
MAPS™ SS7 SIGTRAN

SIGTRAN Protocol Emulation over IP

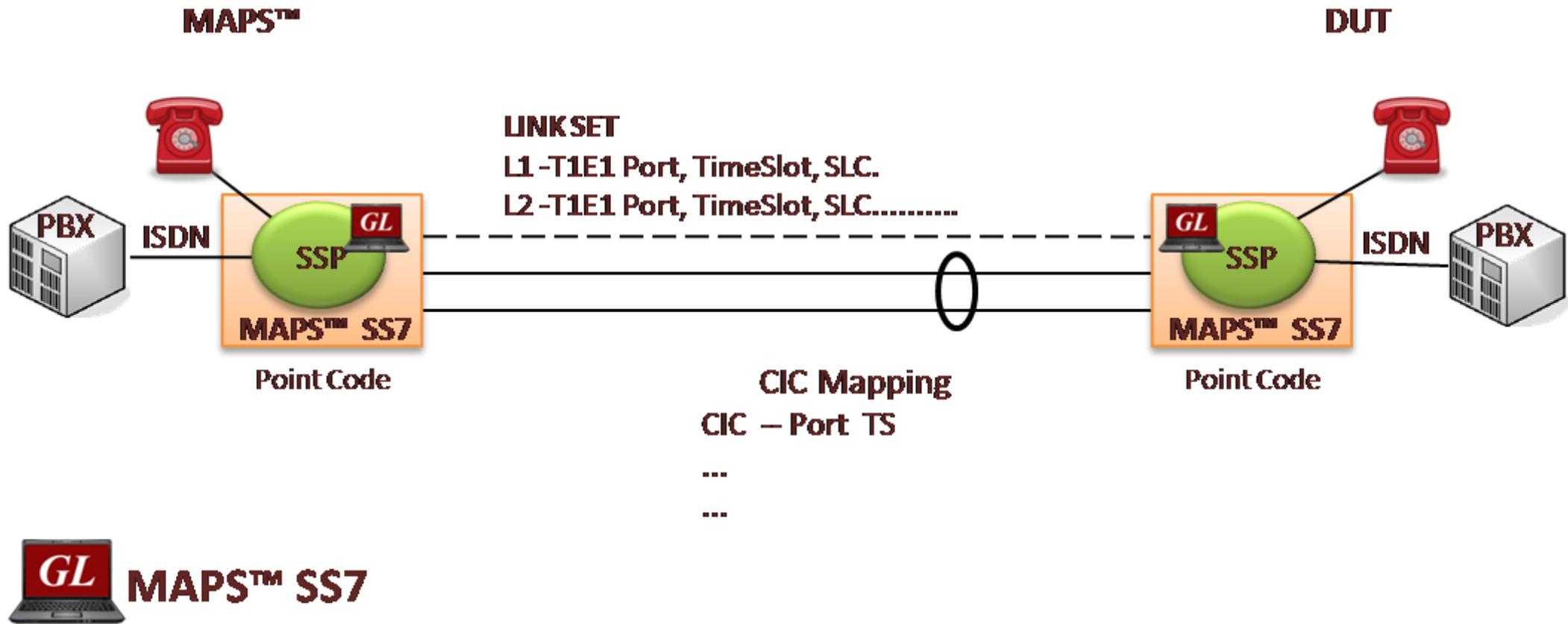


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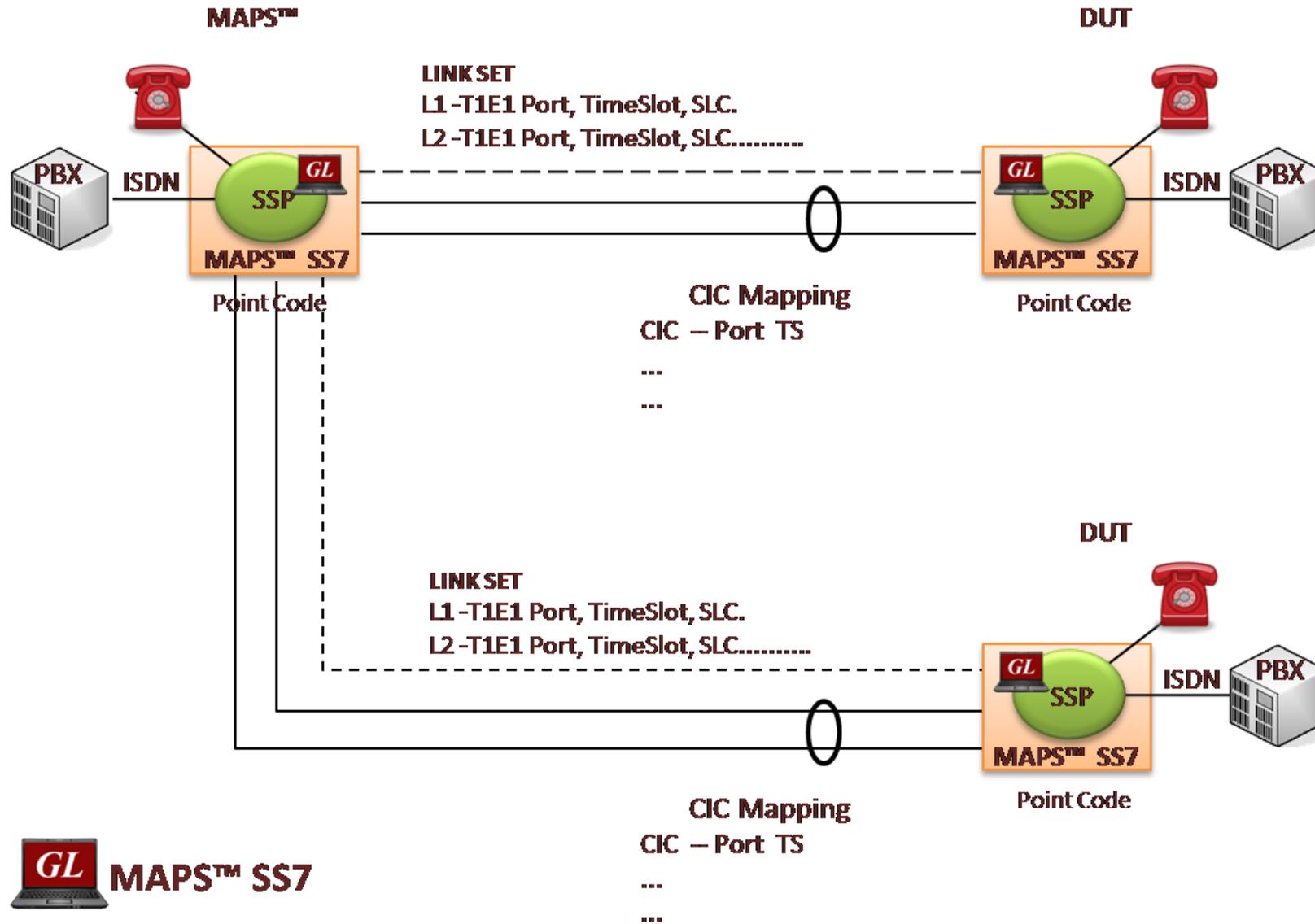
Main Features

- Access to all ISUP Message Parameters Initial Address, Subsequent Address, Release messages, and more
- User controlled access to optional ISUP parameters such as timers
- Subsequent Address Message (SAM) configurations available
- Generates and processes SIGTRAN valid and invalid messages
- Supports calls suspend, call resume, call hold and call retrieve
- Offloads TDM Traffic (digits, voice file, tones, IVR, FAX, Dynamic VF, and Voice Quality) over IP
- Supports SIGTRAN conformance testing (requires additional license)
- With MAPS™ MGC Multi-interface (requires additional licenses), both end-to-end signaling (using SIGTRAN) and RTP media (using MEGACO) simulation can be performed
- Supports Client-Server functionality requires additional license; clients supported are TCL, Python, VBScript, Java, and .Net

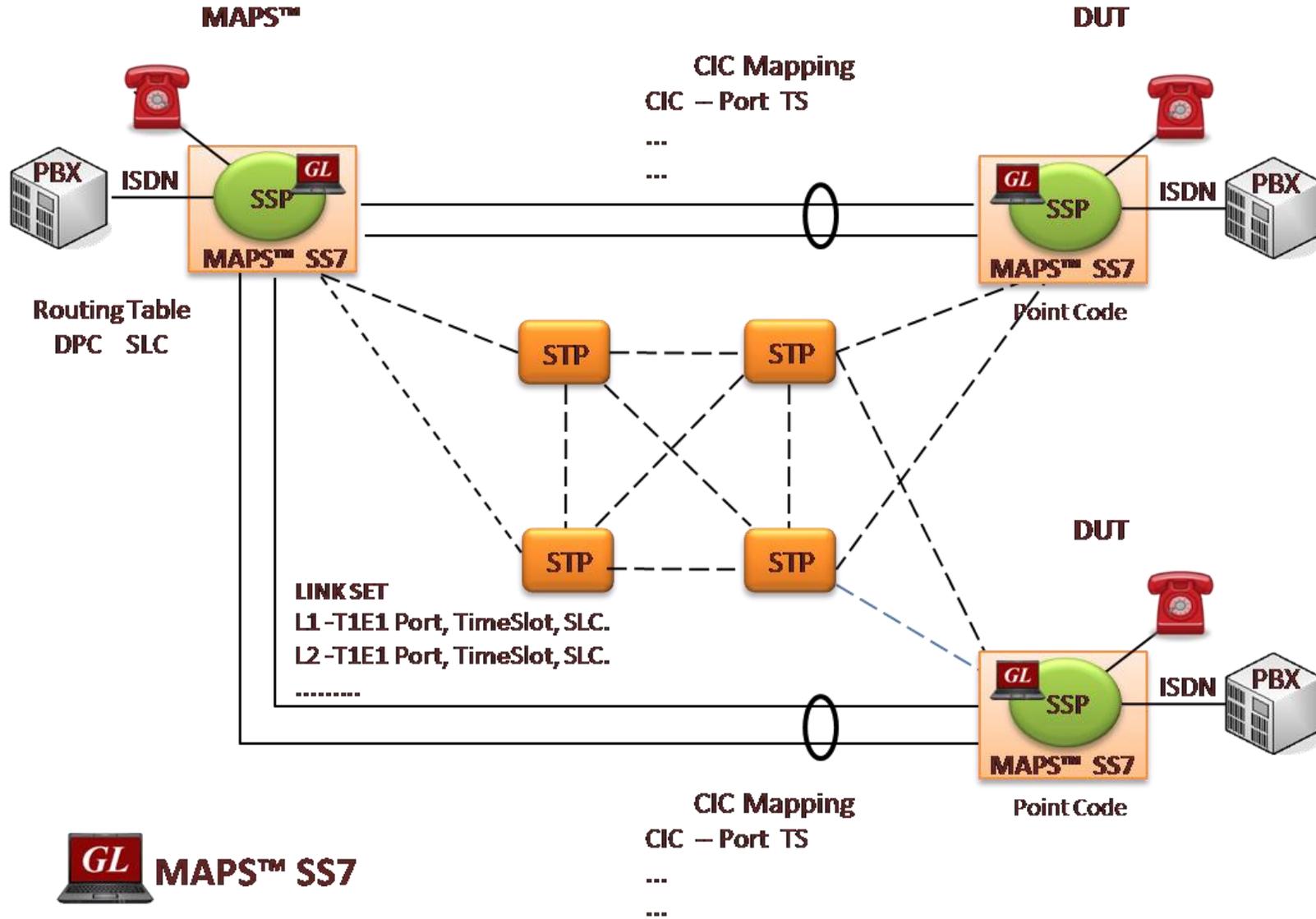
Call Flow Scenario



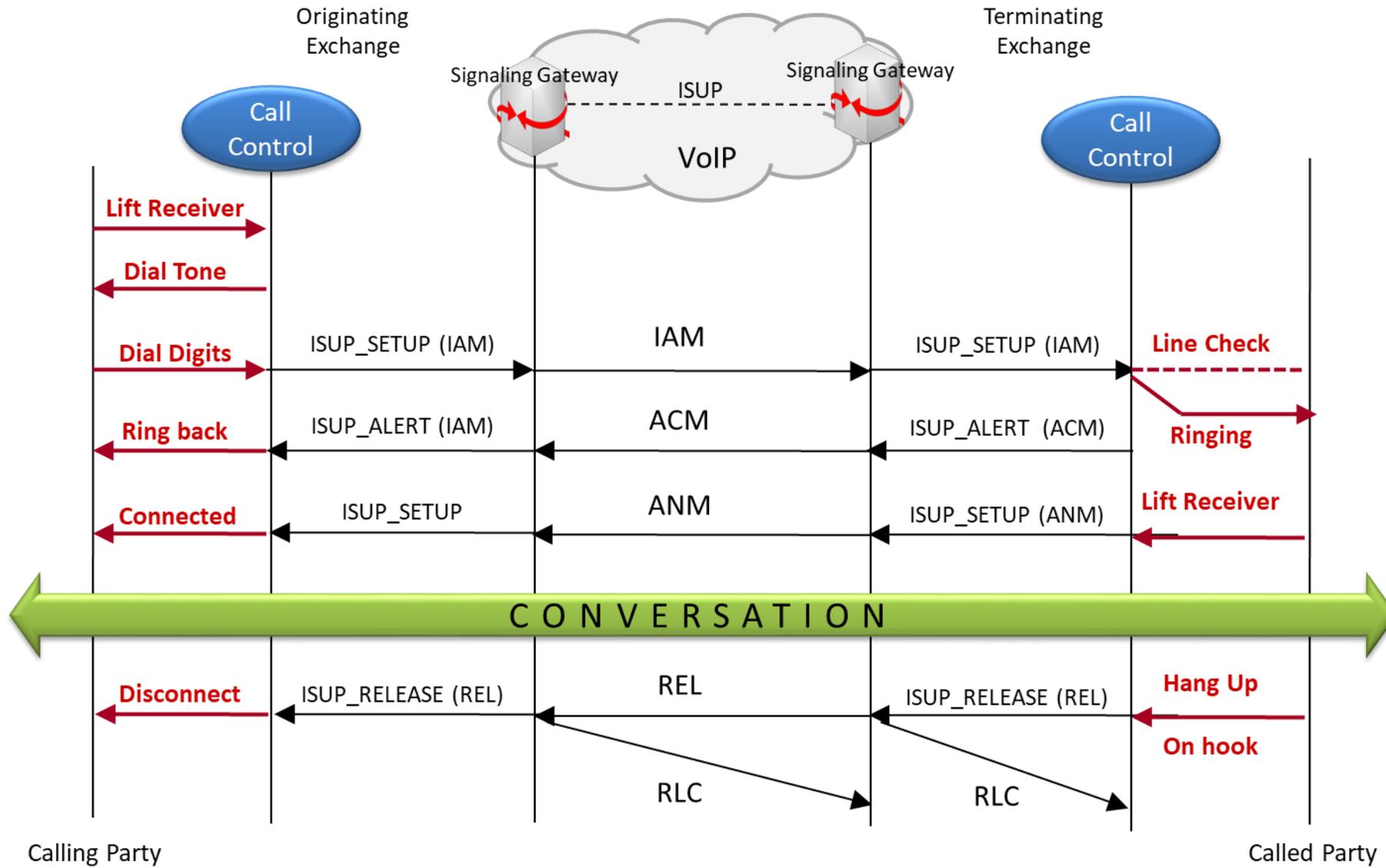
Call Flow Scenario (Contd.)



Call Flow Scenario (Contd.)



ISUP Call Flow



Multi-Interface Call Simulation

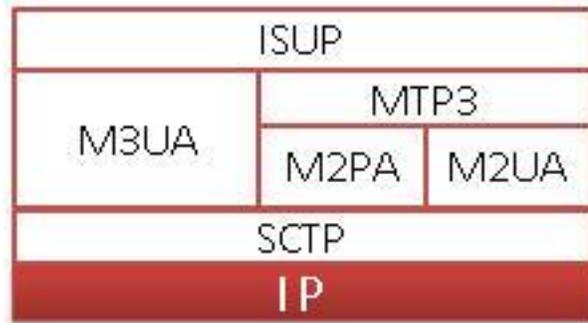
- MAPS™ Media Gateway Controller (MGC) a multi-interface simulator is configured to handle signaling and call control between the Signaling Gateway (SG) and Media Gateway (MG) across the network. MAPS™ MGC simulates SS7 signaling procedure between the SGs on both the ends of the network while handling bulk traffic (RTP Media) between the MG terminals
- GL's MAPS™ MEGACO can be configured to act as MGC, controlling signaling between the SGs and handling bulk traffic between the MGs in a multi-interface MEGACO network. The screenshot depicts the SS7 SIGTRAN signaling flow between the SGs and MEGACO procedure between MGs simulated using MAPS MGC (multi-interface)

Sr No	Script Name	Call Info	Script Execution	Status	Monitoring SCTP Status	Events	Results
1	Check_SCTP_Status.gls		Stop		None		Unknown
2	InitiateM3UA.gls	2	Stop		ASP ACTIVE		Pass
3	InitiateM3UA.gls	3	Stop		ASP ACTIVE		Pass
4	MGC_Control.gls	1.1.1.2.2.21 <-> 3.3.3.4.4.4000	Completed		Call Released		Pass
5	MGC_Control.gls	1.1.1.2.2.21861 <-> 3.3.3.4.4.4014	Stop		ContextDeleted		Unknown
6	MGC_Control.gls	1.1.1.2.2.21838 <-> 3.3.3.4.4.4013	Stop		ContextDeleted		Unknown
7	MGC_Control.gls	1.1.1.2.2.21889 <-> 3.3.3.4.4.4012	Stop		ContextDeleted		Unknown
8	MGC_Control.gls	1.1.1.2.2.21871 <-> 3.3.3.4.4.4011	Stop		ContextDeleted		Unknown
9	MGC_Control.gls	1.1.1.2.2.21986 <-> 3.3.3.4.4.4010	Stop		ContextDeleted		Unknown
10	MGC_Control.gls	1.1.1.2.2.21854 <-> 3.3.3.4.4.4009	Stop		ContextDeleted		Unknown
11	MGC_Control.gls	1.1.1.2.2.21867 <-> 3.3.3.4.4.4008	Stop		ContextDeleted		Unknown
12	MGC_Control.gls	1.1.1.2.2.2.308 <-> 3.3.3.4.4.42453	Stop		ContextModified		Pass
13	MGC_Control.gls	1.1.1.2.2.2.368 <-> 3.3.3.4.4.42452	Stop		ContextModified		Pass

The bottom window displays a sequence diagram showing signaling between SG1 and SG2. The diagram includes messages such as Initial Address, Address Complete, Add, Add Reply, Modify, Answer, Release, and Release Complete, with associated IP addresses and timestamps.

On the right, the MTP3 User Adaptation Layer parameters are listed, including fields like Version, Message Class, Transfer Message Type, Protocol Data, and various indicators and parameters.

Supported Protocol Standards



Supported Protocols	Standard / Specification Used
ISUP ITU	ITU - Q.761, Q.762, Q.763 and Q.764
ISUP ANSI	ANSI - T1.113.1 to T1.113.4
ISUP UK	ND1007:2007/01 TSG/SPEC/007
M3UA ITU	RFC 4666
M3UA ANSI	RFC 4666
M2PA	RFC 4165
M2UA	RFC 3331
ISUP ITU	ITU - Q.761, Q.762, Q.763 and Q.764
ISUP ANSI	ANSI - T1.113.1 to T1.113.4

Testbed Setup Configuration

The screenshot displays the MAPS (Isup-Sigtran ITU M3UA) configuration interface. The window title is "MAPS (Isup-Sigtran ITU 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 panes. The left pane shows a tree view of the configuration hierarchy, and the right pane shows the selected configuration item's details.

Config	Value
Signaling Gateway	
SCTP Mode	Client
Exchange Type	Control
Circuit Mapping	CIC Mapped to TS
CIC to Circuit Mapping	Timeslot Based
CIC Handling Method for CIC Based Mapping	Most Idle
Signaling Gateway	1
Signaling Gateway 1	
SGW IP Address	192.168.12.195
SGW Port	2905
MGC IP Address	192.168.12.219
MGC Port	2905
M3UA Parameters	
Termination Type	SGP
Network Indicator	International
Routing Context Indicator	Absent
Routing Context	1
Network Appearance Indicator	Absent
Network Appearance	1
Media Gateway Controller	
Traffic Type	E1
MGC IP Address for Traffic	192.168.1.184
SSP	1
SSP 1	
SSP Point Code	2.2.2
Link Set Parameters	1
Link Set Parameters 1	
Adjacent Destination Point Code	1.1.1
Link Set Id	1
Link	1
Link 1	
Signaling Link Selection	1
Destination SSP	1
Destination SSP 1	

The right pane shows the "Enable" checkbox, which is checked. At the bottom of the right pane, there are "Start" and "Edit" buttons.

Profile Configuration

The screenshot displays the MAPS (Isup-Sigtran ITU M3UA) Profile Editor window. The interface is divided into several sections:

- Profiles List (Left):** A list of profiles from Card1TS00 to Card1TS30. Card1TS01 is selected and highlighted in blue.
- Config Table (Center):** A table showing the configuration for the selected profile. The columns are 'Config' and 'Value'.

Config	Value
Card1TS01	
Enable Traffic	AutoTraffic - File
Traffic Direction For AutoTraffic	Tx
Enable File Recording	False
IVR Type	Path Verification
Digit Parameters	
TypeOfDigit	DTMF
Digits	1234567890
Digit Power 1	-13.00
Digit Power 2	-13.00
On Time in msec	80
Off Time in msec	80
Tone Parameters	
Transmit Tone Type	Dial Tone
Dial Tone Parameters	
Dial Tone Frequency 1 in Hz	440
Dial Tone Frequency 2 in Hz	350
Ringback Tone Parameters	
Ringback Tone Frequency 1 in Hz	440
Ringback Tone Frequency 2 in Hz	480
Busy Tone Parameters	
Busy Tone Frequency 1 in Hz	480
Busy Tone Frequency 2 in Hz	620
Userdefined Tone Parameters	
Userdefined Test Tone Frequency 1 in Hz	1004
Userdefined Test Tone Frequency 2 in Hz	0
Tone Power	-10.00
Transmit Tone Duration in msec	10000
Voice Files for Transmission	
Default Voice File	a-law samples\count10.pcm
Voice File1	a-law samples\2x2lcq1a.pcm
Voice File2	a-law samples\2x2lcq2a.pcm
Voice File3	a-law samples\b52_alaw.pcm
Voice File4	a-law samples\count10.pcm
Voice File5	a-law samples\luvshack.pcm
Voice File6	a-law samples\samp_est.pcm
Voice File7	a-law samples\samp_wst.pcm
Voice File8	a-law samples\testref1.pcm
Voice File9	a-law samples\2x2lcq1a.pcm
Voice File10	a-law samples\2x2lcq1a.pcm
Tx File Duration in msec	20000
- Enable Checkbox (Right):** A checked checkbox labeled 'Enable'.
- Buttons (Bottom Right):** 'Add', 'Insert', and 'Delete' buttons, along with a 'Properties' button.
- Bottom Status Bar:** Includes 'Insert', 'Delete', and 'Clear' buttons, and a status area with 'Initialisation Errors', 'Error Events', 'Captured Errors', and 'Link Status Up' indicators.

Basic Call Generation

Active Calls Call Status Call Events

Loading Scripts and Profiles

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed Iterations
1	Isup_Call.gls	Card2TS01	2.2.2.1.1.1.33	Start	ISUP Call Released	None	Pass	1	1

Message Sequence

MAPS	DUT
Initial Address	12:41:52.360000
Address Complete	12:41:53.059000
Answer	12:41:54.081000
Release	12:42:54.113000
Release Complete	12:42:54.147000

Decode Message

```

===== 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 = 52 (x00000034)
Protocol Data =
0008 Tag = x0210 Transfer Protocol
000A Length = 44 (x002C)
000E Originating Point Code =
Point Code = 2.2.2(..010000 00010010
Destination Point Code =
Point Code = 1.1.1(..001000 00001001
0014 Service Indicator = ....0101 ISDN User Part
0015 Network Indicator = .....00 International
0016 Message Priority = .....00 Priority Code
0017 Signalling Link Selection = 1 (x01)

===== ISUP Layer =====
0018 Circuit Identification Code = 00100001 ....0000 (33)
001A Message Type = 00000001 Initial address
    
```

Initialisation Errors Error Events Captured Errors Link Sta

ISUP Call Reception

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Results
1	M3UA.gls		1001	Stop	ASP Active	None	Pass
2	Isup_Call.gls		1.1.1.2.2.2.33	Completed	ISUP Call Released	None	Pass

Message Sequence

Event	Time
Initial Address	12:41:53.036000
Address Complete	12:41:53.052000
Answer	12:41:54.072000
Release	12:42:54.124000
Release Complete	12:42:54.139000

Decode Message

```
===== MTP3 User Adaptation Layer =====  
0000 Version = 00000001 Release  
0002 Message Class = 00000001 Transfer  
0003 Transfer Message Type = 00000001 Payload  
0004 Message Length = 52 (x00000034)  
Protocol Data  
0008 Tag = x0210 Transfer Pr  
000A Length = 44 (x002C)  
Originating Point Code  
000E Point Code = 2.2.2(..010000 00  
Destination Point Code  
0012 Point Code = 1.1.1(..001000 00  
0014 Service Indicator = ...0101 ISDN Use:  
0015 Network Indicator = .....00 Internat:  
0016 Message Priority = .....00 Priority  
0017 Signalling Link Selection = 1 (x01)  
Pdu  
===== ISUP Layer =====  
0018 Circuit Identification Code = 00100001 ...0000  
001A Message Type = 00000001 Initial
```

Call Results

Message Sequence

Decode Message

Call and Message Statistics

Statistics

Call Stats Message Stats Reset

Message Type	Tx Count	Rx Count	Retransmit Count
Address Complete	61	0	0
Answer	61	0	0
Initial Address	0	61	0
Release	31	28	0
Release Complete	28	31	0
Signalling Link Test Acknowledgement Message	1	1	0
Signalling Link Test Message	1	1	0

Events

Event Log Error Events Captured Errors

Date/Time	Captured Events	Call Trace Id	Script Name	Script Id
2015-6-24 12:39:02.727000	Destination SSP Id = 0	1.1.1.2.2.2.1	Isup_Call.gls	CGProtScriptId_4_413384686-4653-5868
2015-6-24 12:39:02.727000	RouteSize= 1	1.1.1.2.2.2.1	Isup_Call.gls	CGProtScriptId_4_413384686-4653-5868
2015-6-24 12:39:02.727000	RoutingLinkSet value is = 1	1.1.1.2.2.2.1	Isup_Call.gls	CGProtScriptId_4_413384686-4653-5868
2015-6-24 12:39:02.727000	LinkSetSize = 1	1.1.1.2.2.2.1	Isup_Call.gls	CGProtScriptId_4_413384686-4653-5868
2015-6-24 12:39:02.727000	LinkSet value is = 1	1.1.1.2.2.2.1	Isup_Call.gls	CGProtScriptId_4_413384686-4653-5868
2015-6-24 12:39:02.730000	Call Initiated	1.1.1.2.2.2.1	ISUP.gls	CGProtScriptId_4_413384686-4653-5868
2015-6-24 12:39:02.752000	Call Connected	1.1.1.2.2.2.1	ISUP.gls	CGProtScriptId_4_413384686-4653-5868
2015-6-24 12:39:02.752000	Card and Timeslot = Card1TS01	1.1.1.2.2.2.1	Isup_Call.gls	CGProtScriptId_4_413384686-4653-5868
2015-6-24 12:39:02.753000	Loaded Traffic Profile: Card1TS01	1.1.1.2.2.2.1	Isup_Call.gls	CGProtScriptId_4_413384686-4653-5868
2015-6-24 12:40:02.783000	Call Released	1.1.1.2.2.2.1	ISUP.gls	CGProtScriptId_4_413384686-4653-5868

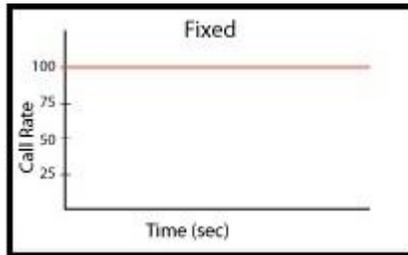
Save Events

Capture Events to file

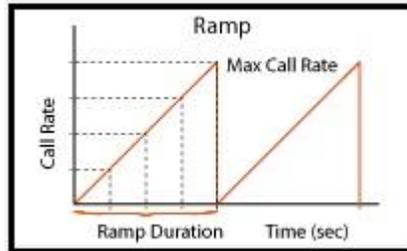
Load Generation

- 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.

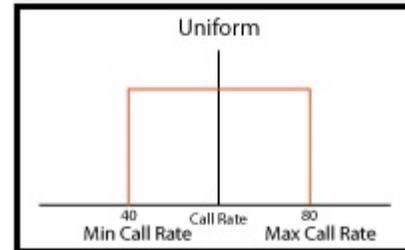
Fixed



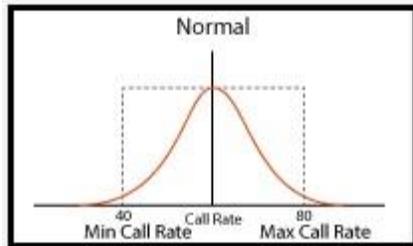
Ramp



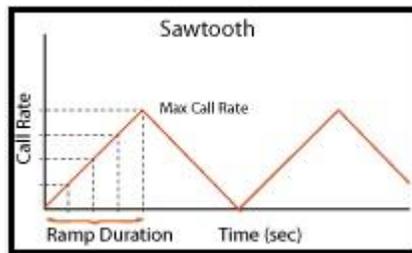
Uniform



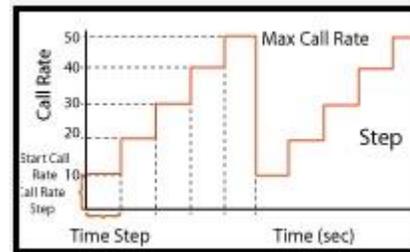
Normal



Saw-tooth



Step



The screenshot shows the 'Load Generation - LoadGendefault' window. It includes a table of distributions, a list of scripts, and time configuration options.

Distributions	Description
Uniform	MinCR=40, MaxCR=80, Duration=10
Fixed	Call Rate=1500, Duration=10
Normal	MinCR=40, MaxCR=80, Duration=10

Scripts: Isup_Call

Profile: Card1TS01, Card1TS02, Card1TS03, Card1TS04, Card1TS05, Card1TS06, Card1TS07, Card1TS08, Card1TS09, Card1TS10, Card1TS11, Card1TS12, Card1TS13, Card1TS14

Start Time: 00:00:00.000, End Time: 00:00:00.000

SS7 Sigtran Bulk Call Generation

The screenshot displays the MAPS (Message Automation Protocol Simulation) software interface, specifically the 'Call Generation' window. The window title is 'MAPS (Message Automation Protocol Simulation) (Isup-Sigtran ITU M3UA) - [Call Generation]'. The menu bar includes 'Configurations', 'Emulator', 'Reports', 'Editor', 'Debug Tools', 'Windows', and 'Help'. The toolbar contains various icons for file operations and simulation control.

The main area features a table with the following columns: Sr No, Script Name, Profile, Call Info, Script Execution, Status, Events, Events P..., Result, Total Iterations, and Completed Iterations. The table contains 10 rows, each representing a call configuration with a unique profile name (Card1TS01 to Card1TS10) and a script name (Isup_Call.gls). The 'Script Execution' column shows 'Start' for all entries, and the 'Result' column shows 'Unknown' for all entries.

Below the table is a control panel with buttons: 'Add', 'Delete', 'Insert', 'Refresh', 'Start', 'Start All', 'Stop', 'Stop All', 'Abort', and 'Abort All'. There is also a checkbox for 'View Executing Line'.

The 'Script Contents' area shows the following code:

```
//Initialize Variables
ReportEvent (ISUPScript = "Started");
KeyIdentifier: opc , dpc, cic ;
CallDuration=${_CallDuration};
CallAnswerTime=${_CallAnswerTime};
InterCallDuration=${_InterCallDuration};
ISUPScriptId="ISUP";
ProtocolStandard="Isup-Sigtran";
StopAll=0;
LocalCICState="";
RemoteCICState="";
TDMSessionState = "NOT STARTED";
```

At the bottom, there is a status bar with indicators for 'Initialisation Errors', 'Error Events', 'Captured Errors', and 'Link Status Up=1 Down=0'.

ISUP Conformance Testing (XX647)

ISUP Conformance Test Suite

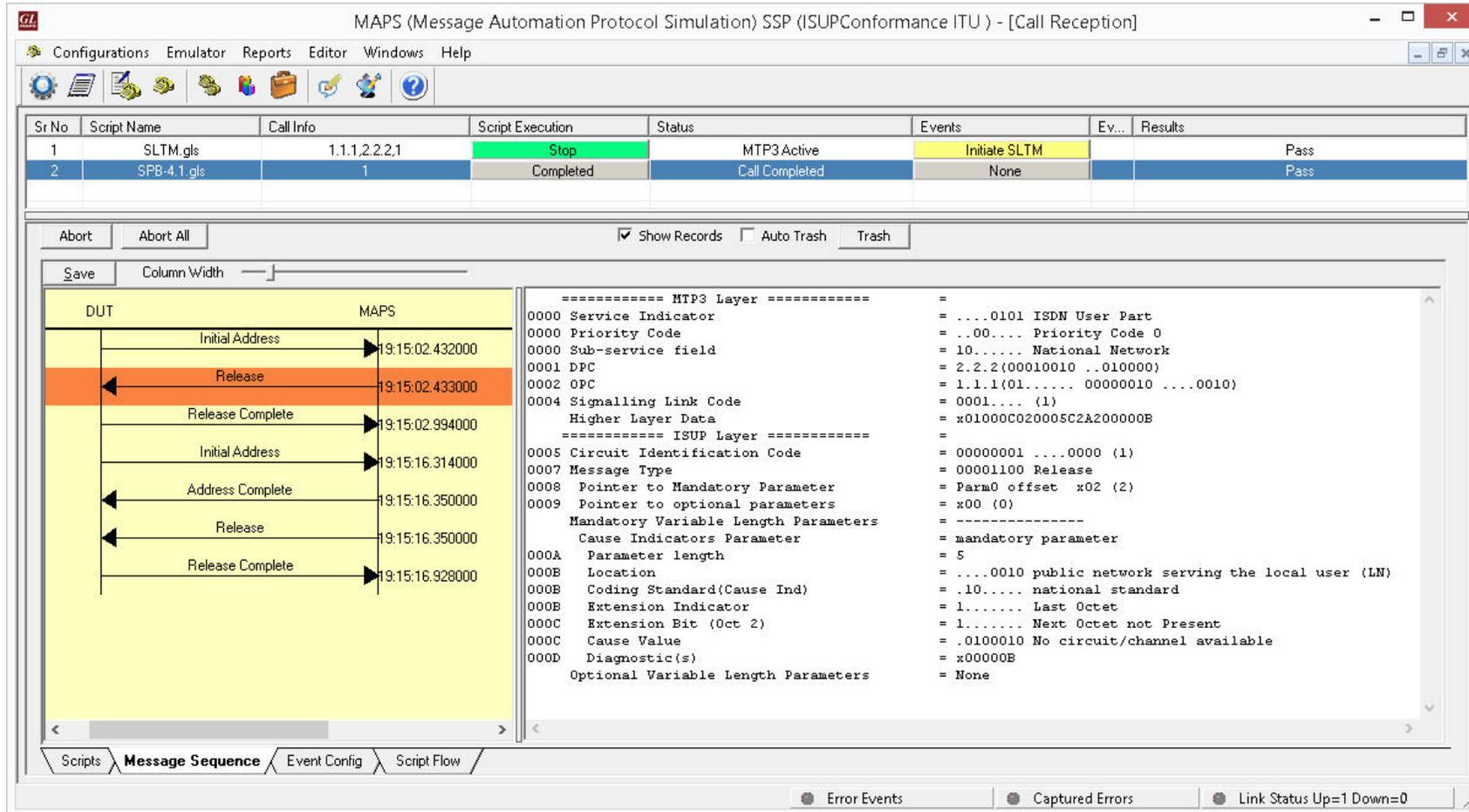
SPB-1.2.1.gls (Reset of circuits)

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Ev...	Result	Total Iterations	Completed Iterations
1	SPB-1.2.1.gls	TS01	1	Start	Circuit is Reset	None		Pass	1	1

- The purpose of this test is to verify that on receipt of a **Reset Circuit** message SP A (DUT) will respond by sending a **Release Complete** message

Unsuccessful Call Setup Conformance Test Case

SPB-4.1.gls script



Sr No	Script Name	Call Info	Script Execution	Status	Events	Ev...	Results
1	SLTM.gls	1.1.1.2.2.2.1	Stop	MTP3 Active	Initiate SLTM		Pass
2	SPB-4.1.gls	1	Completed	Call Completed	None		Pass

=====
0000 Service Indicator = ...0101 ISDN User Part
0000 Priority Code = ..00.... Priority Code 0
0000 Sub-service field = 10..... National Network
0001 DPC = 2.2.2(00010010 ..010000)
0002 OPC = 1.1.1(01..... 000000100010)
0004 Signalling Link Code = 0001.... (1)
Higher Layer Data = x01000C020005C2A200000B
=====
0005 Circuit Identification Code = 000000010000 (1)
0007 Message Type = 00001100 Release
0008 Pointer to Mandatory Parameter = Parm0 offset x02 (2)
0009 Pointer to optional parameters = x00 (0)
Mandatory Variable Length Parameters = -----
Cause Indicators Parameter = mandatory parameter
000A Parameter length = 5
000B Location =0010 public network serving the local user (LN)
000B Coding Standard(Cause Ind) = .10..... national standard
000B Extension Indicator = 1..... Last Octet
000C Extension Bit (Oct 2) = 1..... Next Octet not Present
000C Cause Value = .0100010 No circuit/channel available
000D Diagnostic(s) = x00000E
Optional Variable Length Parameters = None

- **Purpose:** To verify that the call will be immediately released by the outgoing signaling point if a release message with a given cause is received and the correct indication is given to the calling party

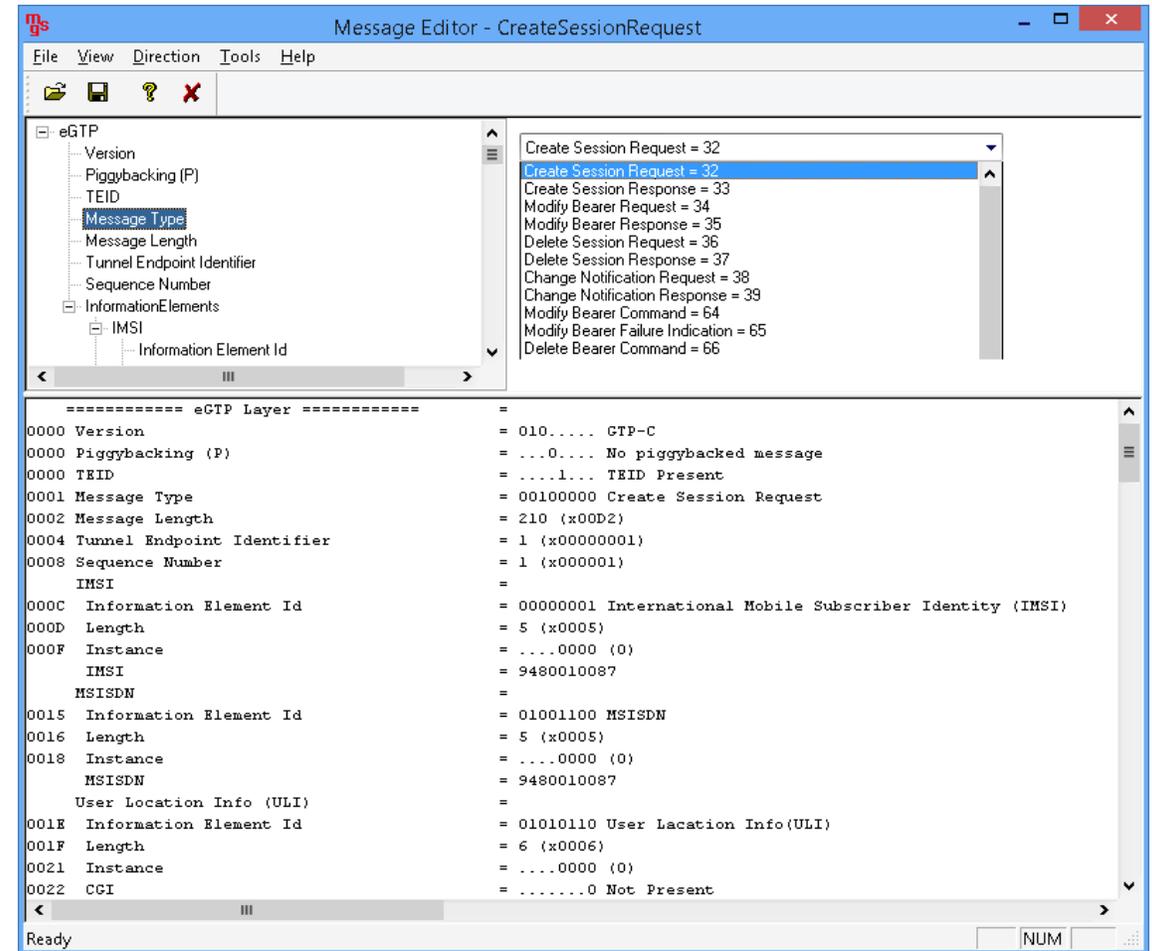
Customizations - Call Flow (Scripts)

- Scripts are written in our proprietary gls scripting language. They represent generic state machines intended provide protocol/signaling logic for a call and establish bearer traffic
- Each instance of a script corresponds to a single transaction/call, i.e., if you place 500 calls in parallel you will actually have 500 script instances running at once. If you place 500 calls in series the same script will execute and terminate 500 times
- It is possible to create your own scripts, but almost never necessary! We attempt to provide all necessary scripts out of the box

```
93     goto "FormatSDP";
94     endif
95
96     if((G711_VAD == 1) || (G726_16_VAD == 1) || (G726_24_VAD == 1) || (G726_32_VAD == 1) || (G726_40_VAD == 1))
97         AttrFileEtxn = "G711VAD";
98     endif
99
100    if( (Codec == "AMR-WB") || (Codec == "G7221") || (Codec == "ISAC") )
101        TelEventSR = 16000;           // Sampling rate for WideBand codecs
102    else
103        TelEventSR = 8000;           // Sampling rate for NarrowBand codecs
104    endif
105
106    goto "Get_Proxy_IPAddress_Port";
107    RoutePort = $Port;
108
109    if(TransportType == "TCP")
110        NoReTxmit();
111    endif
112
113    if(_ED137)
114        goto "ED137_Initialization";
115        send $"InsertHeaders-ED137.gls" "Invite.txt" "InviteImport.txt" SendIp Port reTxmit TimerA(T1timeout msec, A2T1
116    else
117        _MaxForwards = 70;
118        send $"InsertHeaders.gls" "Invite.txt" "InviteImport.txt" SendIp Port reTxmit TimerA(T1timeout msec, A2T1timeout
119    endif
120
121    InviteClientTransactionState = "Calling";
122    starttimer TimerB TimerBtimeout msec;
123
124    RCSeqNo = $CSeqNo;
125    SipState = "Invite Sent";
126    EventLog("INVITE Sent");
127    incr CSeqNo 1;
```

Customizations - Protocol Messages

- When the script sends a message it does so by loading a text file template from disk (“Invite.txt” in the screenshot)
- These message templates provide the actual structure of the message, the script simply populates it with values contained in its variables
- These messages are customizable by the user, header fields can be altered and removed. Text-based protocol messages can be edited in any text editor. Binary-based messages must be edited in our provided message editor



Customizations - User Events

The screenshot shows the MAPS (Message Automation Protocol Simulation) interface. The main window displays a table of call events and a script editor. A context menu is open over the 'Retrieve' event in the table, and a blue box highlights the 'Retrieve' section in the script editor. A blue arrow points from the menu to the script editor section.

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events ...	Result	Total Iterations	Completed Iterations
1	Isup_Call.gls	Card1TS01	1.1.1.2.2.2.1	Abort	File Sent	Retrieve		Pass	1	0
2	Call.gls	Card1TS02		Start		None			0	0
3	Call.gls	Card1TS03		Start		None			0	0
4	Call.gls	Card1TS04		Start		None			0	0
5	Call.gls	Card1TS05		Start		None			0	0
6	Call.gls	Card1TS06		Start		None			0	0
7	Call.gls	Card1TS07		Start		None			0	0
8	Call.gls	Card1TS08		Start		None		Unknown	1	0

```
"Hold":
CallHoldInitiated = 1;
(ISUPScriptId) goto "Hold";
resume;

"Retrieve":
CallHoldInitiated = 0;
(ISUPScriptId) goto "Retrieve";
resume;

"Suspend":
SuspendInitiated = 1;
(ISUPScriptId) goto "Suspend Call";
resume;
```

Control moves to "Retrieve" section, after selecting the "Retrieve" User Event

Customizations - Statistics and Reports

MOS, R-Factor

Packet Loss

Packets Discarded

Duplicate Packets

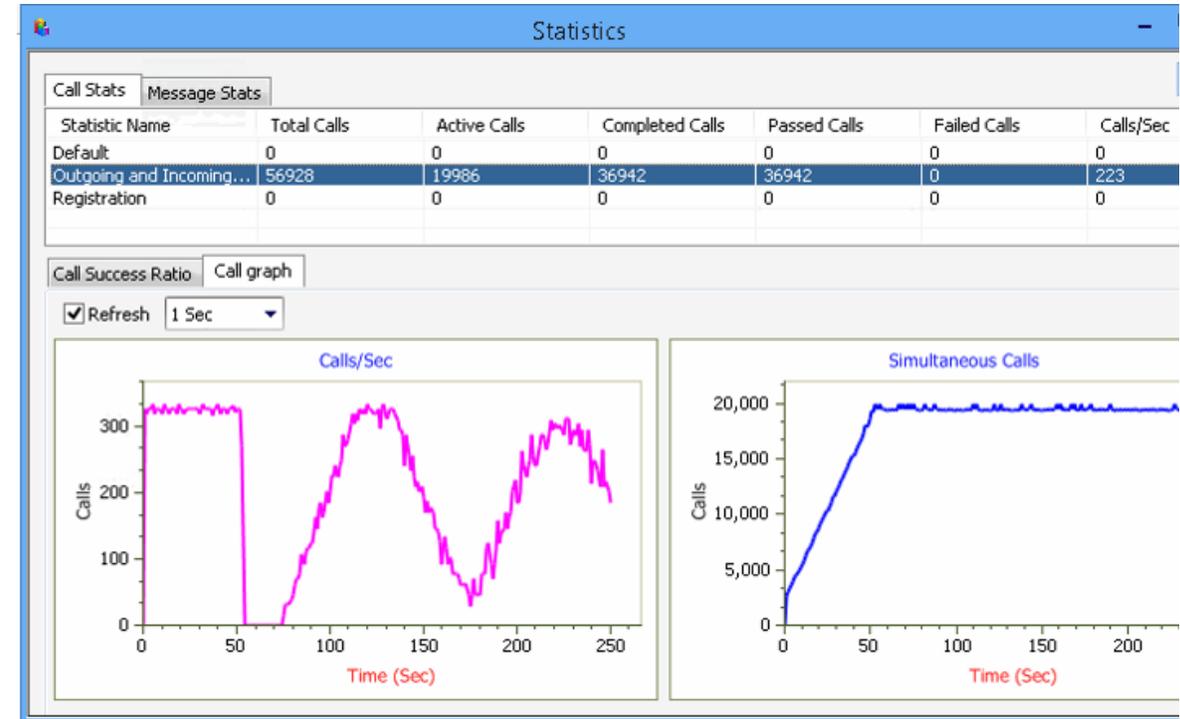
Out-Of-Sequence

Packets

Jitter Statistics

User Defined Statistics - VoiceQualityStats

Name	Values
Active RTP Sessions	1987
Completed RTP Sessions	1548093
Sessions With Zero Receive Traffic	0
MOS Score Stats	0
Sessions 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%]
Total RTP Packet Sent	4485008797
Total RTP Packet Received	4481760883
Packet-Loss Stats	0
Total PacketLoss	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%]
Packet-Discarded Stats	0
Total PacketDiscarded	3738934 [0%]
Sessions with Zero Packet-Discard	1464299 [94%]
Sessions with Packet-Discard(<1%)	41479 [2%]
Sessions with Packet-Discard(1% - 5%)	37232 [2%]
Sessions with Packet-Discard(5% - 10%)	4843 [0%]
Sessions with Packet-Discard(>10%)	240 [0%]
Packet-Duplicate Stats	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
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%]
Jitter Stats	0
Sessions with Jitter(< 1 msec)	1450779 [93%]
Sessions with Jitter(< 5 msec)	93031 [6%]
Sessions With Jitter(< 10 msec)	4841 [0%]
Sessions With Jitter(>= 10 msec)	350 [0%]

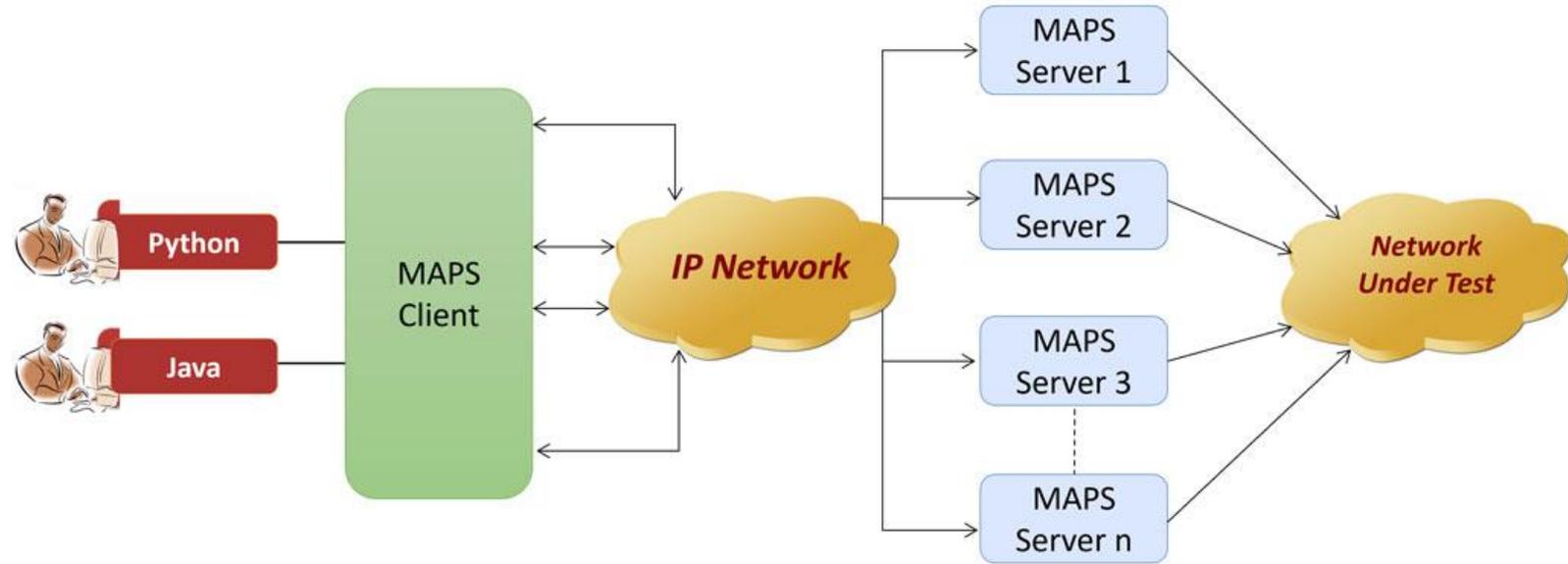


Call Stats provide a running tabular log of system level stats, tracked stats include: Total Calls, Active Calls, Completed Calls, Passed Calls, Failed Calls, Instantaneous Calls/Sec

MAPS™ API Architecture

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



CLI Sample Scripts

```
CLI MapsCLI SSP (ISUP ITU E1)
File Edit View
View Latest Command
2015-5-22 15:31:01.412000 : Apply Global Configuration # "_CallAnswerTime"=700000,"_CallDuration"=70000,"_IAMProtocol"="SND","_MaxRequestedDigitsinSendnDigits"=2,"_Require
2015-5-22 15:31:01.413000 : IncomingCallHandler # "Initial Address"="Isup_Call.gls";
2015-5-22 15:31:04.800000 : UserEvent 2147483649 "Accept Call";
2015-5-22 15:31:04.913000 : UserEvent 2147483649 "MonitorDigits";
2015-5-22 15:31:09.611000 : StopScript 2147483649;
2015-5-22 15:35:31.018000 : Apply Global Configuration # "_CallDuration"=70000,"_EnableCLI"=1,"_InterCallDuration"=500000;
2015-5-22 15:35:31.018000 : StartScript 1 "Isup_Call.gls" "Card1TS01" 1 ;
2015-5-22 15:35:31.128000 : UserEvent 1 "Place Call"# "CalledNumber"=( binarystring ) 5551234543,"CallingNumber"=( binarystring ) 555
2015-5-22 15:35:33.754000 : UserEvent 1 "TxDigits"# "DigitOffTime"="80","DigitOnTime"="80","DigitPower1"="-10.00","DigitPower2"="-1
2015-5-22 15:36:06.676000 : UserEvent 1 "Terminate Call";
2015-5-22 15:36:07.333000 : StopScript 1;
2015-5-22 15:36:17.068000 : Apply Global Configuration # "_CallAnswerTime"=700000,"_CallDuration"=70000,"_IAMProtocol"="SND","_M
2015-5-22 15:36:17.068000 : IncomingCallHandler # "Initial Address"="Isup_Call.gls";
2015-5-22 15:36:21.877000 : UserEvent 2147483650 "Accept Call";
2015-5-22 15:36:21.987000 : UserEvent 2147483650 "MonitorDigits";
2015-5-22 15:36:26.691000 : StopScript 2147483650;
```

```
C:\Program Files (x86)\GL Communications Inc\MAPS-SS7\TCL Client\tclsh85.e...
% Run Place_Call.tcl "Send_Digits" ""
Starting Placecall Script...
Script Started
Line 1 Placing Call....
ISUP Call Initiated
Line 1 Waiting For Response....
ISUP Call Proceeding
Line 1 Waiting For Call Connection....
ISUP Call Connected
Sending Dtmf Digits from Line1...
TDM Digits Sent
Line 1 Waiting For Call Release....
ISUP Release not Received
Line 1 Releasing Call....
ISUP Call Released
Script Stopped
% _
```

MAPS™ SIGTRAN High Density

- MAPS™ SIGTRAN High Density supports generation of high volume of calls with traffic for load testing network using MAPS™ RTP HD network appliance, specialized 1U rack mounted designed to easily achieve up to 20,000 endpoints per appliance (5000 simultaneous calls with duplex traffic per port)
- Scales to around 100,000 to 200,000 endpoints with use of Master Controller for single point of control
- Simulate various traffic conditions to measure the performance of a network element
- Real-time monitoring and reporting of registration and call statistics
- Statistics can be viewed on any pair of endpoints
- Export data to other applications for customized user report



Thank you