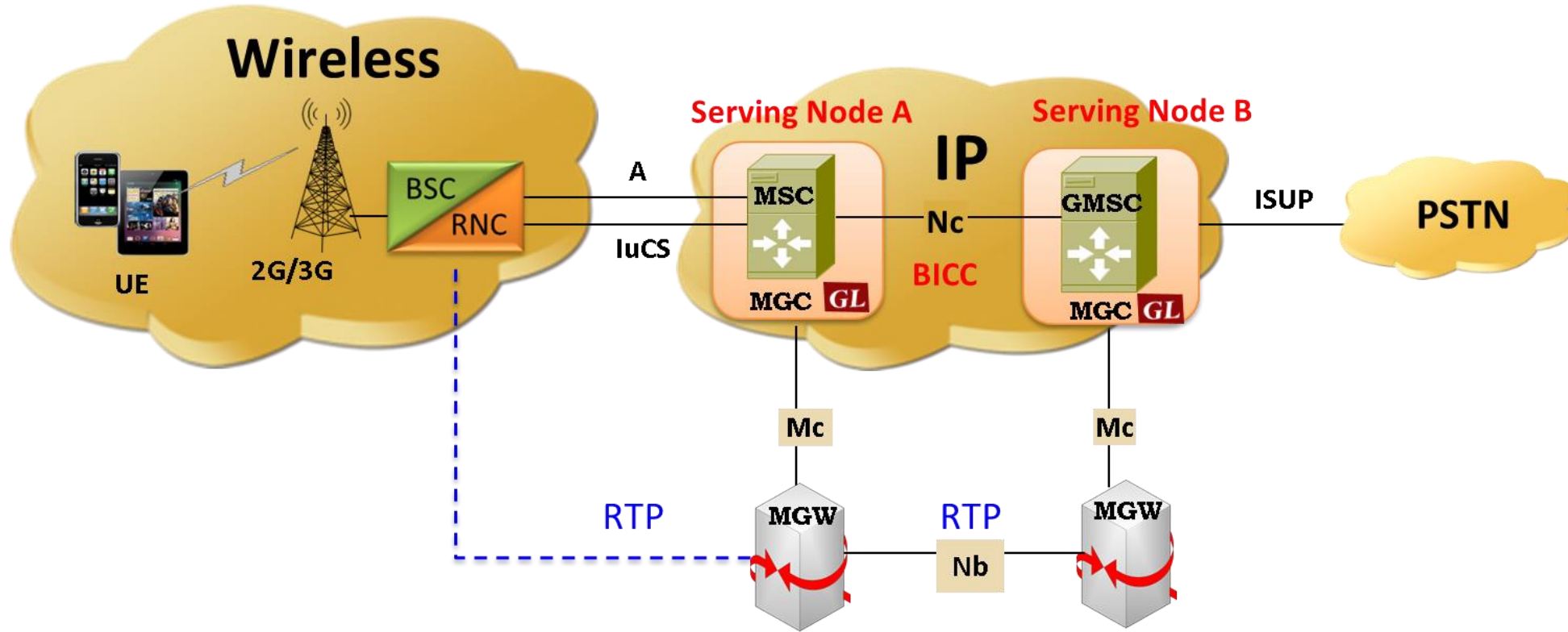

MAPS™ BICC over IP EMULATOR

Bearer Independent Call Control Protocol Emulation over IP



818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878
Phone: (301) 670-4784 Fax: (301) 670-9187 Email: info@gl.com
Website: <https://www.gl.com>

MAPS™ BICC IP Emulator



———— Signaling
- - - - Traffic



MAPS™ BICC IP Emulator

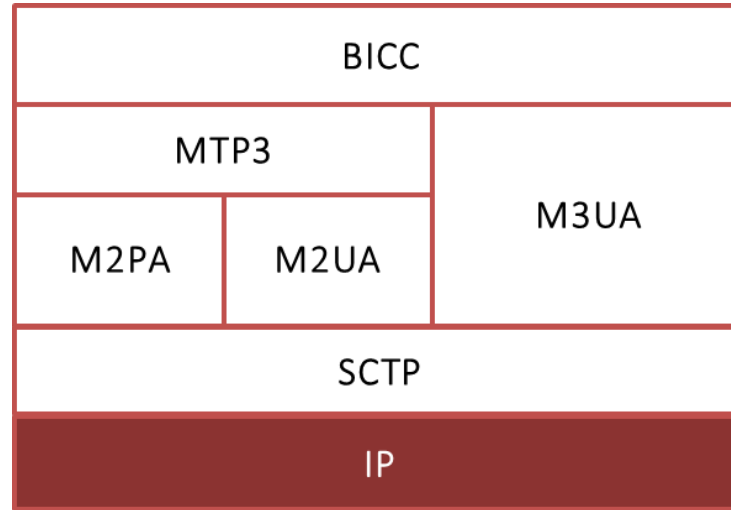


**MAPS™ BICC IP Emulator
HD RTP Generator Hardware
(w/ 4 x 1G cards)**

Protocol Specific Features

- BICC emulation over IP network
- User-friendly GUI for configuring the BICC IP Layers
- Supports BICC IP bearer control (call control or APM) messages
- Supported procedures includes Successful Basic Call, Additional Setup, Mid Call, Normal Call Release, Unsuccessful Call Setup, Codec modification/mid-call Codec Negotiation
- Access to all BICC Call Control Message Parameters OPC, DPC, calling number, called number, and more
- Simulate MSC and GMSC Nodes in the BICC over IP network
- User-friendly GUI for configuring the M3UA Layers
- Supports transmission and detection of various RTP traffic such as, digits, voice file, single tone, and dual tones over established calls.
- High density of up to 20,000 calls with traffic is easily achievable per appliance (5000 calls per port)
- Supports Client-Server functionality requires additional license; clients supported are TCL, Python, VBScript, Java, and .NET

Supported Protocol Standards

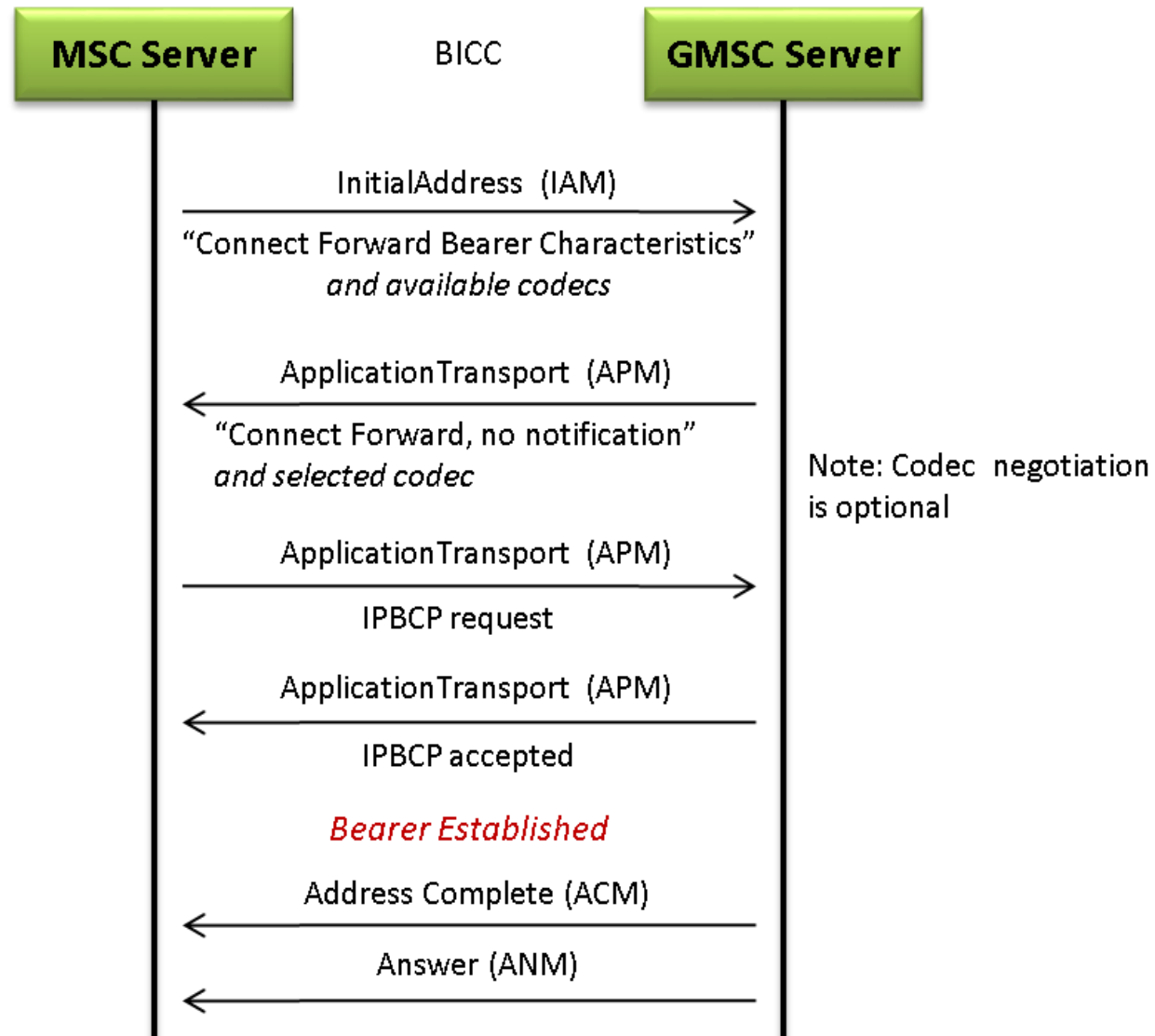


Supported Protocols	Standard / Specification Used
BICC	ITU-T Q.1902
IPBCP	RFC 2327
M3UA	RFC 3332
SCTP	RFC 4960

Supported BICC IP Procedures

- Successful Basic Call procedure with enBloc and Overlap operation includes
 - IAM, SAM, ACM, ANM messages
- Mid Call Procedures
 - Suspend
 - Resume
- Normal Call Release Procedures
- Unsuccessful call Setup
- Codec modification/mid-call Codec negotiation procedures
- Additional Setup procedures
 - Call progress
 - Information Messages
 - Echo Control procedures
 - signaling Procedures for Connection Type
 - Information message
 - Calling Geodetic Procedures
 - Inter - Nodal Traffic group Identification
 - Charging
 - Support for Temporary Alternative Routing (TAR)
 - Hop Counter Procedures

BICC over IP Call Procedure



Testbed Configuration

The screenshot displays the configuration interface for a MAPS Serving Node. The window title is "MAPS Serving Node (BICC-IP UK M3UA) - [Testbed Setup - TestBedDefault]". The menu bar includes "Configurations", "Emulator", "Reports", "Editor", "Debug Tools", "Windows", and "Help". The toolbar contains various icons for file operations and system functions.

The main configuration area is divided into two columns: "Config" and "Value". A third column on the right, labeled "Enable", has a checked checkbox. The configuration is organized into a tree structure under "Interface Serving Node".

Config	Value	Enable
Interface Serving Node		<input checked="" type="checkbox"/>
SCTP Mode	Server	
SCTP Configuration Source	Testbed	
SCTP CSV Configuration		
SCTP Config CSV File	ConfigureServerNodes.csv	
Max SCTP Connections	1	
Point Codes for Call Generation	Random	
M3UA Termination Type	SGP	
Exchange Type	Non Control	
CIC Handling Method	Most Idle	
Serving Node	1	
Serving Node 1		
Serving Node IP Address	192.168.12.41	
Serving Node Port	2905	
Remote Serving Node IP Address	192.168.12.35	
Remote Serving Node Port	2905	
M3UA Parameters		
Routing Context Indicator	Absent	
Routing Context	1	
Signaling Link Selection	1	
Network Indicator	National	
Serving Node Point Code	2.2.2	
Remote Serving Node Point Code	1.1.1	
Call Instance		
CIC Start	1	
Number of CICs	4000	
Media Parameters		
Enable RTP Simulation	False	
RTP Hardware Interface Type	PC NIC	
NIC Card RTP Media Configuration		
Media IP Address	192.168.12.219	
GL HD Card RTP Media Configuration		
End User Configuration	MS_Profiles	

At the bottom right of the configuration area, there are "Start" and "Edit" buttons. The status bar at the very bottom shows "Initialisation Errors" and "Error Events".

Profile Configuration

The screenshot displays the 'Profile Editor - MS_Profiles' window for a MAPS Serving Node (BICC-IP UK M3UA). The interface includes a menu bar (Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help) and a toolbar with various icons. A list on the left shows profiles from 1 to 23, with 'MSProfile0001' selected. The main area shows a tree view of configuration parameters for 'MSProfile0001' with their corresponding values. A 'Properties' panel on the right has an 'Enable' checkbox checked and buttons for 'Add', 'Insert', 'Delete', and 'Properties'. The status bar at the bottom shows 'Initialisation Errors' and 'Error Events'.

#	Profiles (Edit-F2)	Config	Value	Enable
1	DefaultProfile			
2	MSProfile0001	MSProfile0001		<input checked="" type="checkbox"/>
3	MSProfile0002			
4	MSProfile0003			
5	MSProfile0004			
6	MSProfile0005			
7	MSProfile0006			
8	MSProfile0007			
9	MSProfile0008			
10	MSProfile0009			
11	MSProfile0010			
12	MSProfile0011			
13	MSProfile0012			
14	MSProfile0013			
15	MSProfile0014			
16	MSProfile0015			
17	MSProfile0016			
18	MSProfile0017			
19	MSProfile0018			
20	MSProfile0019			
21	MSProfile0020			
22	MSProfile0021			
23	MSProfile0022			

Config	Value
MSProfile0001	
Connection Identifier	1
User Provided CIC	1
OPC	1.1.1
DPC	2.2.2
BICC Call Type	Backward
Initial Address Message Para...	
Continuity Check Indicat...	COT Not Expected
Called Number	9900990011
Calling Number	8800880011
Append F to Called Num...	False
Receive Call Parameters	
IAM Response Type	Answer Call
Reject Cause	16 - Normal call ...
Release Location	0 - User(U)
Suspend Resume Parameter	Network Initiated
SDP Parameters	
IP Address Type	IP4
Packetization Time in ms...	20
BICC IP Bearer Control P...	
IPBCP Request Temp...	maps\bicc-ip\itu...
IPBCP Accept Templ...	maps\bicc-ip\itu...
Codec Options and Traffic C...	
Codec Options	PCMA
Traffic Config	
Traffic Type	Auto Traffic File
Traffic Direction	TxOnly
Impairment Type	None
Traffic Profile Name	Profile0001
Impairment Profile N...	Profile0001

BICC IP Call Generation

Active Calls Call Status Call Events

Loading Scripts and Profiles

The screenshot displays the MAPS Serving Node interface for BICC-IP UK M3UA. The main window shows a table of active calls with the following data:

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total Iterations	Completed Iterations
1	BICC_Call.gls	MSPProfile0001	1.1.1.2.2.2.4000	Start	BICC Call Released	None		Pass	1	1

Below the table, the 'Message Sequence' tab is active, showing a sequence of messages between the 'Serving Node' and the 'Remote Serving Node':

- Initial Address: 15:31:27.273000
- Application Transport: 15:31:27.778000
- Application Transport: 15:31:27.780000
- Application Transport: 15:31:27.788000
- Address Complete: 15:31:27.810000
- Answer: 15:31:27.810000
- File Transmitted :: VoiceFiles\Send\G711\ALAW\vijay.glw: 15:31:52.829000
- Release: 15:32:57.819000
- Release Complete: 15:32:57.840000

On the right side, the 'Decode Message' window shows the following message details:

```

===== MTP3 User Adaptation Layer =====
0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 88 (x00000058)
      Protocol Data =
0008 Tag = x0210 Transfer Protocol D
000A Length = 78 (x004E)
      Originating Point Code =
000E Point Code = 1.1.1(...001000 00001001)
      Destination Point Code =
0012 Point Code = 2.2.2(...010000 00010010)
0014 Service Indicator = ....1101 BICC
0015 Network Indicator = .....10 National Network
0016 Message Priority = .....00 Priority Code 0
0017 Signalling Link Selection = 1 (x01)

      Parameter Padding = x0000
===== BICC Layer =====
0018 Call Instance Code = 4000 (xA00F0000)
001C Message Type = 00000001 Initial address
      Mandatory Fixed Parameters =
    
```

Message Sequence

Decode Message

BICC IP Call Reception

MAPS Serving Node (BICC-IP UK M3UA) - [Call Reception]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Results
111	Tx_GRS.gls		2.2.2.1.1.1.3489	Completed	Circuit Group Reset Ack Received	None		Pass
112	Tx_GRS.gls		2.2.2.1.1.1.3521	Completed	Circuit Group Reset Ack Received	None		Pass
113	Tx_GRS.gls		2.2.2.1.1.1.3553	Completed	Circuit Group Reset Ack Received	None		Pass
114	Tx_GRS.gls		2.2.2.1.1.1.3585	Completed	Circuit Group Reset Ack Received	None		Pass
115	Tx_GRS.gls		2.2.2.1.1.1.3617	Completed	Circuit Group Reset Ack Received	None		Pass
116	Tx_GRS.gls		2.2.2.1.1.1.3649	Completed	Circuit Group Reset Ack Received	None		Pass
117	Tx_GRS.gls		2.2.2.1.1.1.3681	Completed	Circuit Group Reset Ack Received	None		Pass
118	Tx_GRS.gls		2.2.2.1.1.1.3713	Completed	Circuit Group Reset Ack Received	None		Pass
119	Tx_GRS.gls		2.2.2.1.1.1.3745	Completed	Circuit Group Reset Ack Received	None		Pass
120	Tx_GRS.gls		2.2.2.1.1.1.3777	Completed	Circuit Group Reset Ack Received	None		Pass
121	Tx_GRS.gls		2.2.2.1.1.1.3809	Completed	Circuit Group Reset Ack Received	None		Pass
122	Tx_GRS.gls		2.2.2.1.1.1.3841	Completed	Circuit Group Reset Ack Received	None		Pass
123	Tx_GRS.gls		2.2.2.1.1.1.3873	Completed	Circuit Group Reset Ack Received	None		Pass
124	Tx_GRS.gls		2.2.2.1.1.1.3905	Completed	Circuit Group Reset Ack Received	None		Pass
125	Tx_GRS.gls		2.2.2.1.1.1.3937	Completed	Circuit Group Reset Ack Received	None		Pass
126	Tx_GRS.gls		2.2.2.1.1.1.3969	Completed	Circuit Group Reset Ack Received	None		Pass
127	BICC_Call.gls		2.2.2.1.1.1.4000	Completed	BICC Call Released	None		Pass

Stop Stop All Abort Abort All Show Records Select Active Call Auto Trash Trash Show Hidden Calls Ter

Save Column Width Show Latest

Remote Serving Node Serving Node

Initial Address → 15:31:27.765000

Application Transport ← 15:31:27.770000

Application Transport ← 15:31:27.772000

Application Transport → 15:31:27.799000

Address Complete ← 15:31:27.803000

Answer ← 15:31:27.803000

File Transmitted :: VoiceFiles\Send\G711\ALAW\vjay.glw ← 15:31:52.813000

Release → 15:32:57.828000

Release Complete ← 15:32:57.831000

Find

```

===== MTP3 User Adaptation Layer =====
0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 88 (x00000058)
Protocol Data
0008 Tag = x0210 Transfer Protocol Data
000A Length = 78 (x004E)
Originating Point Code
000E Point Code = 1.1.1(...001000 00001001)
Destination Point Code
0012 Point Code = 2.2.2(...010000 00010010)
0014 Service Indicator = ...1101 BICC
0015 Network Indicator = .....10 National Network
0016 Message Priority = .....00 Priority Code 0
0017 Signalling Link Selection = 1 (x01)
Pdu
Parameter Padding = xA00F0000110200100030209077E105
===== BICC Layer =====
0018 Call Instance Code = 4000 (xA00F0000)
001C Message Type = 00000001 Initial address
Mandatory Fixed Parameters
Nature Of Connection Indicators Parameter
001D Satellite indicator = .....00 no satellite circuit in
001D Continuity check indicator = ....00.. continuity check not re
001D Echo ctrl dev.ind(Nat.Conn.Ind) = ...1.... outgoing echo control c
Forward Call Indicators Parameter
0017 National (International) call ind = 0 treated as a national
    
```

Scripts **Message Sequence** Event Config Script Flow

● Initialisation Errors ● Error Events ● Captured Errors ● Link Status Up=1 Down=0

Call Results

Message Sequence

Decode Message

Event Log

GL MAPS Serving Node (BICC-IP UK M3UA) - [Events]

Configurations Emulator Reports Editor Debug Tools Windows Help

Event Log Error Events Captured Errors

Date/Time	Captured Events	Call Trace Id	Script Name	Script Id
2022-5-12 15:31:00.883000	RTP Stats Query Script started		RTP_Stats_Display.gls	ProtScriptId-1-80619569-4284-8724
2022-5-12 15:31:05.887000	SCTP Up On ConnectionId = 1000		Check_SCTP_Status.gls	ProtScriptId-0-80613663-4282-8724
2022-5-12 15:31:05.989000	ASP Up Received	1000	M3UA.gls	ProtScriptId-2-80625727-4286-8724
2022-5-12 15:31:05.990000	ASP Acknowledged	1000	M3UA.gls	ProtScriptId-2-80625727-4286-8724
2022-5-12 15:31:05.991000	AS Status Notified	1000	M3UA.gls	ProtScriptId-2-80625727-4286-8724
2022-5-12 15:31:06.003000	ASP Active Received	1000	M3UA.gls	ProtScriptId-2-80625727-4286-8724
2022-5-12 15:31:06.004000	AS Status Notified	1000	M3UA.gls	ProtScriptId-2-80625727-4286-8724
2022-5-12 15:31:06.004000	M3UA Up On ConnectionId = 1000		Check_SCTP_Status.gls	ProtScriptId-0-80613663-4282-8724
2022-5-12 15:31:06.150000	Number of CICs for 2.2.2.1.1.1 = 4000		Check_SCTP_Status.gls	ProtScriptId-0-80613663-4282-8724
2022-5-12 15:31:06.150000	Number of CICs for 2.2.2.1.1.1 = 0		Check_SCTP_Status.gls	ProtScriptId-0-80613663-4282-8724
2022-5-12 15:31:06.150000	Number of CICs for 2.2.2.1.1.1 = 0		Check_SCTP_Status.gls	ProtScriptId-0-80613663-4282-8724
2022-5-12 15:31:06.293000	CIC = 1 & Range = 31	2.2.2.1.1.1	Tx_GRS.gls	ProtScriptId-3-80625969-4289-8724
2022-5-12 15:31:06.293000	Status bits =	2.2.2.1.1.1	Tx_GRS.gls	ProtScriptId-3-80625969-4289-8724
2022-5-12 15:31:06.294000	CIC = 33 & Range = 31	2.2.2.1.1.1,33	Tx_GRS.gls	ProtScriptId-4-80625970-4290-8724
2022-5-12 15:31:06.294000	Status bits =	2.2.2.1.1.1,33	Tx_GRS.gls	ProtScriptId-4-80625970-4290-8724
2022-5-12 15:31:06.295000	CIC = 65 & Range = 31	2.2.2.1.1.1,65	Tx_GRS.gls	ProtScriptId-5-80625971-4291-8724
2022-5-12 15:31:06.295000	Status bits =	2.2.2.1.1.1,65	Tx_GRS.gls	ProtScriptId-5-80625971-4291-8724
2022-5-12 15:31:06.296000	CIC = 97 & Range = 31	2.2.2.1.1.1,97	Tx_GRS.gls	ProtScriptId-6-80625971-4292-8724
2022-5-12 15:31:06.296000	Status bits =	2.2.2.1.1.1,97	Tx_GRS.gls	ProtScriptId-6-80625971-4292-8724
2022-5-12 15:31:06.297000	CIC = 129 & Range = 31	2.2.2.1.1.1,129	Tx_GRS.gls	ProtScriptId-7-80625972-4293-8724
2022-5-12 15:31:06.297000	Status bits =	2.2.2.1.1.1,129	Tx_GRS.gls	ProtScriptId-7-80625972-4293-8724
2022-5-12 15:31:06.298000	CIC = 161 & Range = 31	2.2.2.1.1.1,161	Tx_GRS.gls	ProtScriptId-8-80625972-4294-8724
2022-5-12 15:31:06.298000	Status bits =	2.2.2.1.1.1,161	Tx_GRS.gls	ProtScriptId-8-80625972-4294-8724
2022-5-12 15:31:06.299000	CIC = 193 & Range = 31	2.2.2.1.1.1,193	Tx_GRS.gls	ProtScriptId-9-80625973-4295-8724
2022-5-12 15:31:06.299000	Status bits =	2.2.2.1.1.1,193	Tx_GRS.gls	ProtScriptId-9-80625973-4295-8724
2022-5-12 15:31:06.299000	CIC = 225 & Range = 31	2.2.2.1.1.1,225	Tx_GRS.gls	ProtScriptId-10-80625973-4296-8724
2022-5-12 15:31:06.299000	Status bits =	2.2.2.1.1.1,225	Tx_GRS.gls	ProtScriptId-10-80625973-4296-8724
2022-5-12 15:31:06.300000	CIC = 257 & Range = 31	2.2.2.1.1.1,257	Tx_GRS.gls	ProtScriptId-11-80625974-4297-8724
2022-5-12 15:31:06.300000	Status bits =	2.2.2.1.1.1,257	Tx_GRS.gls	ProtScriptId-11-80625974-4297-8724
2022-5-12 15:31:06.301000	CIC = 289 & Range = 31	2.2.2.1.1.1,289	Tx_GRS.gls	ProtScriptId-12-80625974-4298-8724
2022-5-12 15:31:06.301000	Status bits =	2.2.2.1.1.1,289	Tx_GRS.gls	ProtScriptId-12-80625974-4298-8724

Save Events

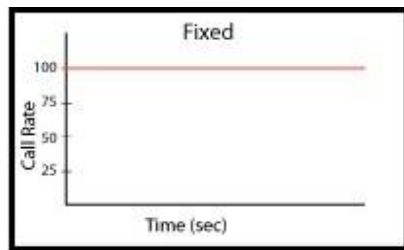
Clear Capture Events to file

● Initialisation Errors ● Error Events ● Captured Errors ● Link Statu

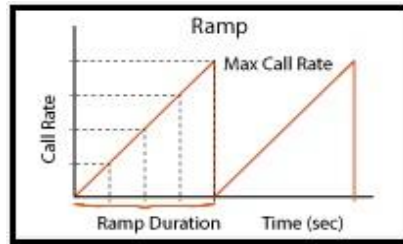
Load Generation

- Stability/Stress and Performance testing using Load Generation
- Different types of Load patterns to distribute load
- User can load multiple patterns for selected script
- User configurable Test Duration, CPS, Maximum and Minimum Call Rate etc.

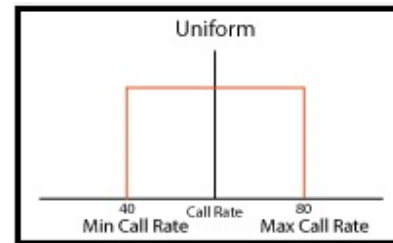
Fixed



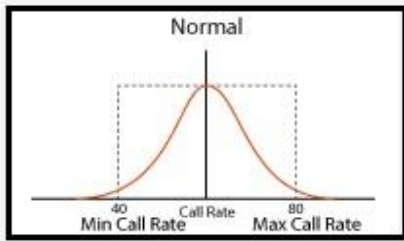
Ramp



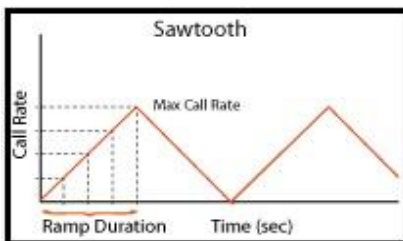
Uniform



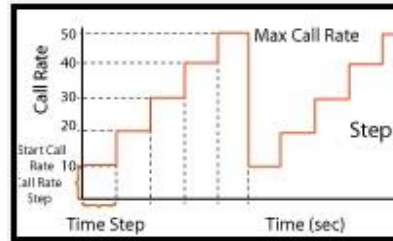
Normal



Saw-tooth



Step



The screenshot shows the 'Load Generation - LoadGendefault' window. It features a toolbar with icons for file operations and help. The main configuration area includes:

- Total Calls To Generate:** * (indicating no limit)
- Max Active Calls:** 2000
- Unique Distributions Per Script**
- Multi Distributions**

A table lists distributions:

Distributions	Description
Uniform	MinCR=40, MaxCR=80, Duration=10
Fixed	Call Rate=250, Duration=10
Normal	MinCR=40, MaxCR=80, Duration=10

Buttons for 'Add', 'Remove', 'Remove All', and 'Edit' are present. Below is a 'Scripts' section with a list containing 'BICC_Call' and a 'Profile' section with a list of profiles from 'MSProfile01' to 'MSProfile10'. At the bottom, there are controls for 'Stop Time' (Days, Hours, Minutes) and 'Start Time' (00:00:00.000) and 'End Time' (00:00:00.000) with 'Pause' and 'Start' buttons.

BICC IP HD Call Reception

Call Status

The screenshot displays the MAPS Serving Node interface for BICC-IP UK M3UA. The top section is a table of call reception logs, and the bottom section is a message sequence diagram.

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Results
111	Tx_GRS.gls		2.2.2.1.1.1.3489	Completed	Circuit Group Reset Ack Received	None		Pass
112	Tx_GRS.gls		2.2.2.1.1.1.3521	Completed	Circuit Group Reset Ack Received	None		Pass
113	Tx_GRS.gls		2.2.2.1.1.1.3553	Completed	Circuit Group Reset Ack Received	None		Pass
114	Tx_GRS.gls		2.2.2.1.1.1.3585	Completed	Circuit Group Reset Ack Received	None		Pass
115	Tx_GRS.gls		2.2.2.1.1.1.3617	Completed	Circuit Group Reset Ack Received	None		Pass
116	Tx_GRS.gls		2.2.2.1.1.1.3649	Completed	Circuit Group Reset Ack Received	None		Pass
117	Tx_GRS.gls		2.2.2.1.1.1.3681	Completed	Circuit Group Reset Ack Received	None		Pass
118	Tx_GRS.gls		2.2.2.1.1.1.3713	Completed	Circuit Group Reset Ack Received	None		Pass
119	Tx_GRS.gls		2.2.2.1.1.1.3745	Completed	Circuit Group Reset Ack Received	None		Pass
120	Tx_GRS.gls		2.2.2.1.1.1.3777	Completed	Circuit Group Reset Ack Received	None		Pass
121	Tx_GRS.gls		2.2.2.1.1.1.3809	Completed	Circuit Group Reset Ack Received	None		Pass
122	Tx_GRS.gls		2.2.2.1.1.1.3841	Completed	Circuit Group Reset Ack Received	None		Pass
123	Tx_GRS.gls		2.2.2.1.1.1.3873	Completed	Circuit Group Reset Ack Received	None		Pass
124	Tx_GRS.gls		2.2.2.1.1.1.3905	Completed	Circuit Group Reset Ack Received	None		Pass
125	Tx_GRS.gls		2.2.2.1.1.1.3937	Completed	Circuit Group Reset Ack Received	None		Pass
126	Tx_GRS.gls		2.2.2.1.1.1.3969	Completed	Circuit Group Reset Ack Received	None		Pass
127	BICC_Call.gls		2.2.2.1.1.1.4000	Completed	BICC Call Released	None		Pass

The message sequence diagram shows the interaction between a Remote Serving Node and a Serving Node. The sequence includes: Initial Address, Application Transport, Address Complete, Answer, File Transmitted (VoiceFiles\Send\G711\VALAW\vijay.glw), Release, and Release Complete.

Call Results

Message Sequence

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 350 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™™ systems with single point of control from Master Controller

BICC IP HD Testbed Configuration

MAPS Serving Node (BICC-IP UK M3UA) - [Testbed Setup - TestBedDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Config	Value
Interface Serving Node	
SCTP Mode	Server
SCTP Configuration Source	Testbed
SCTP CSV Configuration	
SCTP Config CSV File	ConfigureServerNodes.csv
Max SCTP Connections	1
Point Codes for Call Generation	Random
M3UA Termination Type	SGP
Exchange Type	Non Control
CIC Handling Method	Most Idle
Serving Node	1
Serving Node 1	
Serving Node IP Address	192.168.12.249
Serving Node Port	2905
Remote Serving Node IP Address	192.168.12.161
Remote Serving Node Port	2905
M3UA Parameters	
Routing Context	12512
Signaling Link Selection	1
Network Indicator	National
Serving Node Point Code	2.2.2
Remote Serving Node Point Code	1.1.1
Call Instance	
CIC Start	1
Number of CICs	20000
Media Parameters	
Enable RTP Simulation	True
RTP Hardware Interface Type	GL's High Density Interface Card
NIC Card RTP Media Configuration	
GL HD Card RTP Media Configuration	
RTP Cores	4
RTP Cores 1	
RTP Port Index	
RTP Media IP Address	192.168.12.76
Default Gateway Configuration	
Subnet Mask	255.255.255.0
Gateway IP Address	192.168.12.1
RTP Cores 2	
RTP Port Index	
RTP Media IP Address	192.168.12.77
Default Gateway Configuration	
Subnet Mask	255.255.255.0
Gateway IP Address	192.168.12.1
RTP Cores 3	
RTP Port Index	
RTP Media IP Address	192.168.12.78
Default Gateway Configuration	
Subnet Mask	255.255.255.0
Gateway IP Address	192.168.12.1
RTP Cores 4	
RTP Port Index	
RTP Media IP Address	192.168.12.79
Default Gateway Configuration	
Subnet Mask	255.255.255.0
Gateway IP Address	192.168.12.1
End User Configuration	MS_Profiles

_SctpTransactionType

Select Option

Server

Start Edit

Initialization Errors Error Events Captured Errors Link Status

BICC IP HD Profile Configuration

MAPS Serving Node (BICC-IP UK M3UA) - [Profile Editor -MS_Profiles]

Configurations Emulator Reports Editor Debug Tools Windows Help

Profiles (Edit-F2)

#	Profiles (Edit-F2)	Config	Value	Enable
1	DefaultProfile	DefaultProfile		<input checked="" type="checkbox"/>
2	MSPProfile0001			
3	MSPProfile0002			
4	MSPProfile0003			
5	MSPProfile0004			
6	MSPProfile0005			
7	MSPProfile0006			
8	MSPProfile0007			
9	MSPProfile0008			
10	MSPProfile0009			
11	MSPProfile0010			
12	MSPProfile0011			
13	MSPProfile0012			
14	MSPProfile0013			
15	MSPProfile0014			
16	MSPProfile0015			
17	MSPProfile0016			
18	MSPProfile0017			
19	MSPProfile0018			
20	MSPProfile0019			
21	MSPProfile0020			
22	MSPProfile0021			
23	MSPProfile0022			

Config Value Enable

- DefaultProfile
 - Connection Identifier 1
 - User Provided CIC 1
 - OPC 1.1.1
 - DPC 2.2.2
 - BICC Call Type Backward
 - Initial Address Message Para...
 - Continuity Check Indicator COT Not Expected
 - Called Number 9900990011
 - Calling Number 8800880011
 - Append F to Called Num... False
 - Receive Call Parameters
 - IAM Response Type Answer Call
 - Reject Cause 16 - Normal call c...
 - Release Location 0 - User(U)
 - Suspend Resume Parameter Network Initiated
 - SDP Parameters
 - IP Address Type IP4
 - Packetization Time in msec 20
 - BICC IP Bearer Control Pr...
 - IPBCP Request Templ... maps\bicc-ip\itu...
 - IPBCP Accept Template maps\bicc-ip\itu...
 - Codec Options and Traffic Co...
 - Codec Options PCMA
 - Traffic Config
 - Traffic Type Auto Traffic File
 - Traffic Direction TxOnly
 - Impairment Type None
 - Traffic Profile Name Profile0001
 - Impairment Profile Na... Profile0001

Buttons: Add, Insert, Delete, Properties, Insert, Delete, Clear

BICC IP HD Incoming Call Handler Configuration

The screenshot shows a configuration window titled "Incoming Call Handlers Configuration - default". It contains a table with two columns: "Message Name" and "Script Name". The "Initial Address" message is selected and linked to "BICC_Call.gls". Other messages are linked to "Rx_CIC_Management.gls" or "Rx_IdleStateMsgHandler.gls" or "M3UA.gls". To the right, a "Scripts" list contains "BICC_Call.gls". Below the table are "Add", "Delete", and "Clear" buttons. To the right of the Scripts list are radio buttons for "Sequence" (selected) and "Random", and "Up" and "Down" buttons. At the bottom right are "Add" and "Delete" buttons.

Message Name	Script Name
Initial Address	BICC_Call.gls
Circuit Group Reset	Rx_CIC_Management.gls
Circuit Group Blocking	Rx_CIC_Management.gls
Circuit Group Unblocking	Rx_CIC_Management.gls
Release	Rx_IdleStateMsgHandler.gls
Circuit Group Blocking Acknowledgement	Rx_CIC_Management.gls
Circuit Group Unblocking Acknowledgement	Rx_CIC_Management.gls
Circuit Group Reset Acknowledgement	Rx_CIC_Management.gls
Release Complete	Rx_IdleStateMsgHandler.gls
Reset Circuit	Rx_CIC_Management.gls
ASP Up	M3UA.gls
ASP Down	M3UA.gls
ASP Active	M3UA.gls
ASP Inactive	M3UA.gls
Address Complete	Rx_IdleStateMsgHandler.gls
Connect	Rx_IdleStateMsgHandler.gls
Answer	Rx_IdleStateMsgHandler.gls
Suspend	Rx_IdleStateMsgHandler.gls
Resume	Rx_IdleStateMsgHandler.gls
Application Transport	Rx_IdleStateMsgHandler.gls

Scripts: BICC_Call.gls

Sequence
 Random

Up
Down

Add Delete Clear Add Delete

Bulk Call Simulation Results

Call Statistics



Message Statistics

Statistics window showing Message Stats table. The table is as follows:

Message Type	Tx Count	Rx Count	Retransmit Count
ASP Active	1	0	0
ASP Active Acknowledgement	0	1	0
ASP Up	1	0	0
ASP Up Acknowledgement	0	1	0
Address Complete	0	18756	0
Answer	0	18756	0
Application Transport	32333	18875	0
Circuit Group Reset	313	313	0
Circuit Group Reset Acknowledgement	313	313	0
Initial Address	25476	0	0
Notify	0	2	0
Release	20399	4280	3
Release Complete	4280	20399	0

Customizations - Call Flow (Scripts)

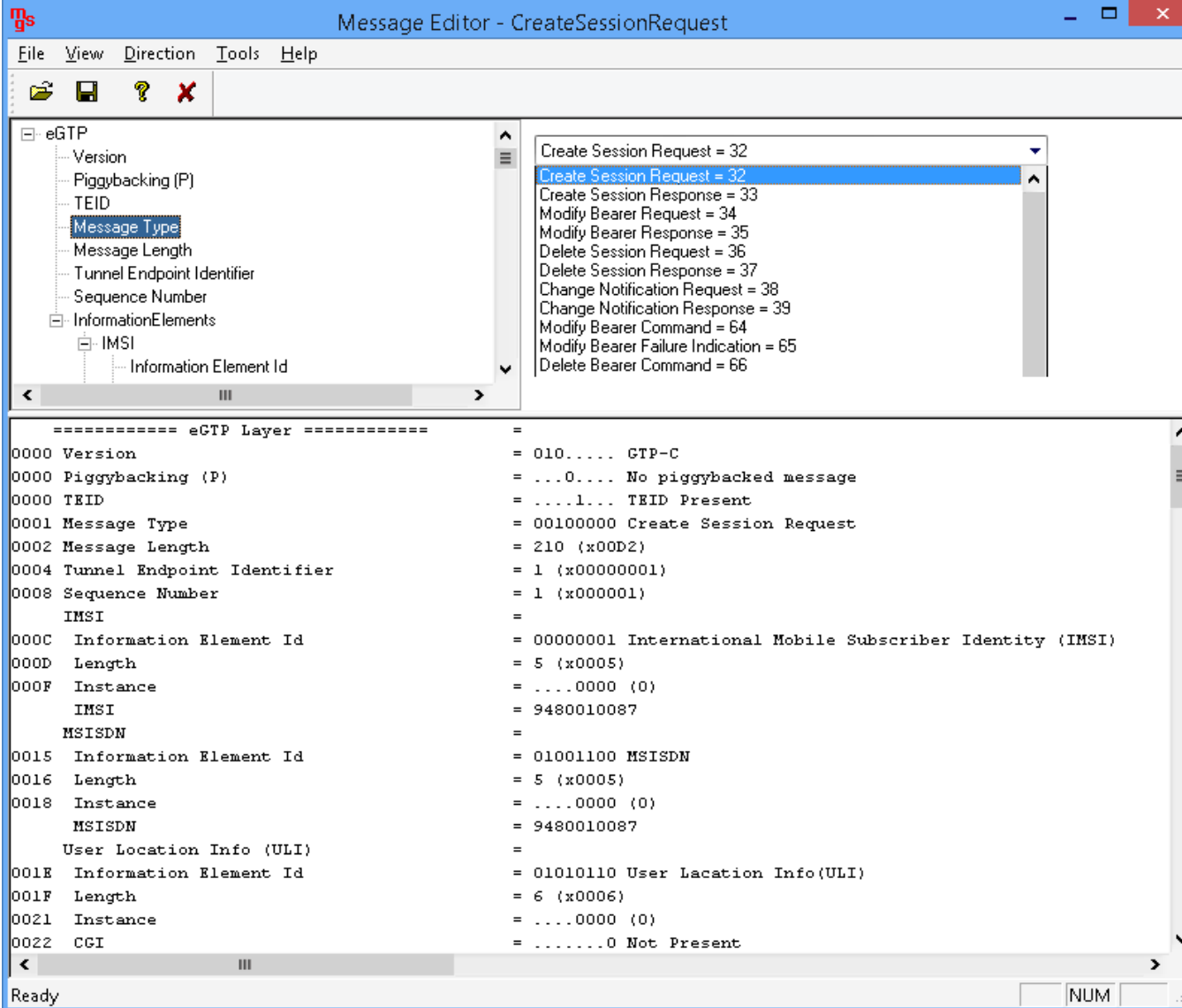
The screenshot displays the ScriptEditor application window. The title bar reads "ScriptEditor - [C:\Program Files\GL Communications Inc\MAPS-BICCIP\MAPS\BICC-IP\UK\Serving Node\M3UA\Scripts\BICC_Call.gls]". The menu bar includes "File", "View", "Edit", "Shortcuts", "Tools", and "Help". Below the menu bar is a toolbar with icons for file operations and settings.

The main workspace is divided into three panes:

- Command Window:** A tree view on the left showing script elements such as Action, Conditional & Flow Control (If Statements, Wait Statements, Loop Statements), Variable, Maps CLI, Logs / Comment, Init, Child Script, DataBase, Utility Functions, and Traffic Commands.
- Script Editor:** The central pane displays the script code for "BICC_Call". The code includes initialization of variables like KeyIdentifier, RtpSessionState, BICCState, Result, and MsgHandler. It also contains logic for handling CLI parameters and setting up paths for CSV files and MS profiles.
- Help Window:** A vertical pane on the right side of the editor.

The status bar at the bottom of the window shows "Ready" on the left and "Line Count - 798 | Line: 36 Col: 1" on the right.

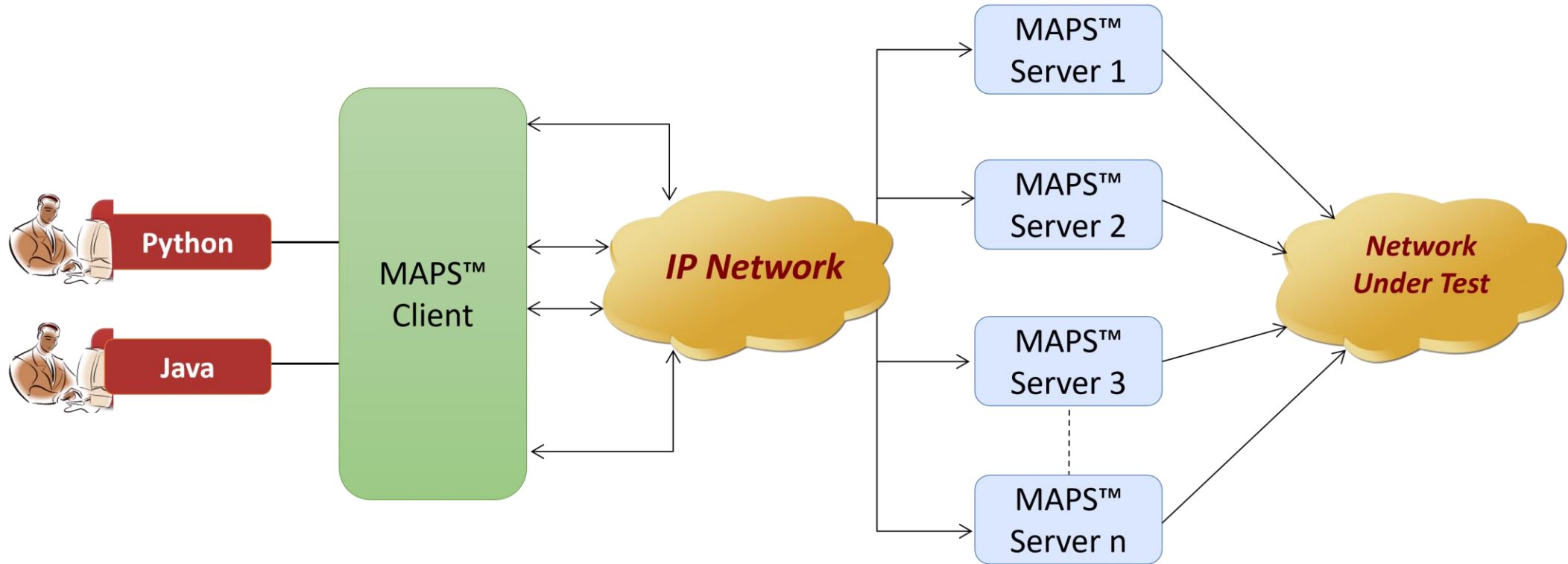
Customizations - Protocol Messages



The screenshot shows the 'Message Editor - CreateSessionRequest' window. The left pane displays a tree view of the eGTP message structure, with 'Message Type' selected. The right pane shows a list of message types, with 'Create Session Request = 32' selected. The main area displays the hex dump of the message.

```
=====  
0000 Version = 010..... GTP-C  
0000 Piggybacking (P) = ...0.... No piggybacked message  
0000 TEID = ...1... TEID Present  
0001 Message Type = 00100000 Create Session Request  
0002 Message Length = 210 (x00D2)  
0004 Tunnel Endpoint Identifier = 1 (x00000001)  
0008 Sequence Number = 1 (x000001)  
IMSI  
000C Information Element Id = 00000001 International Mobile Subscriber Identity (IMSI)  
000D Length = 5 (x0005)  
000F Instance = ....0000 (0)  
IMSI  
MSISDN  
0015 Information Element Id = 01001100 MSISDN  
0016 Length = 5 (x0005)  
0018 Instance = ....0000 (0)  
MSISDN  
User Location Info (ULI)  
001E Information Element Id = 01010110 User Location Info(ULI)  
001F Length = 6 (x0006)  
0021 Instance = ....0000 (0)  
0022 CGI = .....0 Not Present
```

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.

Command Line Interface

Serving Node Client

MAPS™ CLI Server

```
Python 3.7.5 Shell
File Edit Shell Debug Options Window Help
Type Copyright, Credits or License() for more information.
>>>
RESTART: C:\Program Files\GL Communications Inc\MAPS-BICCIP\MAPSCLI\Python Client\examples
\BiccIp_PlaceCall.py
BICC IP Server Connection... True
BICC IP Testbed Starting... True
BICC IP Profile Loading... True
Link Status Checking... True
Link is UP... True
Set OPC: 0
Set DPC: 0
Set Called Number: 0
Set Calling Number: 0
Set Traffic Type: 0
BICC IP Call Placing... True
BICC IP Call Connecting... True
BICC IP Call Status...BICC CALL CONNECTED
Send File started
BICC IP Call Hold... True
BICC IP Call Retrieve... True
BICC IP Call Suspend... True
BICC IP Call Resume... True
BICC IP Call Terminating... True
BICC IP Call MsgCount: 13
BICC IP Call's LastMSGRcv.....
Time Stamp      Route      Message
10:37:40.123    <-        Release Complete

***** BICC IP Call Message Flow *****
      CLI  <-->  DUT

Time Stamp      Route      Message
10:37:15.739    ->         Initial Address
10:37:15.739    ->         Initial Address
===== MTP3 User Adaptation Layer =====
0000 Version                = 00000001 Release 1.0
0002 Message Class          = 00000001 Transfer
0003 Transfer Message Type  = 00000001 Payload Data
0004 Message Length         = 88 (x00000058)
```

```
CLI MapsCLI Serving Node (BICC-IP ITU M3UA)
File Edit View
View Latest Command
1:: 2019-3-8 10:37:00.327000 : Start "TestBedDefault.xml";
1:: 2019-3-8 10:37:06.673000 : LoadProfile "MS_Profiles.xml"
1:: 2019-3-8 10:37:14.781000 : ServerHSRequest;
1:: 2019-3-8 10:37:14.806000 : StartScript 1 "BICC_Call.gls" "MSProfile0001" 1 # "EnableCLI"=1;
1:: 2019-3-8 10:37:15.481000 : UserEvent 1 "IsTransportUp";
1:: 2019-3-8 10:37:15.503000 : UserEvent 1 "SetVariable"# "OPC"="1.1.1";
1:: 2019-3-8 10:37:15.526000 : UserEvent 1 "SetVariable"# "DPC"="2.2.2";
1:: 2019-3-8 10:37:15.538000 : UserEvent 1 "SetVariable"# "CalledNumber"=(binarystring)8800880011;
1:: 2019-3-8 10:37:15.551000 : UserEvent 1 "SetVariable"# "CallingNumber"=(binarystring)9900990011;
1:: 2019-3-8 10:37:15.563000 : UserEvent 1 "SetVariable"# "Traffic Type"="AutoTrafficFile";
1:: 2019-3-8 10:37:15.575000 : UserEvent 1 "Place Call";
1:: 2019-3-8 10:37:15.706000 : UserEvent 1 "GetCallStatus";
1:: 2019-3-8 10:37:16.758000 : UserEvent 1 "GetCallStatus";
1:: 2019-3-8 10:37:17.765000 : UserEvent 1 "GetCallStatus";
1:: 2019-3-8 10:37:18.775000 : UserEvent 1 "GetCallStatus";
1:: 2019-3-8 10:37:18.787000 : UserEvent 1 "GetCallStatus";
1:: 2019-3-8 10:37:19.804000 : UserEvent 1 "SendFile"# "TxFileName"="voicefiles\Send\G711\JLAW\Vijay.glw", "TxFileDuration"=10;
1:: 2019-3-8 10:37:29.840000 : UserEvent 1 "Hold";
1:: 2019-3-8 10:37:31.904000 : UserEvent 1 "Retrieve";
1:: 2019-3-8 10:37:33.968000 : UserEvent 1 "Suspend";
1:: 2019-3-8 10:37:36.028000 : UserEvent 1 "Resume";
1:: 2019-3-8 10:37:40.029000 : UserEvent 1 "Terminate Call";
1:: 2019-3-8 10:37:41.145000 : UserEvent 1 "GetMessageCount";
1:: 2019-3-8 10:37:41.178000 : UserEvent 1 "GetLastReceivedMessage";
1:: 2019-3-8 10:37:41.212000 : UserEvent 1 "GetMessageCount";
1:: 2019-3-8 10:37:41.224000 : UserEvent 1 "GetMessageInfo"# "Index"=0;
1:: 2019-3-8 10:37:41.258000 : UserEvent 1 "GetMessageInfo"# "Index"=0;
1:: 2019-3-8 10:37:41.437000 : UserEvent 1 "GetMessageInfo"# "Index"=1;
1:: 2019-3-8 10:37:41.481000 : UserEvent 1 "GetMessageInfo"# "Index"=1;
1:: 2019-3-8 10:37:41.658000 : UserEvent 1 "GetMessageInfo"# "Index"=2;
1:: 2019-3-8 10:37:41.693000 : UserEvent 1 "GetMessageInfo"# "Index"=2;
1:: 2019-3-8 10:37:41.791000 : UserEvent 1 "GetMessageInfo"# "Index"=3;
1:: 2019-3-8 10:37:41.825000 : UserEvent 1 "GetMessageInfo"# "Index"=3;
1:: 2019-3-8 10:37:41.932000 : UserEvent 1 "GetMessageInfo"# "Index"=4;
1:: 2019-3-8 10:37:41.966000 : UserEvent 1 "GetMessageInfo"# "Index"=4;
1:: 2019-3-8 10:37:42.132000 : UserEvent 1 "GetMessageInfo"# "Index"=5;
1:: 2019-3-8 10:37:42.180000 : UserEvent 1 "GetMessageInfo"# "Index"=5;
```

Thank you