profile	Call Info	Script Execution	Status	Events	Eve	Result	Total Iterat	Completed	iter.
	NCS_Call gls	MSPioRe0001	MSI:,45080301404316	Start	SCCP Connection Released	None		Fal	10	10	
	luCS_Call.gls	MSPtofile0002	IMSI: 45080301404316	Start	SECP Connection Released	None		Fail	10	10	
£.,	luCS_Call.gls	MSPtofile0003	IMSI:,45080301404317	Start	SECP Connection Released	None		Fal	10	10	
	luCS_Call.gls	MSPtofile0004	IMSI:,45080301404318	Start	SECP Connection Released	None		Fail	10	10	
5	luCS_Cal.gls	MSPtofile0005	IMSI:,45080301404318	Start	SECP Connection Released	None		Fail	10	10	
5	luCS_Call.gls	MSPtofile0006	IMSI:,45080301404318	Start	SECP Connection Released	None		Fail	10	10	)
_	luCS_Call.gls	MSPtolie0007	IMSE,45080301404318	Start	SECP Connection Released	None		Fail	10	10	)
3	luCS_Call.gls	MSProfile0008	IMSI:,45080301404319	Stop	SECP Connection Released			Fail	10	9	
1	luCS_Call.gls	MSProfile0009	IM51:,45080301404319	Start	SCCP Connection Released	None		Fail	10	10	)
							1				>
A	d Delete Insert	∫ <u>Refresh</u> _Sa h —j	rt Start All Stop	▼ Rop All ▼	Abort Abort All	Find					
A:	3d Delete Insert ave Column Wid RNC	Refresh Sta	rt Start Al Stop	Stop All	Abort Abort All	Find	 Adapta	tion Laye	- 000	*** *	
A/	3d Delete Insert jave Column Wid RNC	Refresh Sta	rt Start Al Stop	<ul> <li>▼ Stop All</li> <li>▼</li> <li>SC</li> <li>1211.58.066000</li> </ul>	Abort Abort All	Find HTP3 User Class	 Adapta	tion Laye	• 000 • 000	00001 Rel4	• ***
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A:	d Delete Insert	Refresh Sta h SaUE-Message, CM 1 CC connects	rt Start Al Stop	<ul> <li>▼ Stop All</li> <li>▼</li> <li>SC</li> <li>12:11:58.066000</li> <li>12:11:58.084000</li> </ul>	Abort Abort All	Find HTP3 Uses Class Message Type Length	Adapta	tion Laye	r = 000 = 000 = 000 = 116	00001 Rele 00001 Trar 00001 Payj (x0000007	eat 151 74)
A	24 Delete Insert	Refresh Sta h SaUE Message, CM S CC connects DirectTransfer, CM S	rt Start Al Stop	Stop All     Sc     Sc     Sc     121158.066000     121158.084000     121158.084000	Abort Abort All	Find HTP3 User Class Hessage Type Length Data	Adapta	tion Laye	r = 000 = 000 = 000 = 116 =	00001 Pel- 00001 Trar 00001 Payl (x0000007	ean nsi 10/ 74)
A.	6d Delete Insert 2eve Column Wid RNC	Refresh Sta h NAUE-Message, CM CC connecti DirectTransfer, CM S	rt Start Al Stop	SC 1211:58.066000 1211:58.084000 1211:58.084000	Abort Abort All	Find HTP3 User Class Hessage Type Length Data	Adapta	tion Laye	er = 000 = 000 = 000 = 116 = = x02 = 108	00001 Pel- 00001 Trar 00001 Pays (x0000007 10 Transfe (x006C)	eas nsi los 74) er
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A	5d Delete Insert	Refresh Sta h SaUE Message, CM CC connecti DirectTransfet, CM S Iu:ReleaseC Iu:ReleaseC RLSD re	rt Start Al Stop	Stop All     Stop All     Sc     Sc     121158.066000     121158.084000     121158.084000     121158.084000     121158.084000     121158.084000     121158.084000     121158.084000     121158.084000	Abort Abort All	Find Find Class Message Type Length Data ting Point Co Code tion Point Co Code Indicator	Adapta Adapta	tion Laye	<pre>x = 000 = 000 = 000 = 116 = x 02 = 108 = 1.1 = 2.2 =</pre>	00001 Pele 00001 Tran 00001 Tran (x0000007 10 Transfe (x006C) .2(00100 .2(01000 .0011 SCC)	eas ns f loa 74) er 00
A	24 Delete Insert	Refresh Sta h SaUE-Message, CM CC connects DirectTransfer, CM S Iu-Release Iu-Release RLSD re	rt Start Al Stop	Stop All     Sc     Sc	Abort Abort All	Find Find Class Message Type Length Data ting Point Co Code tion Point Co Code Indicator Indicator	- Adapta	tion Laye	F = 000 = 000 = 000 = 116 = x02 = 108 = 1.1 = 1.1 = 2.2 =	00001 Pele 00001 Tran 00001 Tran (x000000 10 Transfe (x006C) .2(00100 .2(01000 .0011 SCC) 10 Nati	eas nsf loa 74) er 00 00 P
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# **MAPS™ UMTS for luH Interfaces**



# Key Features of luH Network

- Simulates RNC, MSC, Home NodeB (HnB) and Home NodeB Gateway (HN GW) entities
- Transmitting Voice Files
- Transmitting DTMF, MF Digits and other Tones and Dual Tones
- Recording Voice Files
- Monitoring Single and Dual Tones, DTMF, and MF digits
- Loopback, Talk using Microphone, Play to Speaker



### **UMTS IuH Protocol Stack**

		Supported Protocols	Specification Used			
		IuH Interface				
CM   MM   RR   SMS  SS		RUA	3GPP TS 25468 V9.1.0			
		RANAP	3GPP TS 25.413 V9.1.0			
RANAP RUA	HNBAP	MM / CC	3GPP TS 04.08 V7.17.0			
		RR	3GPP TS 04.18 V8.13.0			
SC	TP					
	Р	SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998			
MAC		SCTP	RFC 4960			
UMTS IuH over IP		HNBAP Home Node B (HNB) Application Part	Release 9 - 3GPP TS 25.469 V9.1.0 (2010-03) Release 12 - 3GPP TS 25.469 V12.2.0 (2014-09) (Release 12)			



### **Femtocells Overview**





# Location Update Call over IuH IP





# Mobile Originating Call over IuH IP





### Mobile Terminating Call over IuH IP





#### **PS Domain luH Call Procedure**





### **IuH over IP Testbed Configuration**

MAPS (Message Automation Protocol Simulation)	) HNB (UMTS IuH 3GPP ) - [Testbed Setup - SelfTest Configuration] 🛛 – 🗖 💌
<u>Configurations</u> Emulator <u>Reports</u> Editor <u>Debug</u> Tools	Windows Help
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	0
Config	Value
HNB Configurations	Select Ontion
Enable RTP Simulation	Enable
- KTP Hardware Interface Type	Enable -
HNB	1
La HNB1	-
HNB IP Address	192.168.31.46
<ul> <li>MGW IP Address</li> </ul>	192.168.31.46
<ul> <li>HNB GTP IP Address</li> </ul>	192.168.31.48
<ul> <li>GTP Port For Traffic</li> </ul>	2152
<ul> <li>HNB Port</li> </ul>	29169
<ul> <li>HNB Identity</li> </ul>	90170886740421@GLHNB.com
- HNB ID	0000001
PLMN Identifiers	001
Mobile Country Code	01
- Location Area Identifiers	01
	0001
<ul> <li>Service Area Code</li> </ul>	0001
<ul> <li>Routing Area Code</li> </ul>	0001
- RNCID	1
Cell Identity	00000010
HNBGW Parameters	
<ul> <li>HNBGW IP Address</li> </ul>	192.168.31.47
L HNBGW Port	29169
Packet Switched Userplane Configuration	
- Adapter Index	3 Fachlad
GTD TrafficTure	Enabled
- OFF Hancippe	Modicitant
4 RTP Cores	2
RTP Cores 1	-
RTP Port Index	Port_0::4x1G Adapter
<ul> <li>RTP Media IP Address</li> </ul>	192.168.12.243
<ul> <li>Default Gateway Configuration</li> </ul>	
RTP Cores 2	=
<ul> <li>RTP Port Index</li> </ul>	Port_1::4x1G Adapter
<ul> <li>RTP Media IP Address</li> </ul>	192.168.12.244
Le Default Gateway Configuration	
- Subnet Mask	200.200.200.0
End User Configurations	192.100.12.1 MS Drofiles yml
CSV File Name	MS_rolles.MI
Enable SMS Ratio For CSV	False
Ratio of SMS Calls	50 Start Edit
I	Initialisation Errors     A Error Events     A Caotured Errors



### **IuH over IP Profile Configuration**

ĩ.		MAR	PS (M	lessa	ge Automation Protocol Simulation) HNB (UMTS IuH 3GPP ) - [Profile Editor - MS_Profiles]	_ 🗆 🗙
<u>)</u> C	onfigurations	E <u>m</u> ulator	<u>R</u> epo	orts	Editor Debug Tools Windows Help	- 8 ×
Ó		6 <b>%</b>	в.		🖉 🥑 🙀 📑 🔓 😤 🖳 🛞	
100		_		-		
	- 5	<b>~</b>				•
#	Profiles (Edit-F	2)		^ (	onfig Value  Tenable	
- 1	MSProfile0001				MSProfile0001	
2	MSProfile0002			_	CM Service Type Mobile Originating Call Establishment	
3	MSProfile0003			-	Location Update Type     Normal location updating     Mobile ID	
4	MSProfile0004				- Type Of Identity IMSI	
5	MSProfile0005				- IMEI 867802029630010	
6	MSProfile0006				- IMEISV 3500775232370011	
7	MSProfile0007				- TMSI 001013014041/41	
8	MSProfile0008				SISDN	
9	MSProfile0009				- Called Number 3014041791	
10	MSProfile0010				Calling Number 3014041/41	
11	MSProfile0011				Location Area Code 0001	
12	MSProfile0012				- Service Area Code 0001	
13	MSProfile0013				- RAC 0001	
14	MSProfile0014				Authentication Parameters	
15	MSProfe0015				- Key 0123456789abcdef0123456789abcdef	
16	MSProfile0016				Operator Variant Parameter Type     OP     OP     OP	
17	MSProfile0017				OP 01020304050607080910111213141516	
10	MCDrofie0012				L Authentication Algorithm Type Xor	
10	MCDroff-0010				Authentication Failure Parameters	
19	MCDroffe00020				└─ False Key 4444444444444444444444444444444444	
20	MSProneUU20				L NSAPI 9	
21	MSProfileUU21				Access Point Name apnbasic.epg	
22	MSProhle0022				- SMS Call Parameters	
23	MSProfile0023				- SMS Character Set UCS2(16 bit) SMS Data for Default and 8 Bit Data Tart SMS @@0001	
24	MSProfile0024				- SMS Data for UCS2 005400650073007400200053004d0053002000	
25	MSProfile0025			=	Destination SC 885643722311	
26	MSProfile0026				Codec Options and Traffic Configuration	
27	MSProfile0027				Codec Options     PC/VU     Packetization Time in msec     20	
28	MSProfile0028				- Traffic Config	
29	MSProfile0029				- Traffic Type Auto Traffic File	
30	MSProfile0030				Traffic Direction TxRx     Traffic Profile Name Profile0001	
31	MSProfile0031				Impairment Type None	
32	MSProfile0032				DTMF Parameters	
33	MSProfile0033				Send Digits on Call Connect Enable	
34	MSProfile0034				Ha Digits 5	
35	MSProfile0035				- Digit 0	
36	MSProfile0036				Con Duration in msec 100	
37	MSProfile0037				Hell Digits 2	
38	MSProfile0038				On Duration in msec 100	
20	MSProfil-0020				- Digits 3	
39	MCDroff-0040				- Digit 1	
40	MCDraft-0041				- On Juration in msec 100	
41	Monute Corre				Digit A	
42	MSProhleUU42			=	L On Duration in msec 100	
43	MSProfile0043				Le Digits 5	
44	MSProfile0044				On Duration in msec 100	
45	MSProfile0045				BS Domain Traffic Configurations	
46	MSProfile0046				Mobile Traffic Parameters	
47	MSProfile0047				– Udp Src Port 2152 – Udp Dst Port 2152	
48	MSProfile0048				- HTTP Server IP Address 192.168.12.233	
49	MSProfile0049				- TCP port for HTTP 80	
50	MSProfile0050				- TCP Connection Identifier 1	
51	MSProfile0051				- Start File Count 1	
52	MSProfile0052				- Traffic File Name img5a.flixcart.com	
53	MSProfile0053				- File Count For Concurrent Or Sequen 3	elete
54	MSProfile0054			~	Ixtrite For Once Transmission From L 1      Iteration Count     Iteration Count	
Ir	isert Del	lete	Clear			



# **IuH over IP Incoming Call Handler Configuration**

Message Name	Script Name	Scripts	
CM SERVICE REQUEST	IuH_CS_Call.gls	IuH_CS_Call.gls	Sequence
OCATION UPDATING REQUEST	IuH_CS_Call.gls		0 1
PAGING RESPONSE	IuH_CS_Call.gls		ORandom
INBRegisterRequest	Mgmt_HNBGW.gls		
JERegisterRequest	Mgmt_HNBGW.gls		
ATTACH REQUEST	luH_PS_Call.gls		
SERVICE REQUEST	luH_PS_Call.gls		
ROUTING AREA UPDATE REQUEST	IuH_PS_Call.gls		
MSI DETACH INDICATION	IuH_CS_Call.gls		
			Up
			Down
			DOWN
		Add Delete	



#### **IuH over IP Call Generation**

Active Calls Call Status Call Events Call Generation - IuH\_CS\_PS\_Default 1 8 68 Script Name Script Execution Status Events Even... Result Total Iterations Completer A Profile Call Info Sr luH\_CS\_Call.gls MSProfile0001 IMSI:,00101301.. Send\_File-Started Hold Pass Stop luH\_CS\_Call.gls MSProfile0002 Start Unknown None luH\_CS\_Call.gls MSProfile0003 Start Unknown None luH\_CS\_Call.gls MSProfile0004 Start Unknown **Loading Scripts** None luH\_CS\_Call.gls MSProfile0005 Start 5 None Unknown and luH\_CS\_Call.gls MSProfile0006 Start None Unknown luH\_CS\_Call.gls MSProfile0007 **Profiles** Start None Unknown luH\_CS\_Call.gls MSProfile0008 Start Unknown None luH\_CS\_Call.gls MSProfile0009 Start Unknown 9 None luH\_CS\_Call.gls MSProfile0010 10 Start Unknown None IuH PS Call.ols MSProfile0011 TMSI.0x00000004 GTP-U Mobile-Traffic Started SMSCall Stop Pass < > Abort Abort All Stop All Add Delete Insert Refresh Start Start All Stop 🔻 Column Width -----Show Latest Save Find ~ HNB HNBGW Message Sequence ATTACH REQUEST 15:52:42.287.1144 AUTHENTICATION AND CIPHERING REQ 15:52:42.293.5421 GMM AUTHENTICATION AND CIPHERING RESP ~ > Scripts Message Sequence ( Event Config ) Script Flow



#### **IuH over IP Call Reception**





#### **IuH over IP Event and Traffic Log**

#### Server Traffic Log

19	Untitled - BasicServer	_ 0	×			
File Edit View Setup Help						
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Connected: client #644 at 127.0.0.1 644(1): end tasks on disconnect; 644(2): run task "MobilelpCoreSrv:StartServe 644(3): inform task "CONFIGURE Client HTTP 644(4): inform task "ADDGTPSTREAM 192.168 644(5): inform task "ADDCONNECTION 3.1.19	r ''; 0   GTP 192.168.44.50 2152 192.168.44.214 2152 ''; 3.12.1 3 ''; 12 168 2 160 80 192 168 12 1 img5a flivcart com '';			Events Log		
644(6): inform task "DELETEGTPSTBEAM 192	168 12 1 3 <sup>th</sup>	9		Events		_ 🗆 🗙
	inositeiro )	Event Log Error Events	Captured Errors			
Ready		Date / Ime 2015-73 10.41146 400000 2015-73 10.41146 400000 2015-73 10.41146 400000 2015-73 10.41146 400000 2015-73 10.41146 445000 2015-73 10.41146 455000 2015-73 10.41146 455000 2015-73 10.41146 455000 2015-73 10.41146 450000 2015-73 10.5304 550000 2015-73 10.5304 550000 2015-73 10.5304 550000 2015-73 10.5304 550000 2015-73 10.5305 650000 2015-73 10.5305 650000 2015-73 10.5305 660000 2015-73 10.5405 807000 2015-73 10.5405 807000000 2015-73 10.5405 8070000000000000000000000000000000000	Laptured E vents AutTre Lot SBC/TB 41 2A90002800FBE 3688E 9841 Authentication Parameters are RESCont & 0x2800FBE 3 RESEXension 0x580/TB 41 338 30C9678102404 Authentication Response sent TMSI Reallocated MM Connection Established CM service Accepted Call Initiated RAB Assignment Complete Alatring Sent Call Connected Call Cannected Call Connected Call Connected Call Cannected Call Connected Call Cannected Call Call Cannected Call Call Cannected Call C	Lai Trace 10 IMSI, 001010123456219, TMSI, 0x11111001, CaliedN IMSI, 001010123456219, TMSi, 0x0000002, CaliedN IMSI, 001010123456219, TMSi, 0x0000002, CaliedN IMSI, 001010123456219, TMSi, 0x00000002, CaliedN IMSI, 0x00000002 TMSI, 0x0000002 TMSI, 0x00000002 TMSI, 0x0000002 T	Script Name           umber::90558         IuH_CS_Call gls           IuH_PS_Call gls         IuH_PS_Call gls	Scaprid GBPvdScapitld, 7, 1183925924-898-8772 GBPvdScapitld, 8, 118460042-900-5772 GBPvdScapitld, 8, 11



# High Density (HD) RTP Traffic Simulation



- Rackmount network appliance with 4x1GigE NIC
- Transport over UDP and TCP, IPv4 and IPv6, and TLS for secure transport
- Easily achieve up to 20,000 endpoints per appliance (5000 per port)
- Up to 250 calls per second (with RTP traffic)
- Scales to around 100,000 to 200,000 endpoints with use of Master Controller for single point of control
- Manage 10+ MAPS<sup>™</sup> systems with single point of control from Master Controller



#### **Bulk Call Generation using XML profiles**

<u>GL</u>			MAPS (I	Messag	e Auto	omation	n Proto	col Simulation	) HNB (UM	ES TUH BGPP	) - [Call Gene	ration - Unti	tled]		_ 🗆 🗾	k
🍇 <u>C</u> onfig	urations	E <u>m</u> ulator	' <u>R</u> eports	<u>E</u> ditor	<u>W</u> indo	ows <u>H</u> elp	2								- 8	×
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		?			8	₫ <b>ð</b>										
SrNo	Script Nam	e	Profile		Call In	fo		Script Execution	Status		Events	Ev	Result	Total Iterations	Completed Iterations	
1	luH_CS	S_Call.gls	MSProf	ile0001				Start			No	ne	Unknown	10	0	
2	luH_CS	6_Call.gls	MSProf	ile0002				Start			No	ne	Unknown	10	0	
3	luH_CS	6_Call.gls	MSProf	ile0003				Start			No	ne	Unknown	10	0	
4	luH_CS	6_Call.gls	MSProf	ile0004				Start			No	ne	Unknown	10	0	
5	luH_CS	S_Call.gls	MSProf	ile0005				Start			No	ne	Unknown	10	0	
6	luH_CS	6_Call.gls	MSProf	ile0006				Start			No	ne	Unknown	10	0	
7	IuH_CS	6_Call.gls	MSProf	ile0007				Start			No	ne	Unknown	10	0	
8	luH_CS	S_Call.gls	MSProf	ile0008				Start			No	ne	Unknown	10	0	
9	IuH_CS	6_Call.gls	MSProf	ile0009				Start			No	ne	Unknown	10	0	_
10	IuH_CS	S_Call.gls	MSProf	ile0010				Start			No	ne	Unknown	10	0	_
Add View Scrij //Ini Repor CallD Inter Answe IuHSC Scrip RtpSe Appen Proto IuHMM RUADi IMSIS TMSIS <	v Executing pt Conte tialize tEvent uration CallDura rCallTin riptId=' tIdCoun ssionSti dInAsci: colStan State = sconnec tr="INS: tr="TNS:	elete pline Nation Variabl (Script AtionTim neOut=\$_ 'TuH"; tate = "N i (TuHSc hard="Tu "IDLE"; cSent = [:"; [:";	es = "Starte &_CallDur callAnswe Gull"; riptId,So H"; 0;	Refrest d"); ation; terCall rTime; riptId(	1Durat	<pre>Start Stor; stor; stor; stor;</pre>	Star	t All Stop	Stop All	Abort	Abort All					_
	~	- ago o oqu	Λ.		<u> </u>	- soles i rem	V	/			1			E		
										Error Events	<	Cantured Er	rors	🔹 📫 Link Status	Up-1 Down-0	1.1



#### **Bulk Call Generation using CSV Profiles**

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<u> </u>	- 🔒 🖪 💡	8 क								
r No	Script Name F	Profile Call Info		Script Execution	Status	Events	Even	Result	Total Iterations	Completed Iterations
1	luH_CS_Call.gls	IMSI:,1013014041801,TMSI:,	0x11110061,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
2	luH_CS_Call.gls	IMSI:,1013014041802,TMSI:,	0x11110062,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
3	luH_CS_Call.gls	IMSI:,1013014041803,TMSI:,	0x11110063,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
4	luH_CS_Call.gls	IMSI:,1013014041804,TMSI:,	0x11110064,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
5	luH_CS_Call.gls	MSI:,1013014041805,TMSI:,	0x11110065,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
6	luH_CS_Call.gls	IMSI:,1013014041806,TMSI:,	0x11110066,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
7	luH_CS_Call.gls	IMSI:,1013014041807,TMSI:,	0x11110067,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
8	luH_CS_Call.gls	IMSI:,1013014041808,TMSI:,	0x11110068,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
9	luH_CS_Call.gls	IMSI:,1013014041809,TMSI:,	0x11110069,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
10	luH_CS_Call.gls	IMSI:,1013014041810,TMSI:,	0x11110070,CalledNumber:,3	Stop	Send_File-Started	Hold		Pass	1	0
<u>S</u> a	/e Column Width	Show Latest								
	HNB		HNBGW 🔷		Find					
		CM SERVICE REQUEST	15:17:37.228000	RUA PDU	== RUA Layer ========	= = = CHOIC = 0	E			
		AUTHENTICATION REQUEST	15:17:37.263000	Procedu	re Code	= INTEG	ER			
				<b>A</b>			<b>O</b>			
		AUTHENTICATION RESPONSE	15-17-27-262000	Contents Critical	s Lity	= 1 id- = ENUME	Connect RATOR			
	•	AUTHENTICATION RESPONSE	15:17:37.263000	Contents Critical Contents	s Lity s	= 1 id- = ENUME = 0 re	Connect RATOR eject(0)			
		AUTHENTICATION RESPONSE SecurityModeCommand	▶15:17:37.263000	Contents Critical Contents Value Length	s Lity S	= 1 id- = ENUME = 0 re = Open = 101	Connect RATOR eject(0) Type			
	• ●	AUTHENTICATION RESPONSE SecurityModeCommand	15:17:37.263000 15:17:37.285000	Content: Critical Contents Value Length Extensil	s lity s pility Marker	= 1 id- = ENUME = 0 re = Open = 101 = 0	Connect RATOR eject(0) Type			
		AUTHENTICATION RESPONSE SecurityModeCommand SecurityModeComplete	15:17:37.263000 15:17:37.285000	Content: Critical Contents Value Length Extensil Preamble	s Lity s pility Marker a	= 1 id- = ENUME = 0 re = Open = 101 = 0 = 0	Connect RATOR eject(0) Type			
	•	AUTHENTICATION RESPONSE SecurityModeCommand SecurityModeComplete	15:17:37.263000 15:17:37.285000 15:17:37.285000	Contents Critical Contents Value Length Extensil Preamble Protoco	s Lity s pility Marker a DIIE-Container	= 1 id- = ENUME = 0 re = Open = 101 = 0 = 0 = SEQUE	Connect RATOR ject(0) Type			
		AUTHENTICATION RESPONSE SecurityModeCommand SecurityModeComplete CM SERVICE ACCEPT	15:17:37.263000 15:17:37.285000 15:17:37.285000 15:17:37.301000	Contents Critical Contents Value Length Extensil Preamble Protoco Iterats	s Lity s bility Marker a bilE-Container ion Count	= 1 id- = ENUME = 0 re = Open = 101 = 0 = 0 = SEQUE = 5	Connect RATOR ject(0) Type			
		AUTHENTICATION RESPONSE SecurityModeCommand SecurityModeComplete CM SERVICE ACCEPT SETUP	15:17:37.263000 15:17:37.285000 15:17:37.285000 15:17:37.301000	Contents Critical Contents Value Length Extensil Preamble Protoco Iterat: Protoco	s lity s bility Marker s bIIE-Container bIIE-Container bIIE-Container	= 1 id- = ENUME = 0 re = Open = 101 = 0 = 0 = SEQUE = 5 = Insta = INTEG	Connect RATOR sject(0) Type CNCE OF ance 0			
	•	AUTHENTICATION RESPONSE SecurityModeCommand SecurityModeComplete CM SERVICE ACCEPT SETUP		Contents Critical Contents Value Length Extensil Preamble Protoco Iterat: Protoco Conte	s lity s bility Marker s bIIE-Container bIIE-Container bccolIE-ID ents	= 1 id- = ENUME = 0 re = Open = 101 = 0 = 0 = SEQUE = 5 = Insta = INTEG = 7 id-	Connect :RATOR .ject(0) Type :NCE OF ince 0 :ER :CN-Domai	nIndicat	or	
<		AUTHENTICATION RESPONSE SecurityModeCommand SecurityModeComplete CM SERVICE ACCEPT SETUP		Contents Critical Contents Value Length Extensil Preamble Protoco Iterats Protoco Conto	s lity s bility Marker b blIE-Container blIE-Container bolIE-Container bccolIE-ID ants	= 1 id- = ENUME = 0 re = Open = 101 = 0 = 0 = SEQUE = 5 = Insta = INTEG = 7 id-	Connect CRATOR ject(0) Type CNCE OF Ance 0 SER -CN-Domai	nIndicat	or	>



### **Bulk Call Reception using CSV Profiles**

GL			MAPS (Message	Automation Prote	ocol Simulatior	n) HNB GateWay	(UMTS IuH 3GPP) -	[Call Reception]		_ 1	□ ×
🤌 Configu	rations Emulator	Reports Editor	Debug Tools Window	vs Help							- 8 ×
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SrNo	Script Name	Profile	Call Info			Script Execution	Status	Events	Events.	Results	^
1	Mgmt_HNBGW.gls			HNBID,0x00000001		Stop		HNBDeF	Registration	Pass	
2	luH_CS_Call.gls		IMSI:,101301	4041786,CalledNumber:	,3014051786	Stop	Send_File-St	arted Terr	minate	Pass	
3	luH_CS_Call.gls		IMSI:,101301	4041787,CalledNumber:	,3014051787	Stop	Send_File-St	arted Terr	minate	Pass	
4	luH_CS_Call.gls		IMSI:,101301	4041788,CalledNumber:	.,3014051788	Stop	Send_File-St	arted Terr	minate	Pass	
5	luH_CS_Call.gls		IMSI:,101301	4041789,CalledNumber:	,3014051789	Stop	Send_File-St	arted Terr	minate	Pass	
6	luH_CS_Call.gls		IMSI:,101301-	4041790,CalledNumber:	;,3014051790	Stop	Send_File-St	arted Terr	minate	Pass	
7	luH_CS_Call.gls		IMSI:,101301	4041791,CalledNumber:	;,3014051791	Stop	Send_File-St	arted Terr	minate	Pass	
8	luH_CS_Call.gls		IMSI:,101301	4041792,CalledNumber:	,3014051792	Stop	Send_File-St	arted Terr	minate	Pass	
9	luH_CS_Call.gls		IMSI:,101301	4041793,CalledNumber:	.,3014051793	Stop	Send_File-St	arted Terr	minate	Pass	
10	luH CS Call.als		IMSI:.101301	4041794.CalledNumber:	.3014051794	Stop	Send File-St	arted Terr	minate (	Pass	~
Stop	Stop All Abort	t Abort All 🔽 Si	Now Records Select /	Active Call 🔽 Auto Tra	ish <u>Trash</u>					T	erminate
	HNB		HN	IBGW	^	Find					
		CM SERVICE BE	OUEST .			RUA Laye	r				^
		CM SERVICE HE	QUEST	15:16:34.096000	RUA P	DU		= CHOICE			
		AUTHENTICATION	REQUEST		Exten	sibility Marker		= 0 = INTEGED			
	•			15:16:34.097000	Con	tents		= 1 id-Connect			
		AUTHENTICATION F	RESPONSE	5 10 04 11 1000	Cri	ticality		= ENUMERATOR			
				15:16:34.114000	Con	tents		= 0 reject(0)			
	4	SecurityModeCo	mmand	151634114000	Val	ue 		= Open Type			
				13.10.34.114000	Ext	ensibility Mark	er	= 0			
		SecurityModeCo	mplete	15:16:34.128000	Pre	amble		= 0			
					Pr	otocolIE-Contai	ner	SEQUENCE OF			
		UM SERVICE AL		15:16:34.128000	It	eration Count		= 5			
		SETUP			Pr	DTOCOLLE-CONTAL	ner	<pre>= Instance 0 = INTECED</pre>			
				15:16:34.142000		Contents		= 7 id-CN-Domai	nIndicator		
		CALL PROCEE	DING	15.10.04.140000		Criticality		= ENUMERATOR			
				15:16:34.142000	~	Contents		= 0 reject(0)			~
<		DAD A		>	<	/s   116		= Open Time			>
Scripts		nce Event Config	Script Flow		ч <sup>,</sup>						
11 (	/		/								
					Initialisation	on Errors	Error Events	Captured Errors	Link Stat	us Up=1 Down=0	0 //.



### **Message Statistics**

Configurations Emulator	Reports Editor Debug T	ools Windows Help	
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Call Stats Message Stats	Tx Count	Ry Count	Retransmit Count
	10002	0	0
ASD Active	10003	1	0
ASP Active Acknowledgement	1	0	0
	0	1	0
ASP Lip Advowledgement	1	0	0
	10006	0	0
ALITHENTICATION RESPONSE	0	10006	0
	10003	0	0
CC connection confirm	10006	0	0
CM SERVICE REQUEST	0	10003	0
CONNECT	10003	0	0
CONNECT ACKNOWLEDGE	0	10003	0
DISCONNECT	2	8001	0
IDENTITY REQUEST	3	0	0
IDENTITY RESPONSE	0	3	0
IT Inactivity test	9998	9998	0
Iu-ReleaseCommand	8006	0	0
Iu-ReleaseComplete	0	8006	0
LOCATION UPDATING ACCEPT	3	0	0
LOCATION UPDATING REQUEST	0	3	0
Notify	2	0	0
RAB-AssignmentRequest	10003	0	0
RAB-AssignmentResponse	0	10003	0
RELEASE	8001	2	0
RELEASE COMPLETE	2	8001	0
RLC release complete	0	8006	0
RLSD released	8006	0	0
SETUP	0	10003	0
SSA subsystem-allowed	1	0	0
SST subsystem-status-test	0	1	0
SecurityModeCommand	10006	0	0
SecurityModeComplete	0	10006	0
TMST REALLOCATION COMPLETE	0	3	0



#### **Customizations - Statistics and Reports**

Packet Loss
Packets Discarded

MOS, R-Factor

#### **Duplicate Packets**

#### Out-Of-Sequence

#### Packets

**Jitter Statistics** 

Oser Denned Statistics - VOI	co quanty 5 tats	14015
🗅 🗀 🔒 🔣	Add Tab	Delete Ta
Packet Stats		
Name	Values	
Active RTP Sessions	1987	
Completed RTP Sessions	1548093	
Sessions With Zero Receive Traffic	0	
	0	
MOS Score Stats	0	
	0	
iessions with Mos ( 5.0 - 4.0 )	612618 [39%]	
Sessions with Mos ( 4.0 - 3.0 )	852971 [55%]	
Sessions with Mos ( 3.0 - 2.0 )	73446 [4%]	
Sessions with Mos ( < 2.0 )	9058 [0%]	
	0	
Jotal K IP Packet Sent	4485008797	
IULAIN IF FACKEL KELEIVEU	0	
Packet-Loss Stats	0	
	0	
Total Packeti oss	4072 [0%]	
Sessions with Zero Packet-Loss	1534967 [99%]	
Sessions with Packet-Loss( <1%)	13126 [0%]	
Sessions with Packet-Loss(1% - 5%)	0 [0%]	
Sessions with Packet-Loss(5% - 10%)	0 [0%]	
Sessions with Packet-Loss(>10%)	0 [0%]	
	0	
Packet-Discarded Stats	0	
	0	
Total PacketDiscarded	3738934 [0%]	
Sessions with Zero Packet-Discard	1464299 [94%]	
Sessions with Packet-Discard(<1%)	41479 [2%]	
5essions with Packet-Discard(1% - 5%)	37232 [2%]	
Sessions with Packet-Discard(5% - 10%)	4843 [0%]	
Sessions with Packet-Discard(>10%)	240 [0%]	
	0	
Packet-Duplicate Stats	0	
	0	
Total Duplicate Packet	0 [0%]	
Sessions with Zero Duplicate Packets	1539942 [99%]	
Sessions with Duplicate Packets(<1%)	0 [0%]	
Sessions with Duplicate Packets(1% - 5%)	0 [0%]	
Sessions with Duplicate Packets(5% - 10%)	0 [0%]	
sessions with Duplicate Packets(>10%)	0 [0%]	
Packet-Out Of Sequence Stats	0 [0%]	
and as a sequence state	0	
Total Out Of Sequence Packet	0 [0%]	
Sessions with Zero OOS Packets	1539942 [99%]	
Sessions with OOS Packets(<1%)	0 [0%]	
Sessions with OOS Packets(1% - 5%)	0 [0%]	
Sessions with OOS Packets(5% - 10%)	0 [0%]	
Sessions with OOS Packets(>10%)	0 [0%]	
· · ·	0	
litter Stats	0	
	0	
Sessions with Jitter( < 1 msec)	1450779 [93%]	
Sessions with Jitter( < 5 msec)	93031 [6%]	
Sessions With Jitter(< 10 msec)	4841 [0%]	
5essions With Jitter(>= 10 msec)	350 [0%]	
<		>
		1.0



Call Stats provide a running tabular log of system level stats, tracked stats include: Total Calls, Active Calls, Completed Calls, Passed Calls, Failed Calls, Instantaneous Calls/Sec



### **MAPS™ API** Architecture



- API wraps our proprietary scripting language in standard languages familiar to the user:
  - > Python
  - Java
- Clients and Servers support a "Many-to-Many" relationship, making it very easy for users to develop complex test cases involving multiple signaling protocols

### **APIs High Level vs Low Level**

- The API is broken into High and Low level function calls / scripts
- For High Level scripts, all the fine-grained protocol control happen in the script running on the MAPS server, hidden from the API user
- Low Level scripts put the API user in complete control of the protocol stack. This makes Low Level scripts more flexible and powerful, but also correspondingly more complex





### **CLI** Support

Python 3.7.5 Shell File Edit Shell Debug Options Window Help Python 3.7.5 (tags/v3.7.5:5c02a39a0b, Oct 15 2019, 00:11:34) [MSC v.1916 64 bit (AMD64)] on win32 Type "help", "copyright", "credits" or "license()" for more information. >>> = RESTART: C:\Program Files\GL Communications Inc\MAPS-IuCS\MAPSCLI\PythonClient\examples\IuCS\RNC\IuCS PlaceCall.py IuCS Server Connection ... True IuCS Testbed Starting ... True IuCS Profile Loading ... True Check M3UA Health Status... True IuCS Call Initiated ... True Call Connecting ... File Edit View Call Answered... Send File started 🗅 🚔 日 B X IuCS Call Status...CALL ACTIVE IuCS Call Terminating ... True View Latest Command CMOS = 4.15625LMOS = 4.15625CR FACTOR = 91LR FACTOR = 91TX PACKETS = 502RX PACKETS = 1604LOST PACKETS = 0 DISCARDED PACKETS = 0 OUT OF SEQ PACKETS = 0 DUPLICATE PACKETS = 0 AVG JITTER = 0.6875IuCS Script Stopping ... True IuCS Server Disconnecting ... True 1 :: 2019-1-11 12:08:15.288000 : StopScript 1; >>>



**Thank You** 

