MAPS™ SS7 SIGTRAN

SIGTRAN Protocol Emulation over IP

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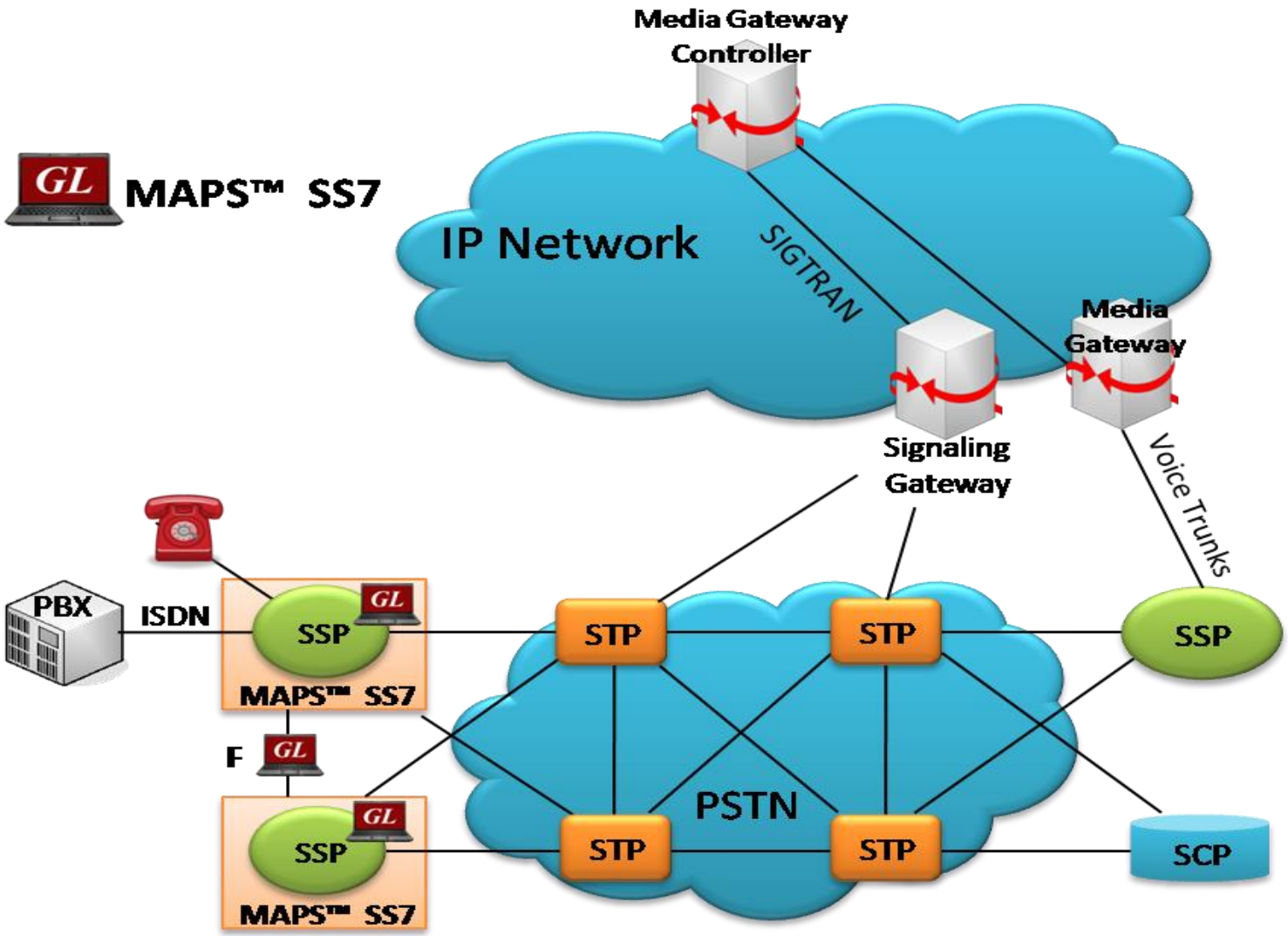
SS7 Network Architecture



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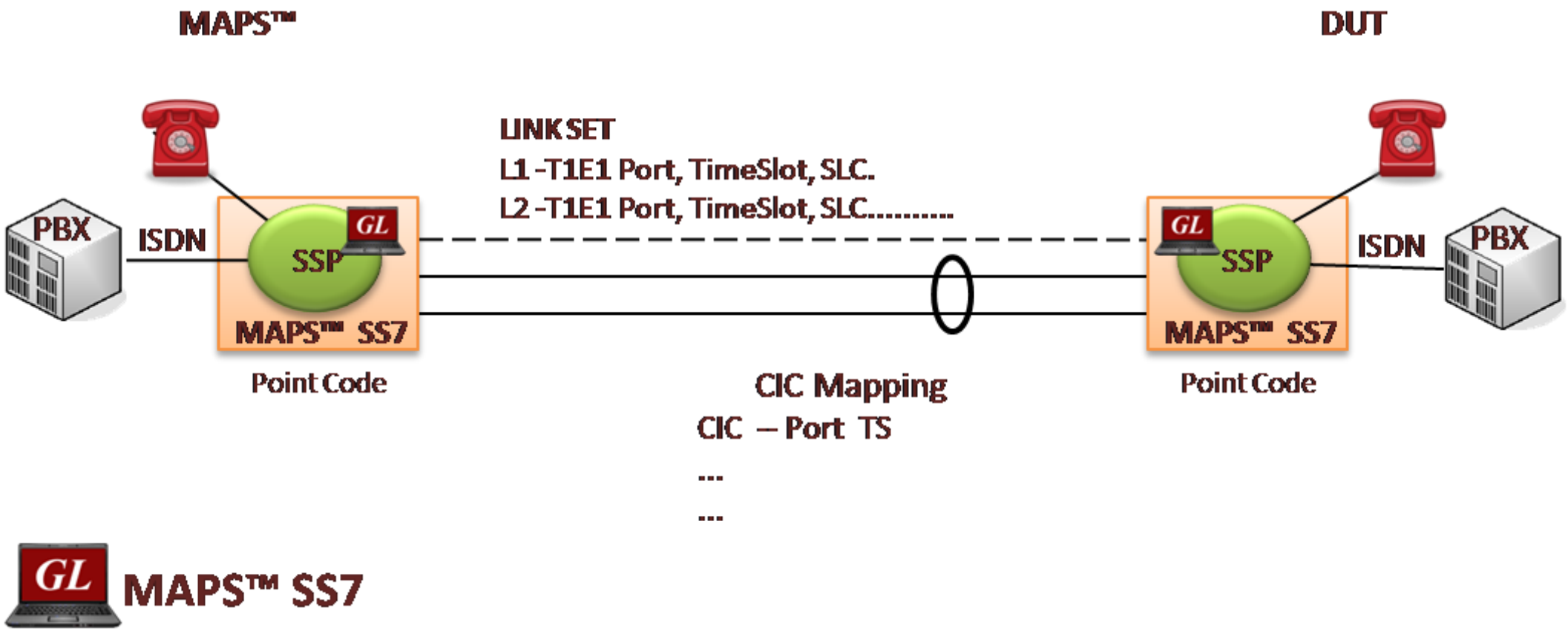
Main Features

- 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



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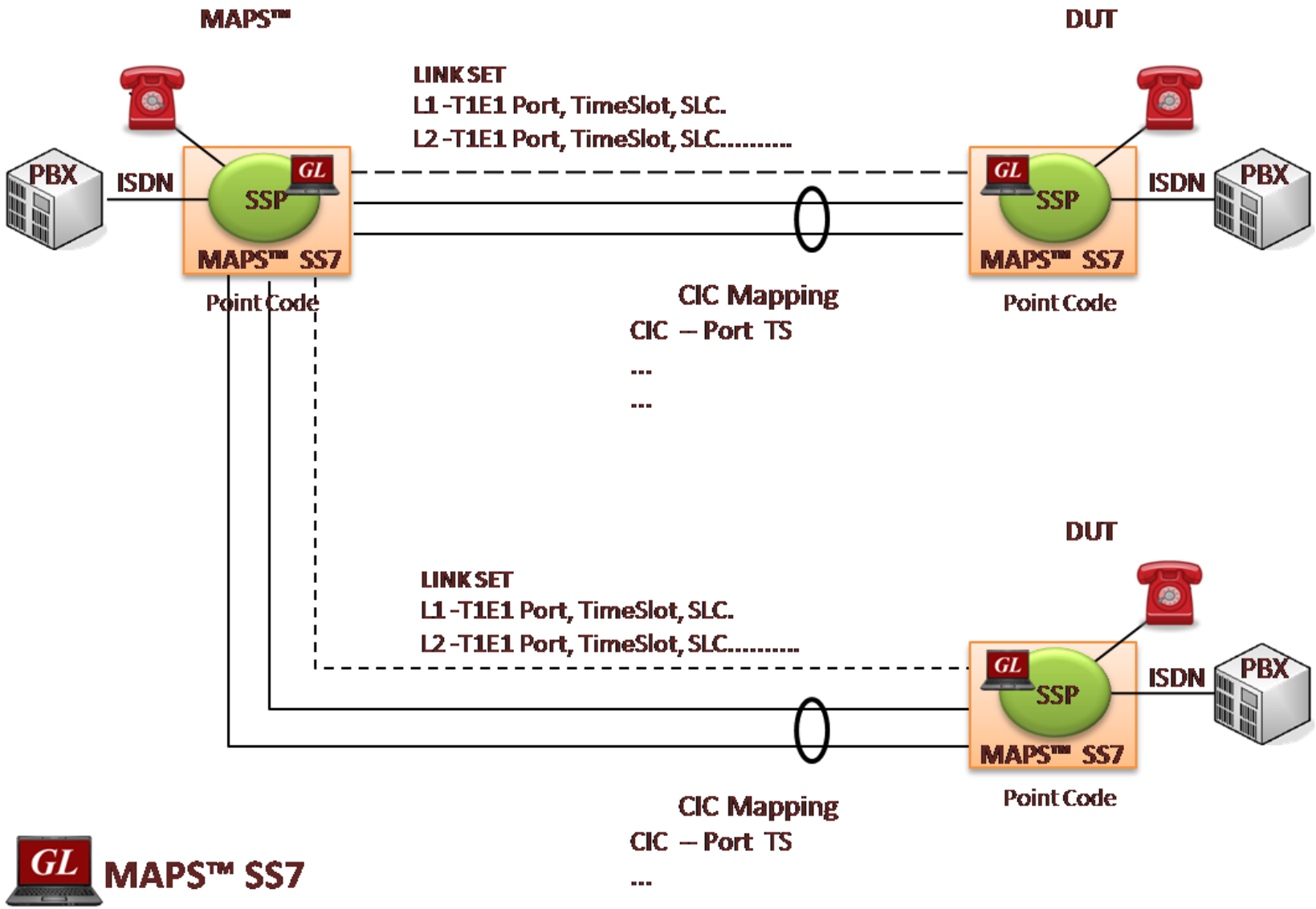
Call Flow Scenario (Contd.)



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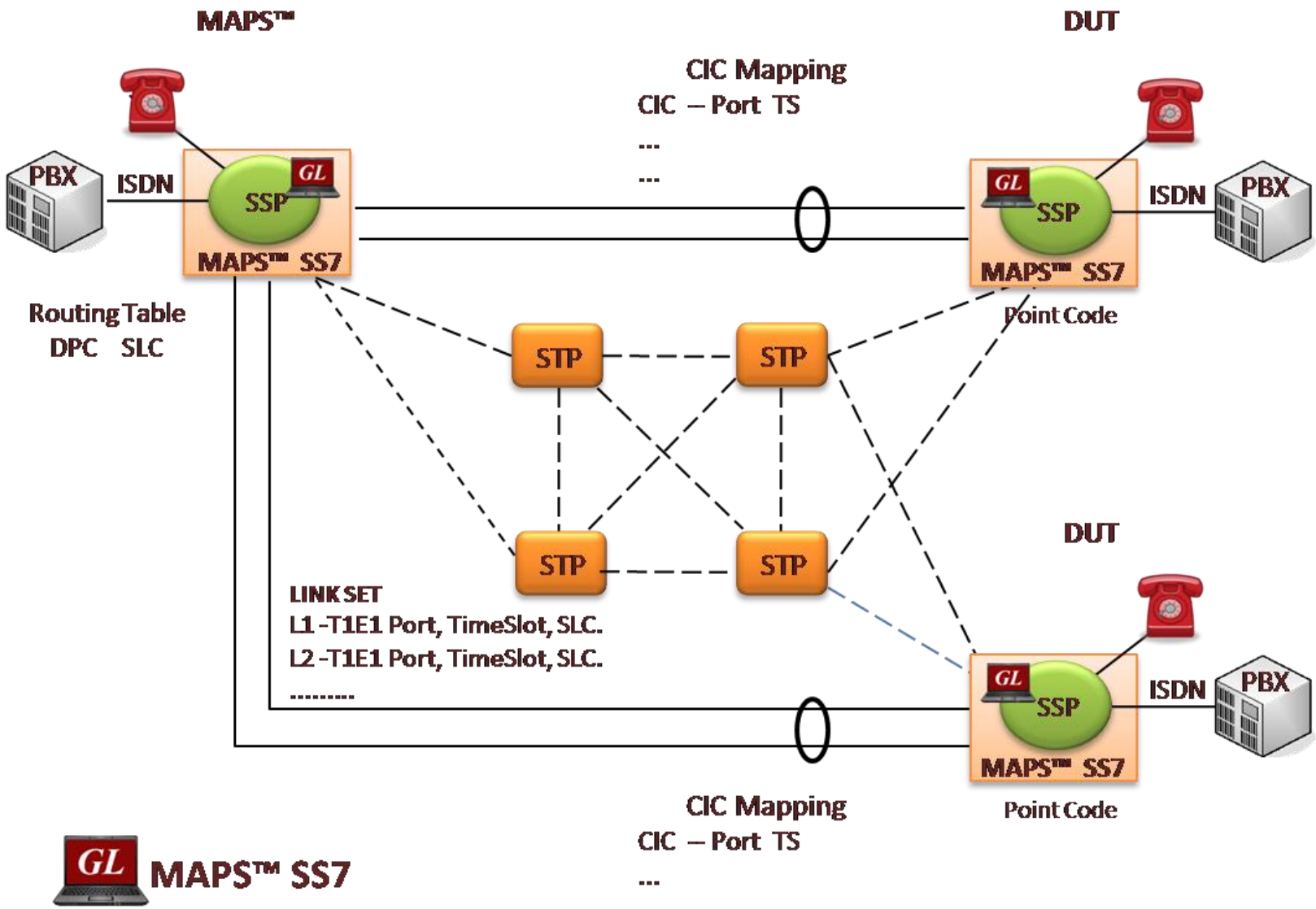
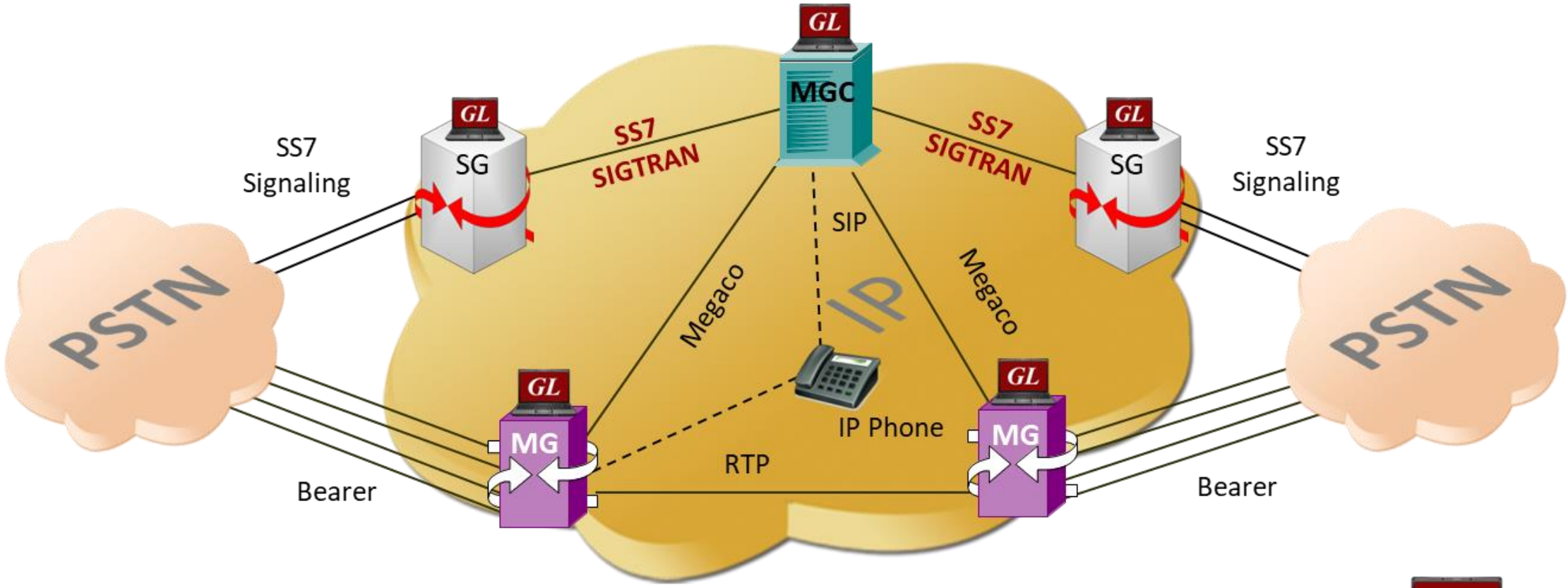
Call Flow Scenario (Contd.)



SIGTRAN in IP over SS7



MAPS™ SS7 SIGTRAN Emulator

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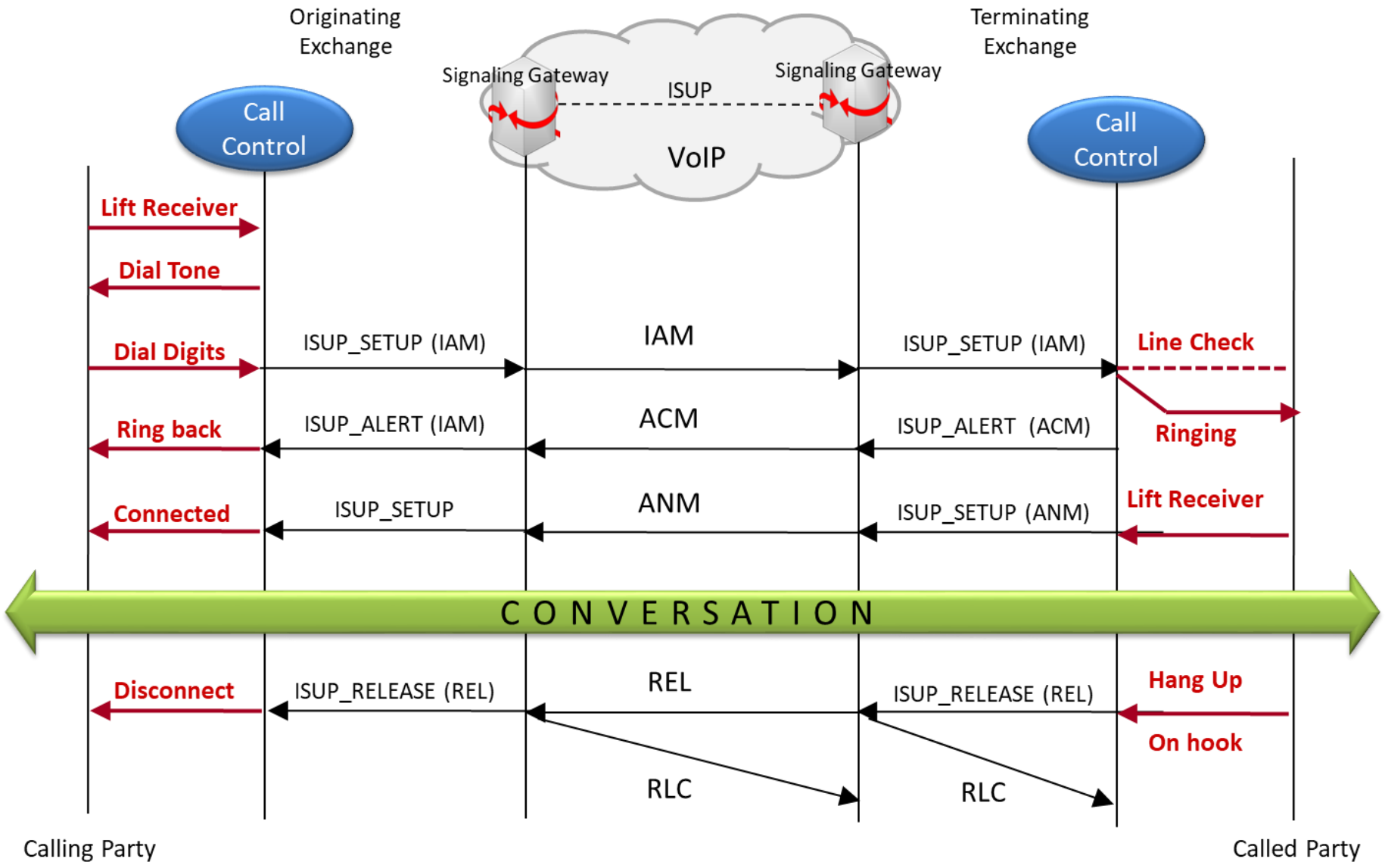
ISUP Call Flow



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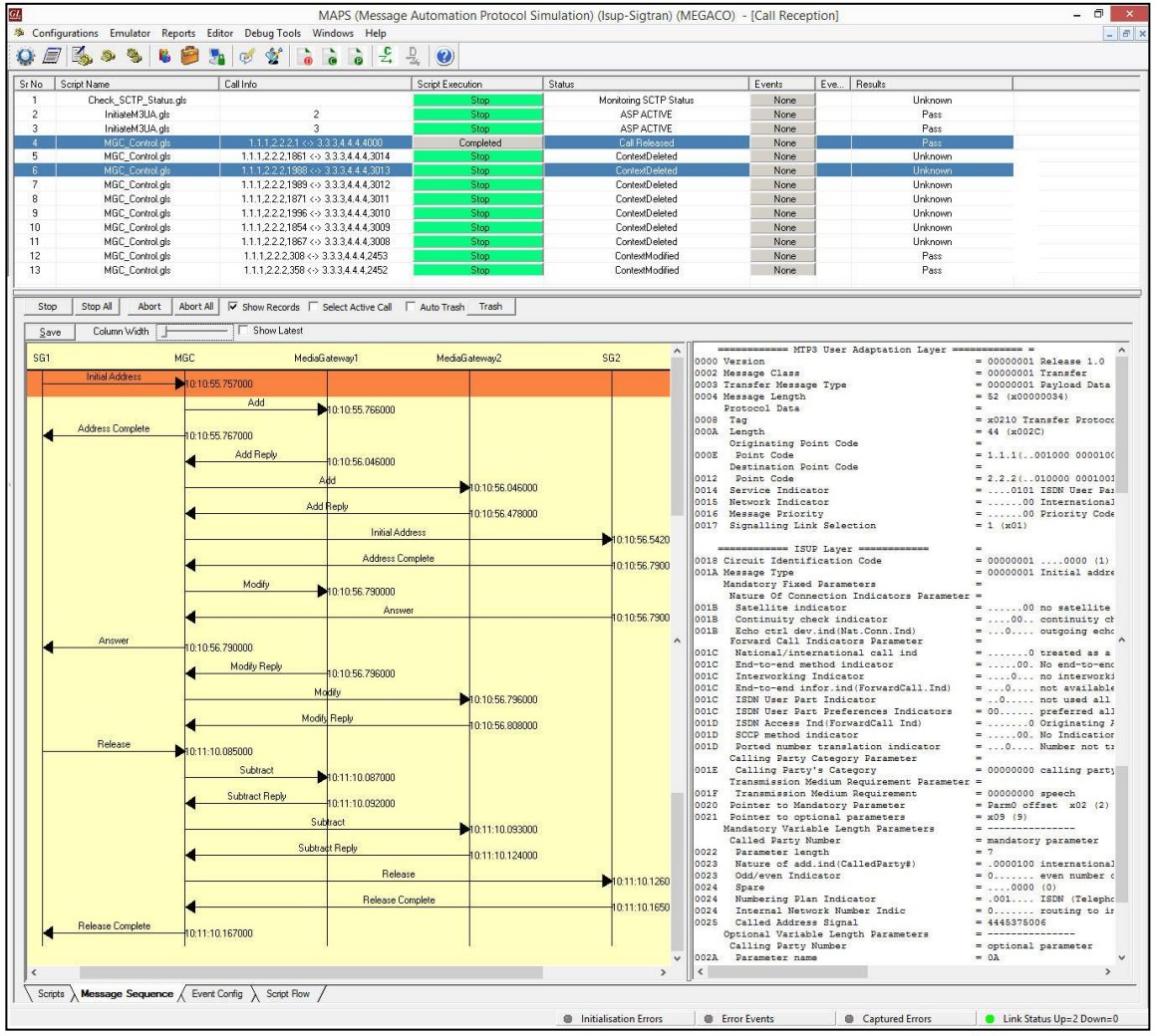
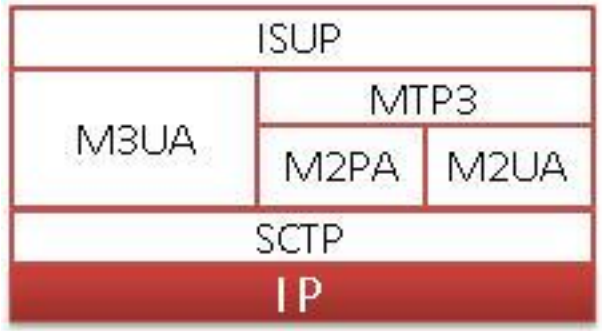
Multi-Interface Call Simulation

- 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 singling 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)



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

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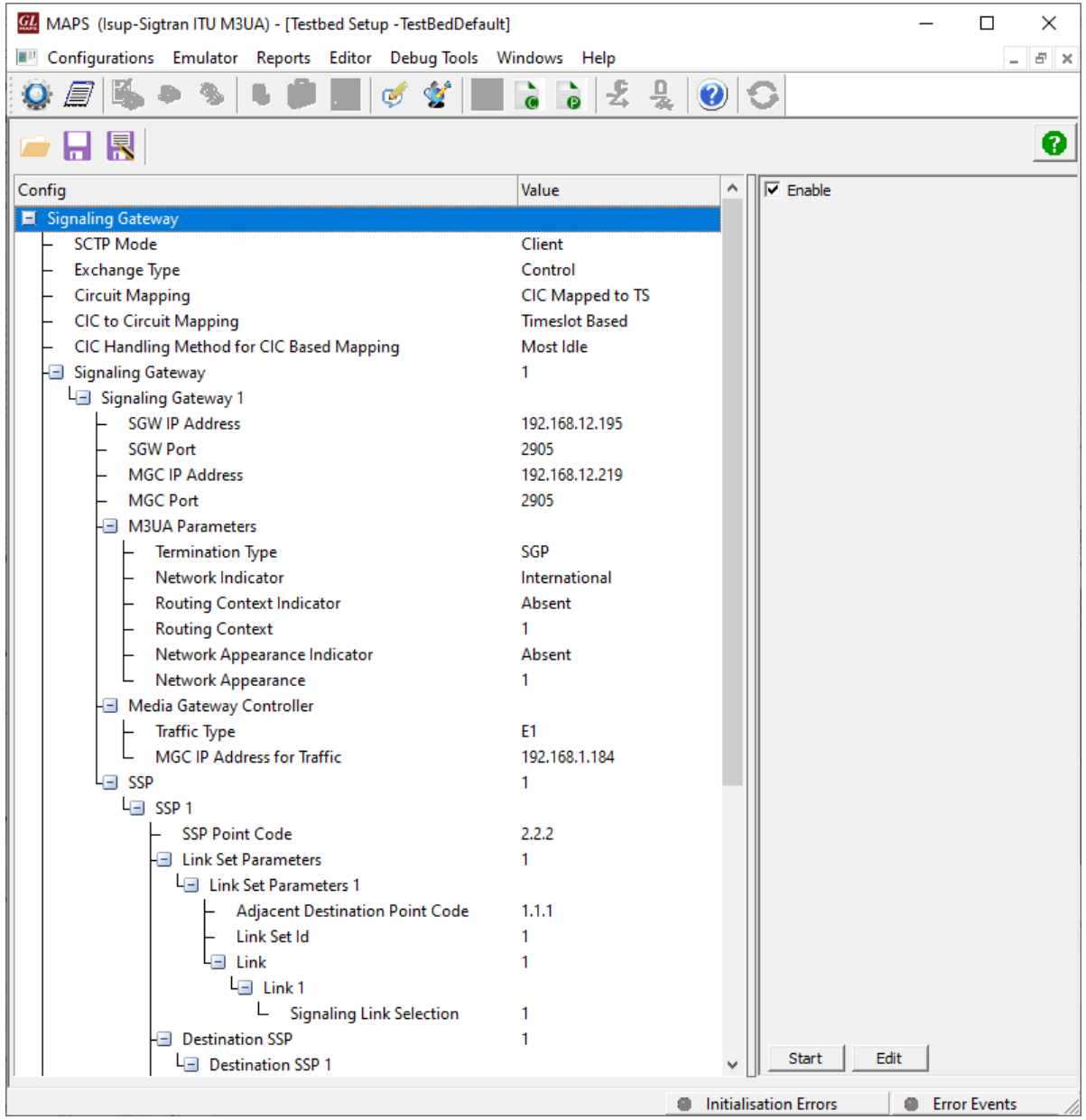
Testbed Setup Configuration



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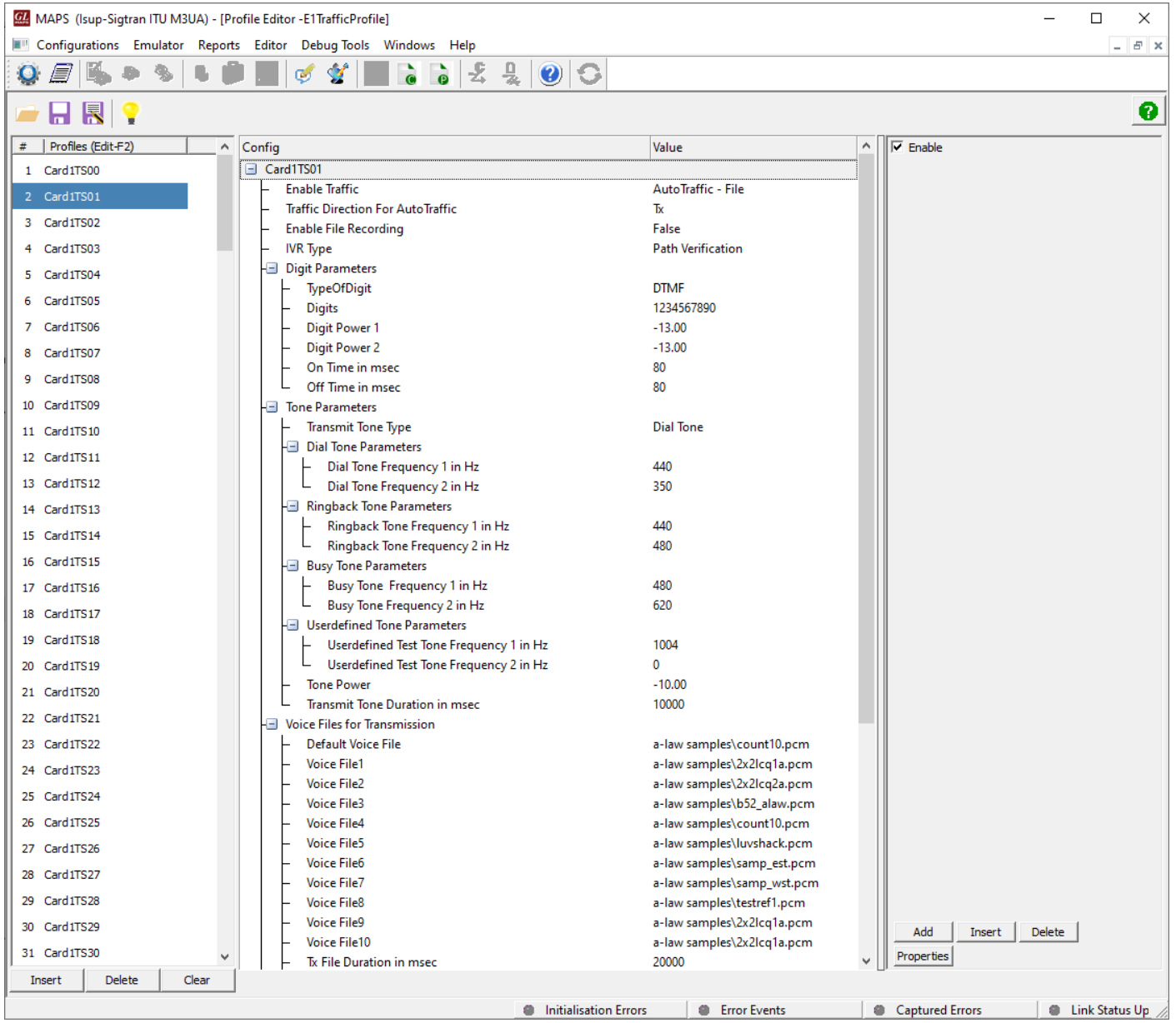
Profile Configuration



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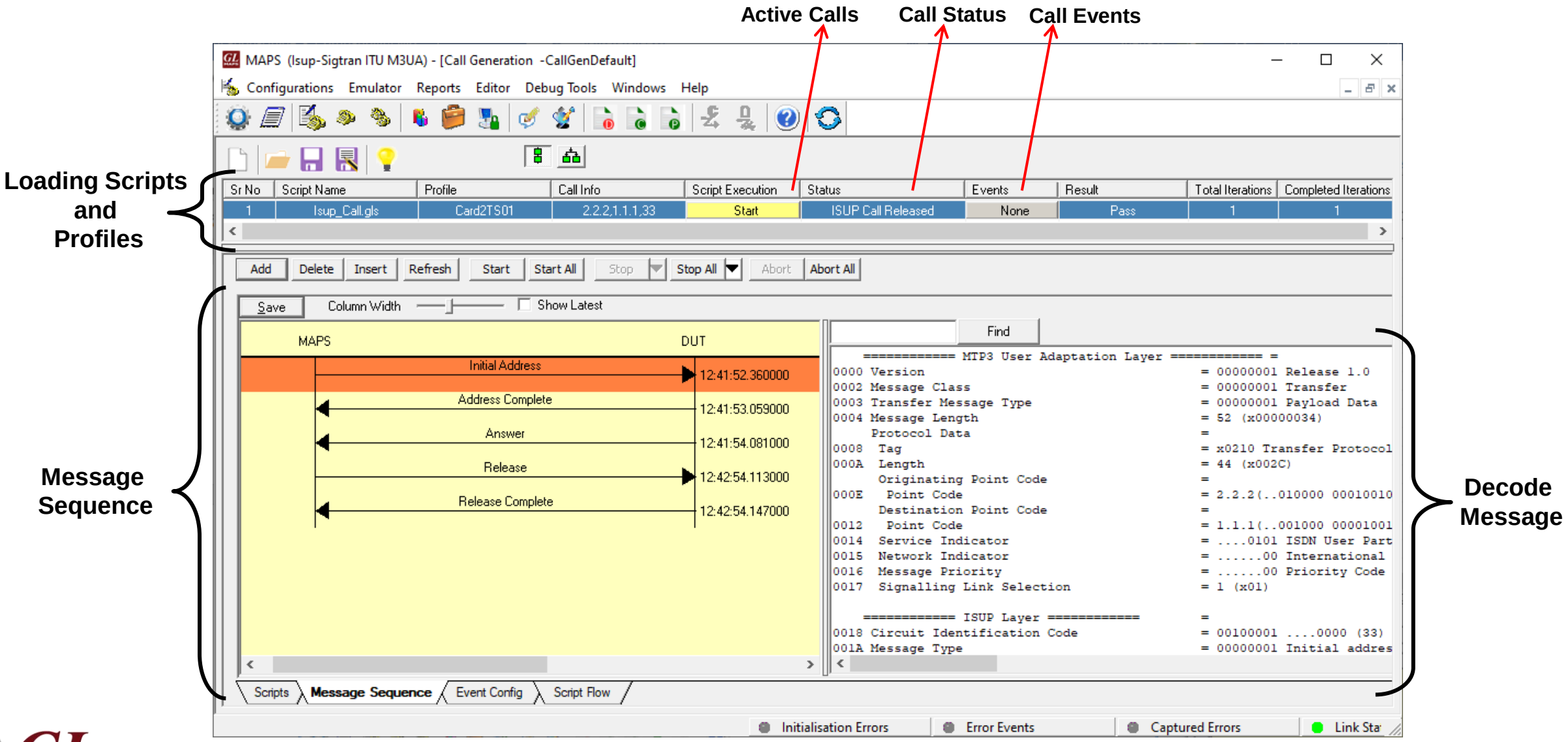
Basic Call Generation



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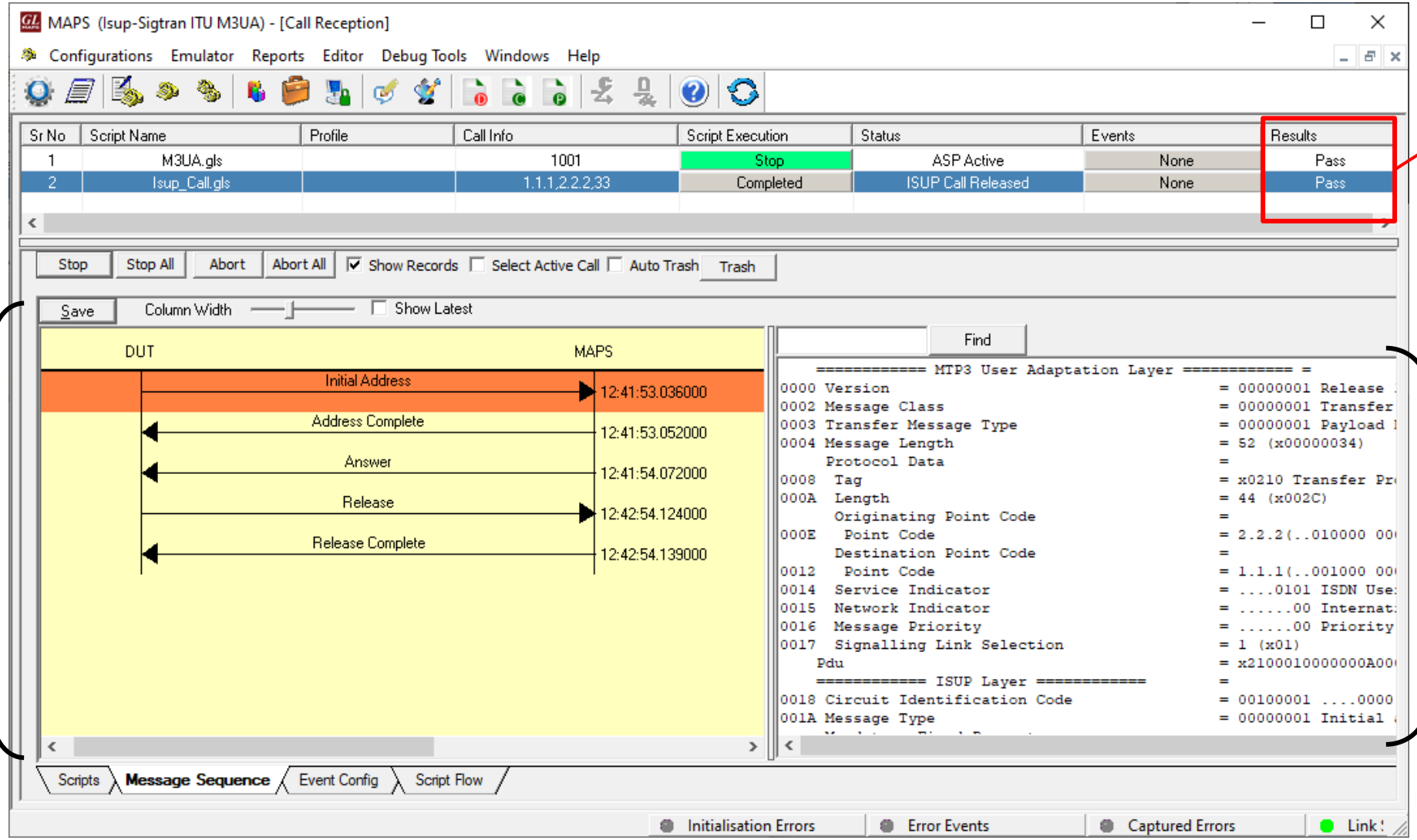
ISUP Call Reception



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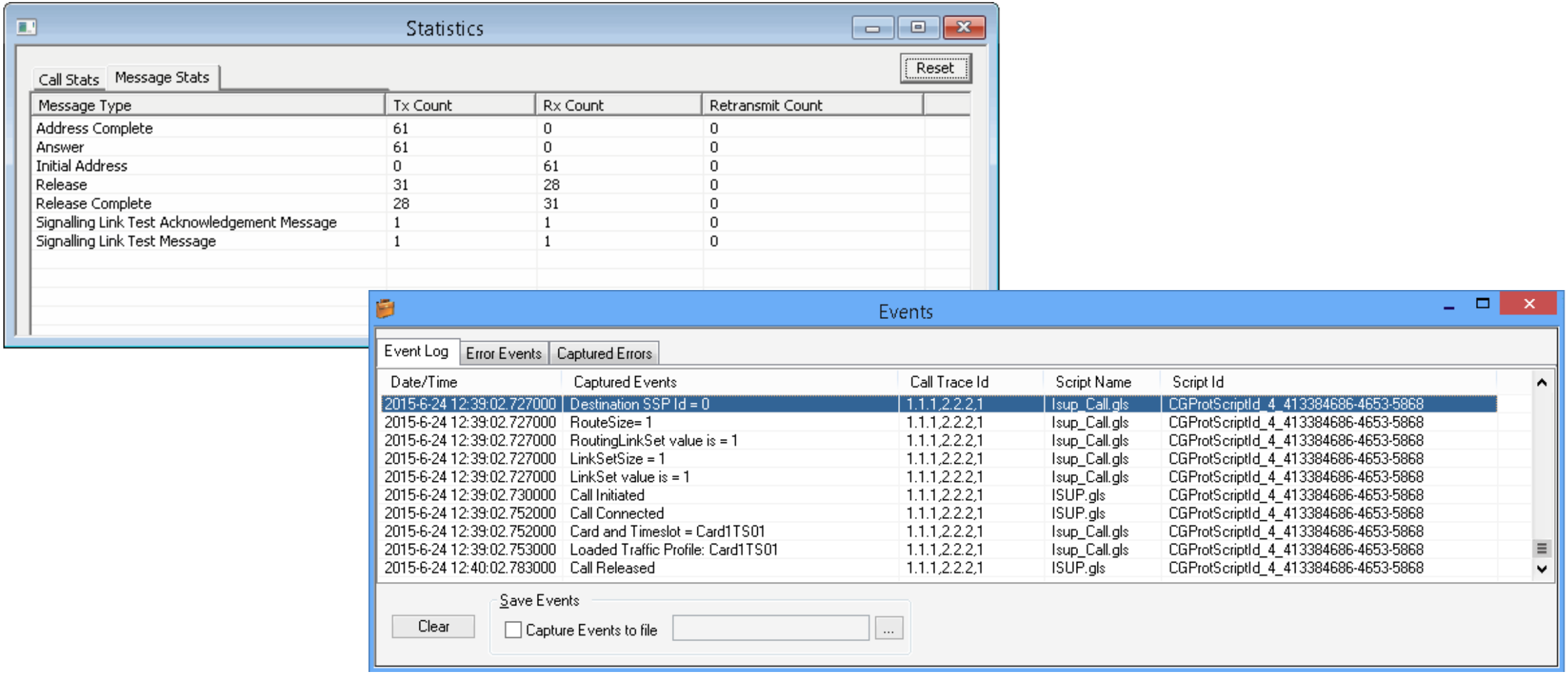
Call and Message Statistics



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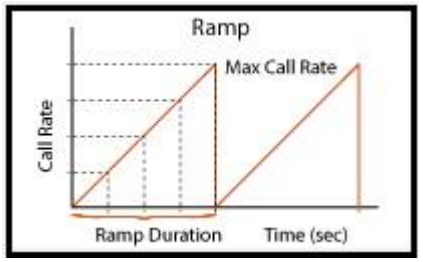
Load Generation

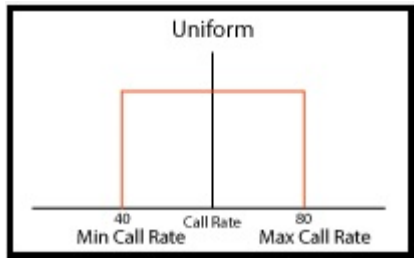
- Stability/Stress and Performance testing using Load Generation
- Different types of Load patterns to distribute load
- User can load multiple patterns for selected script
- User configurable Test Duration, CPS, Maximum and Minimum Call Rate etc.

Fixed

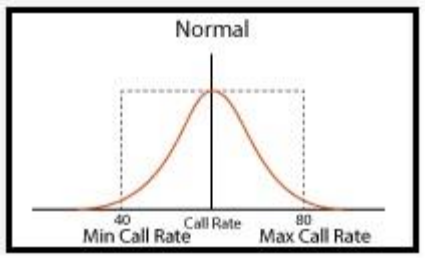
Ramp



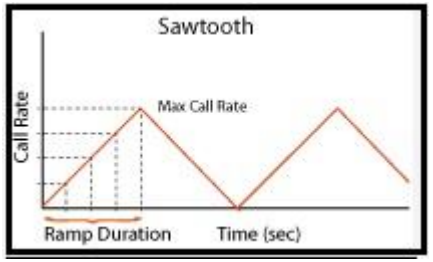
Uniform



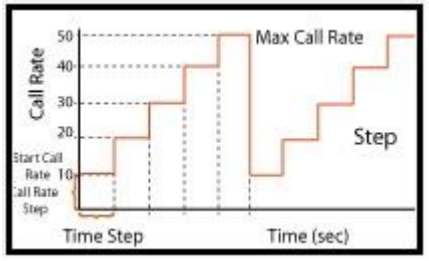
Normal

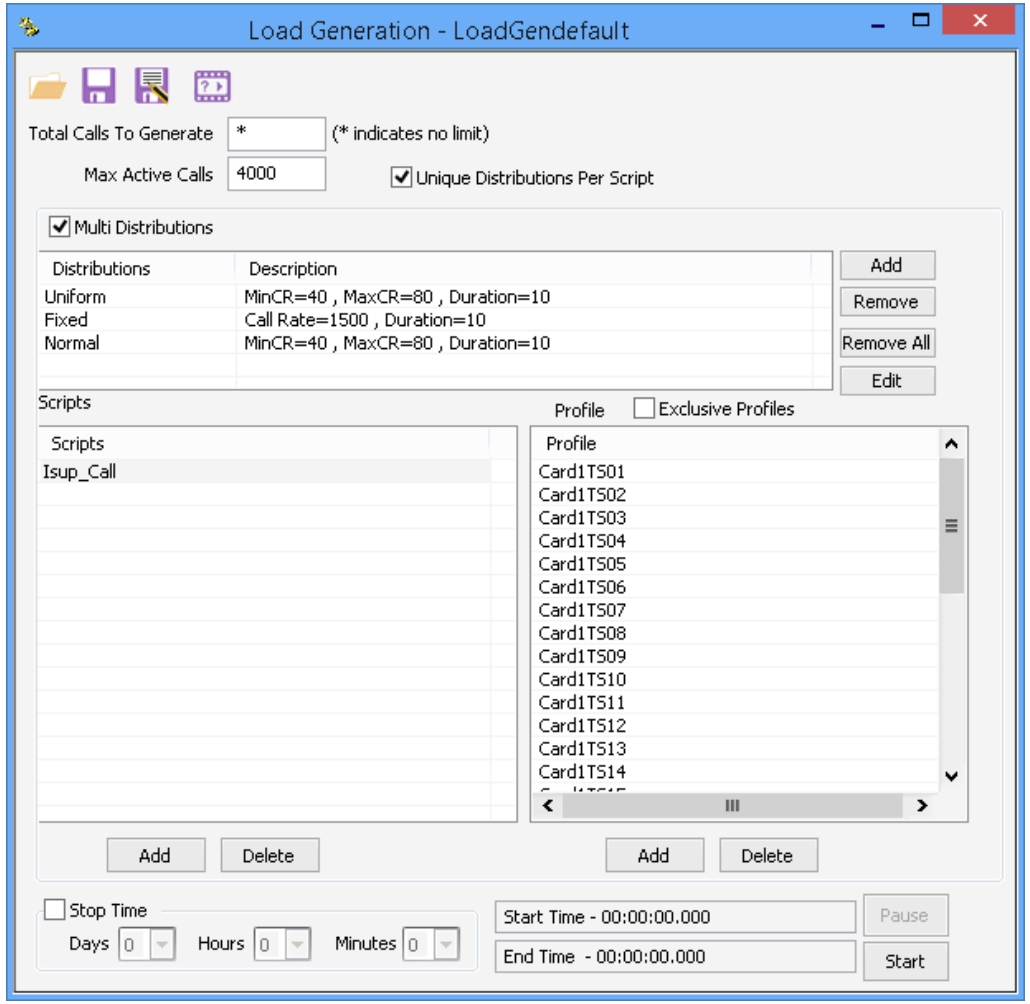


Saw-tooth



Step





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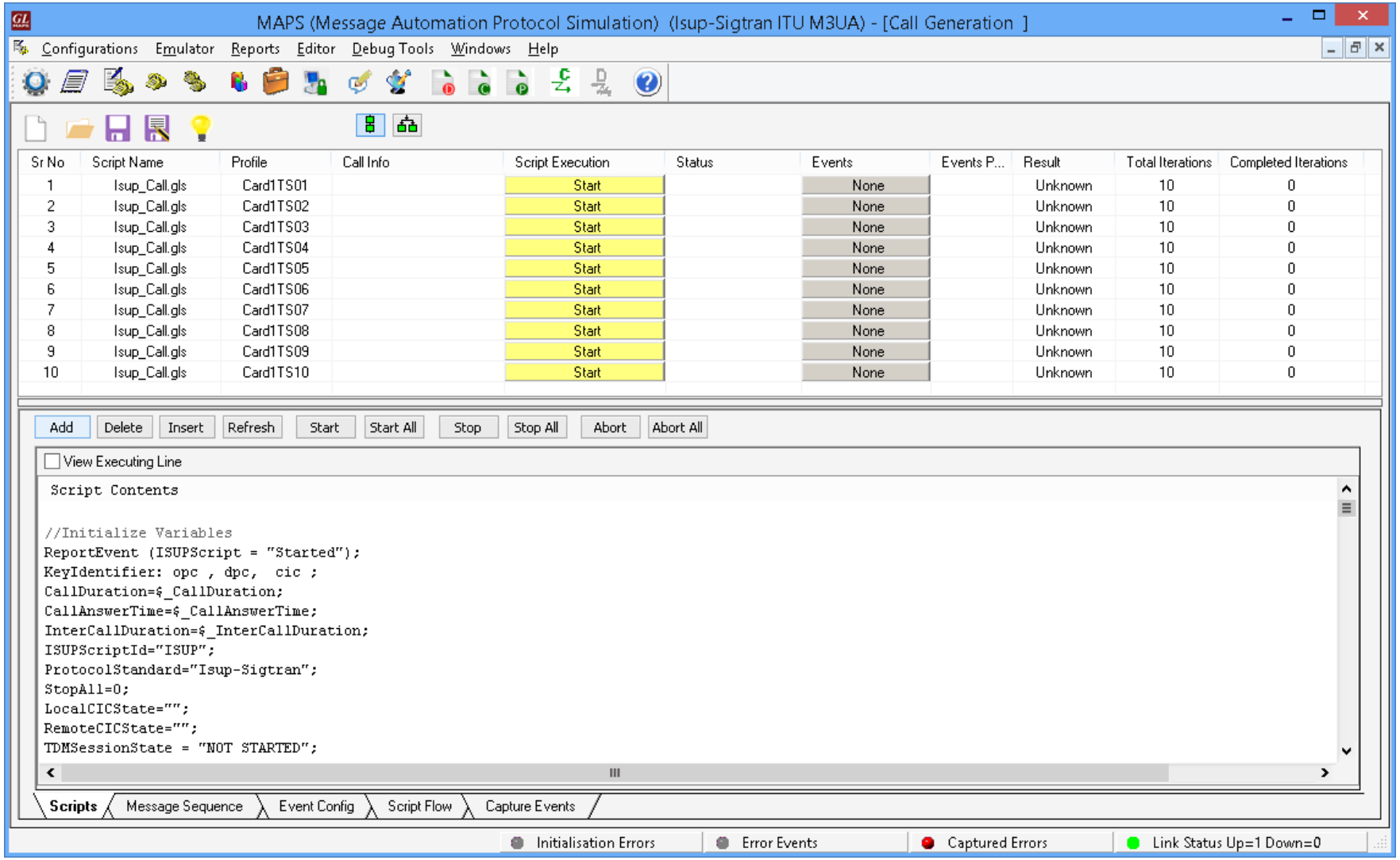
SS7 Sigtran Bulk Call Generation



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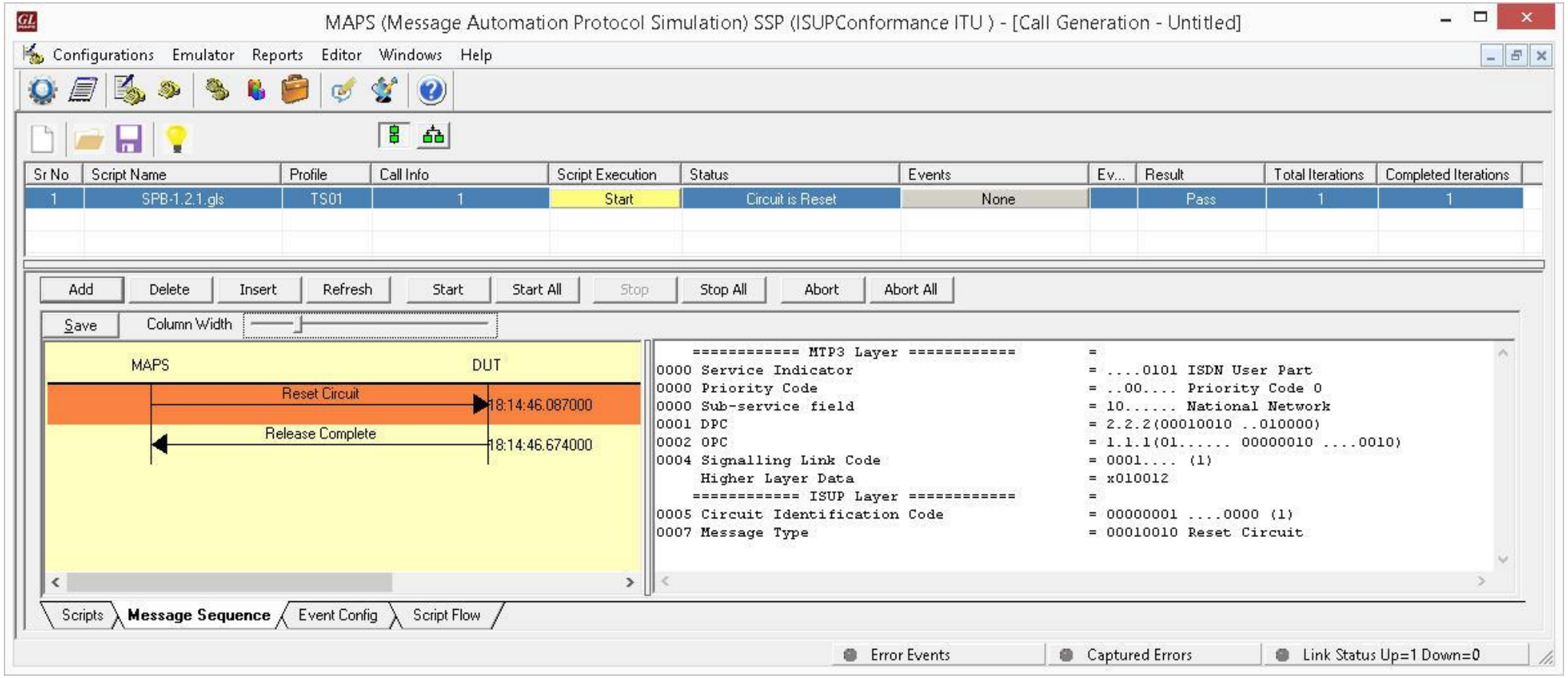
ISUP Conformance Testing (XX647)

ISUP Conformance Test Suite

SPB-1.2.1.gls (Reset of circuits)



- 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

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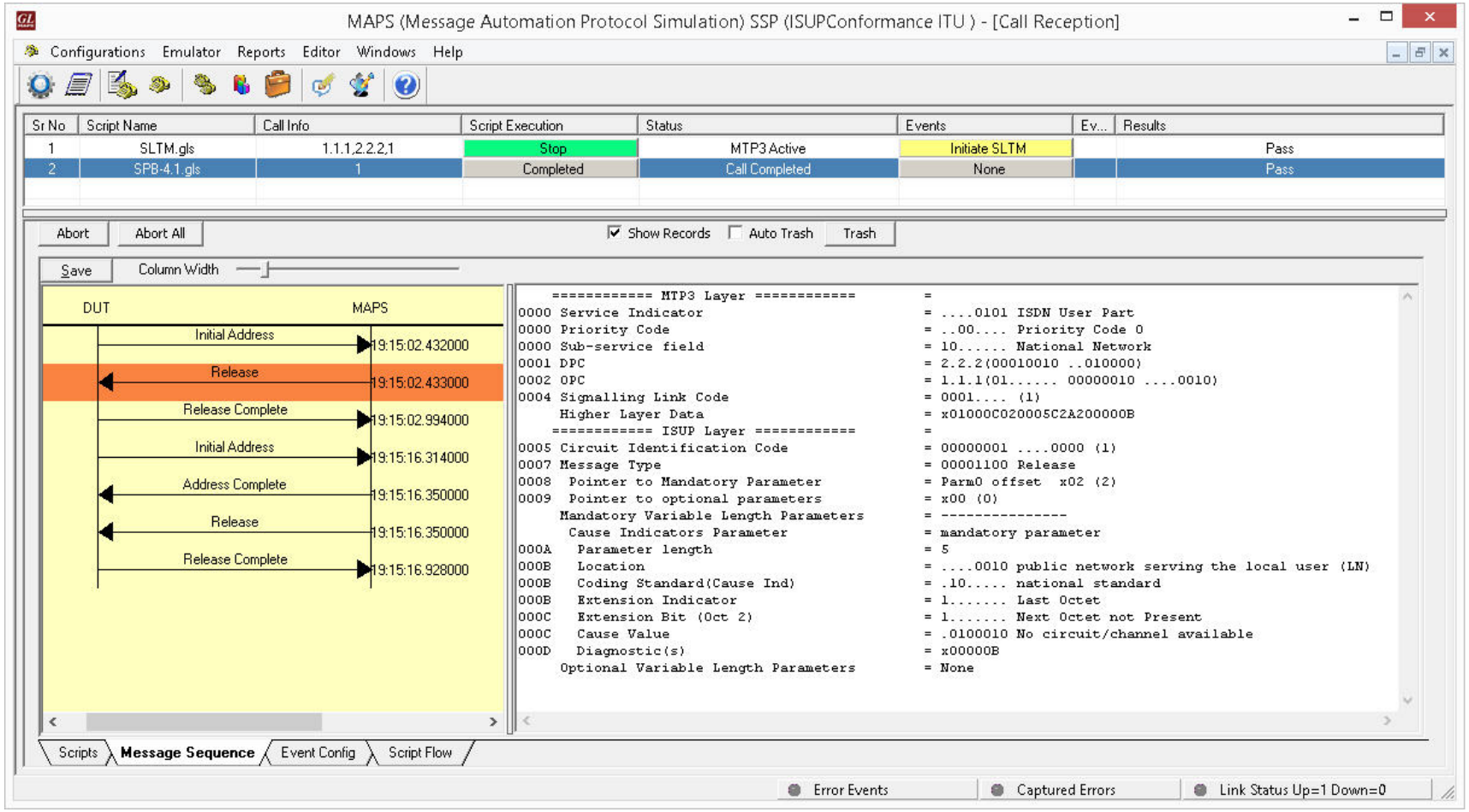
Unsuccessful Call Setup Conformance Test Case

SPB-4.1.gls script



- **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

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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;
```

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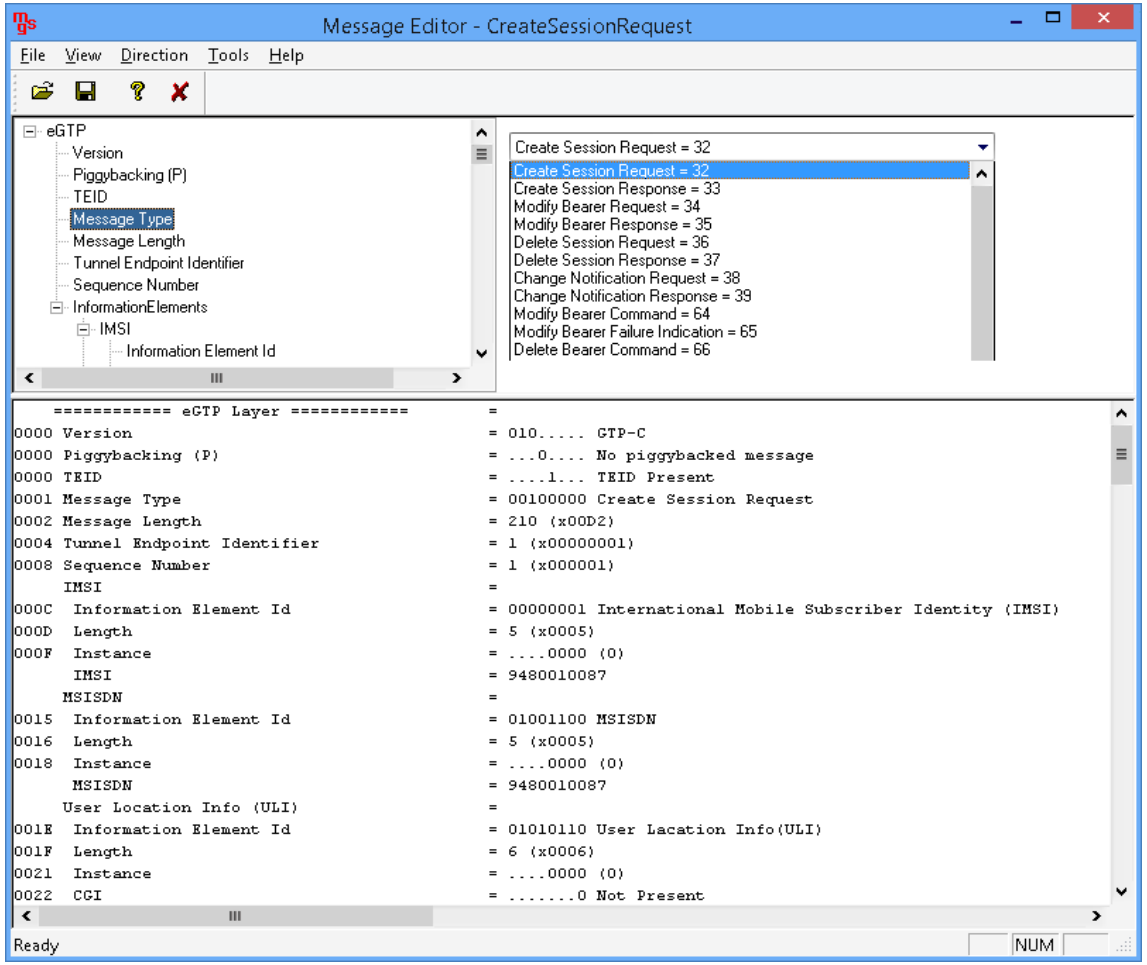
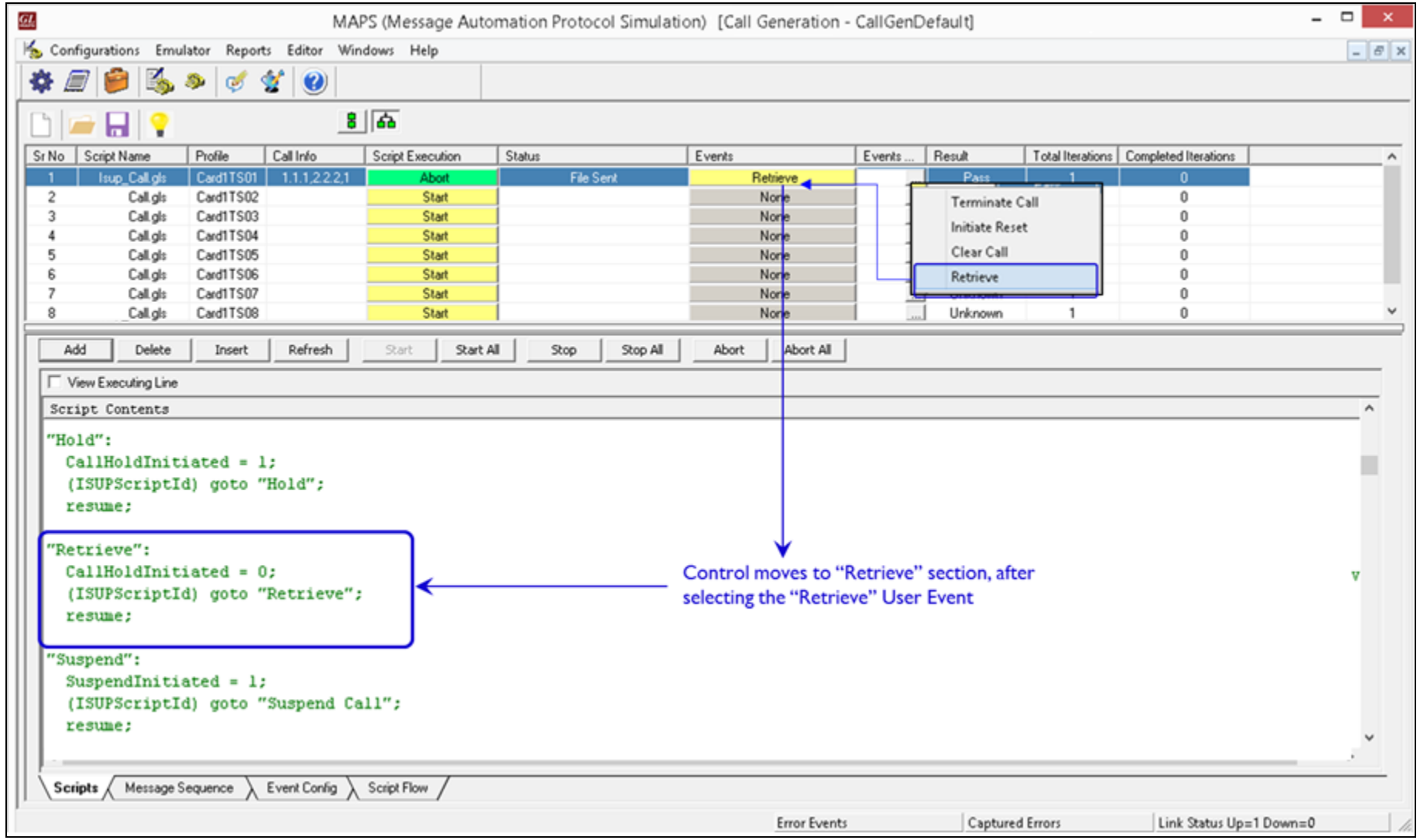
Customizations - Protocol Messages

- 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



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Customizations - Statistics and Reports

MOS, R-Factor

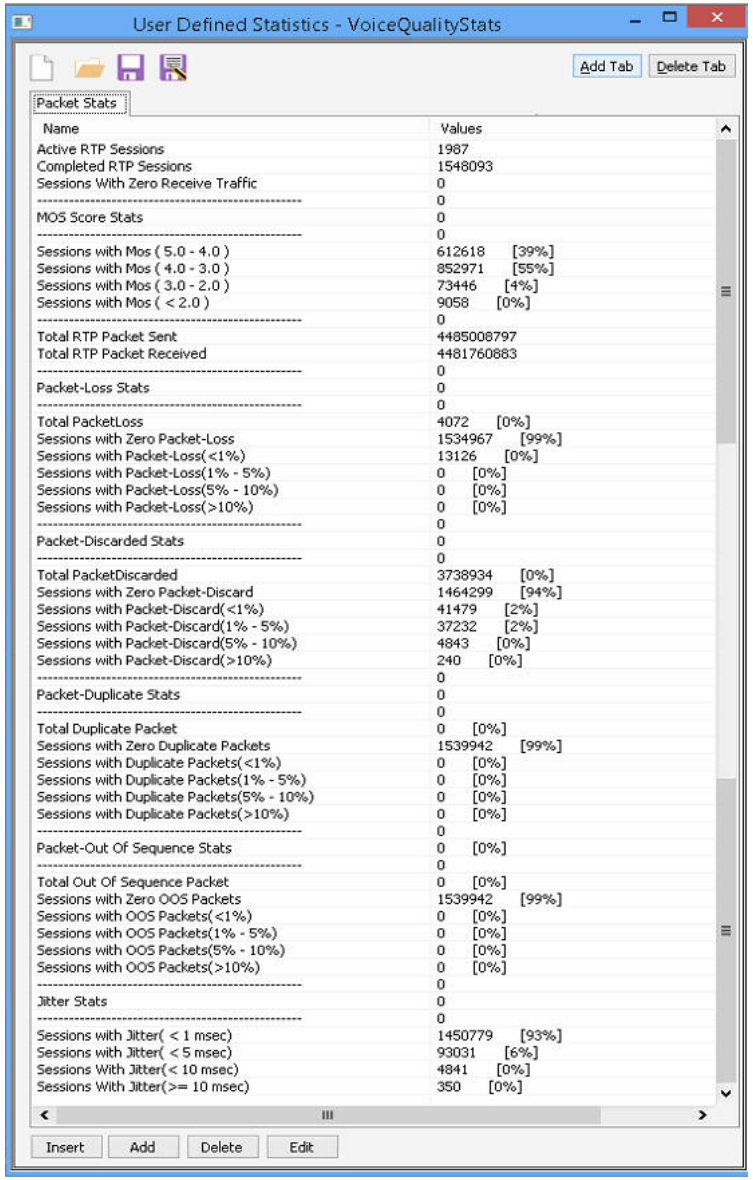
Packet Loss

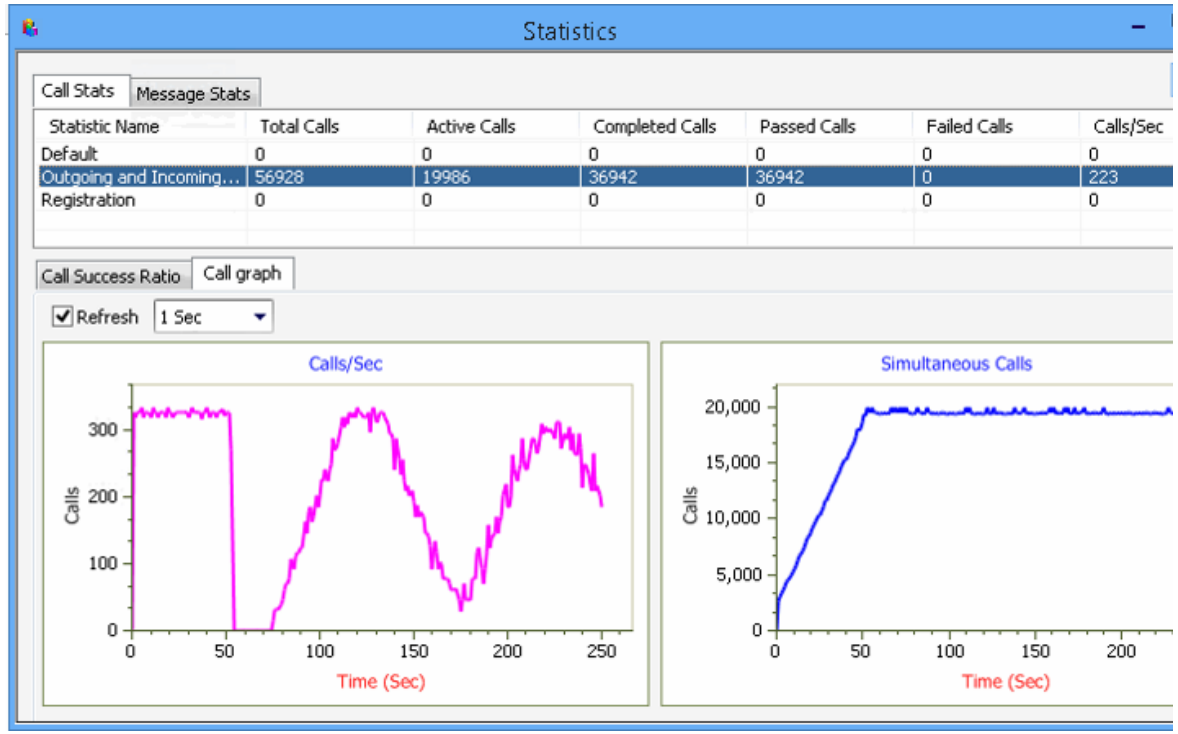
Packets Discarded

Duplicate Packets

Out-Of-Sequence Packets

Jitter Statistics





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

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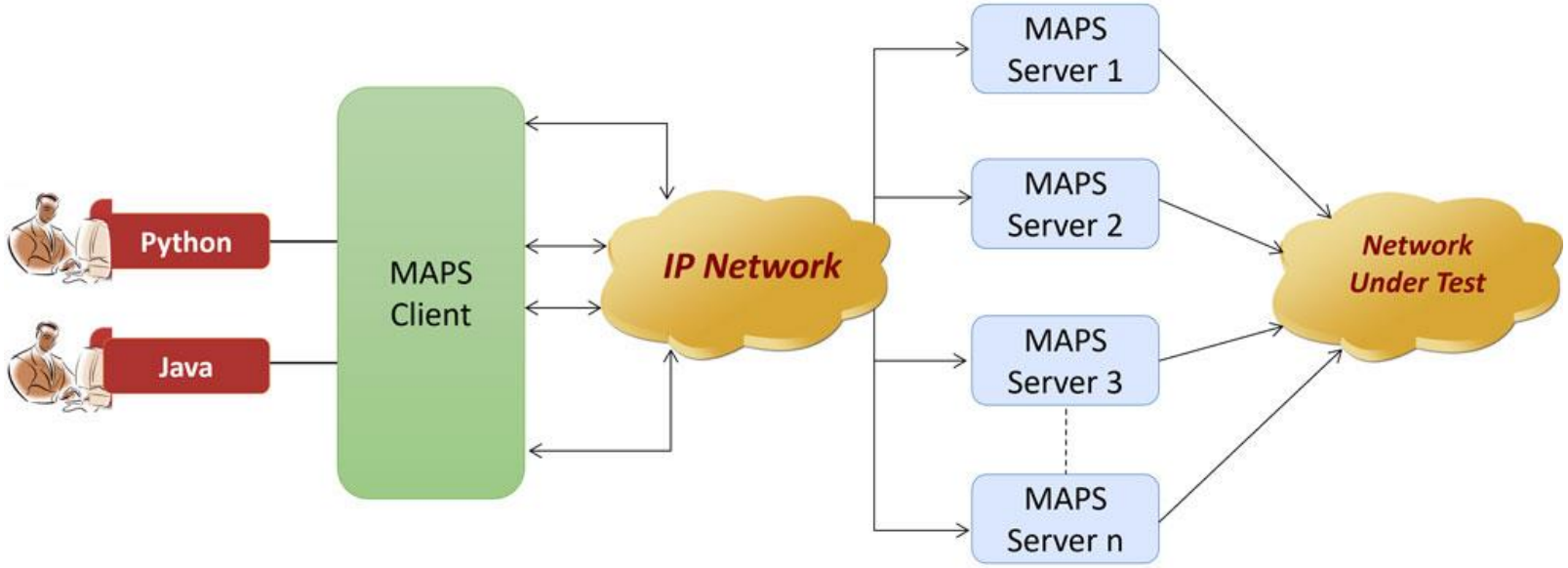
MAPS™ API Architecture

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



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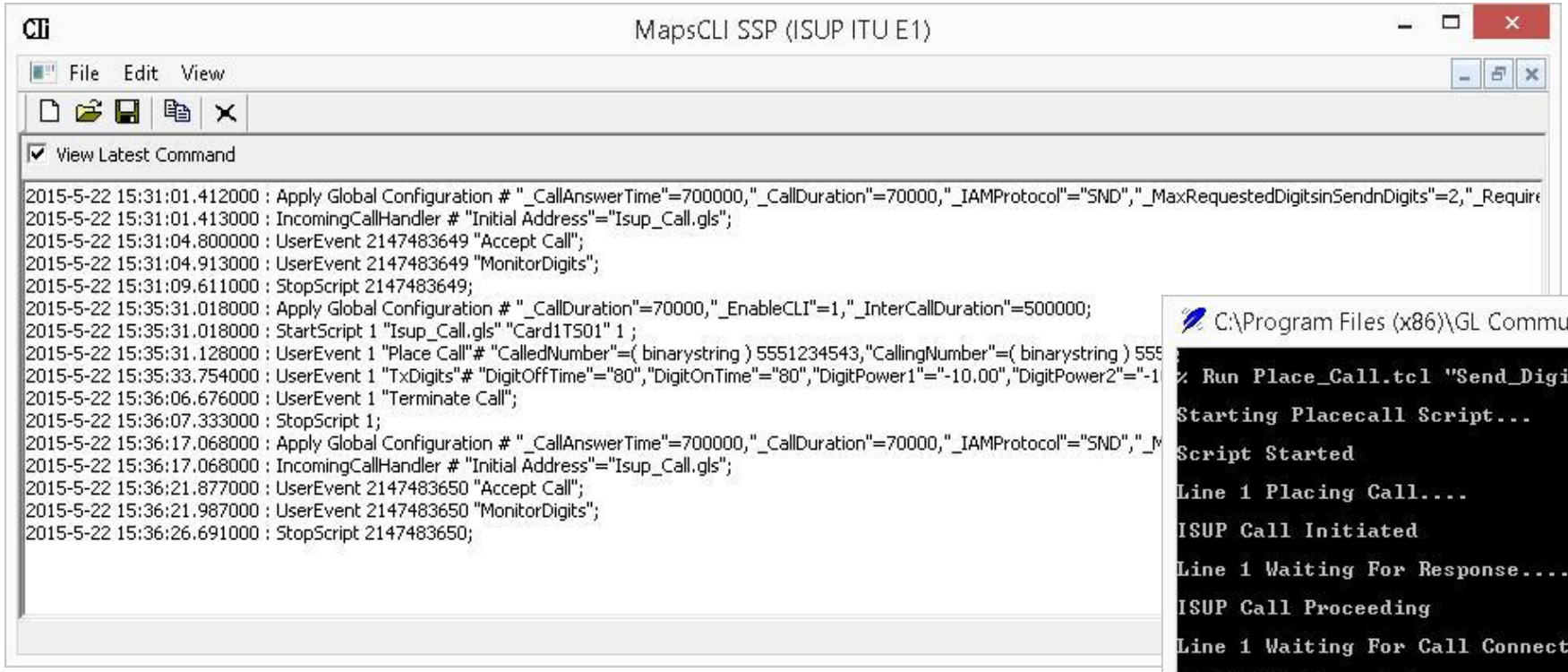
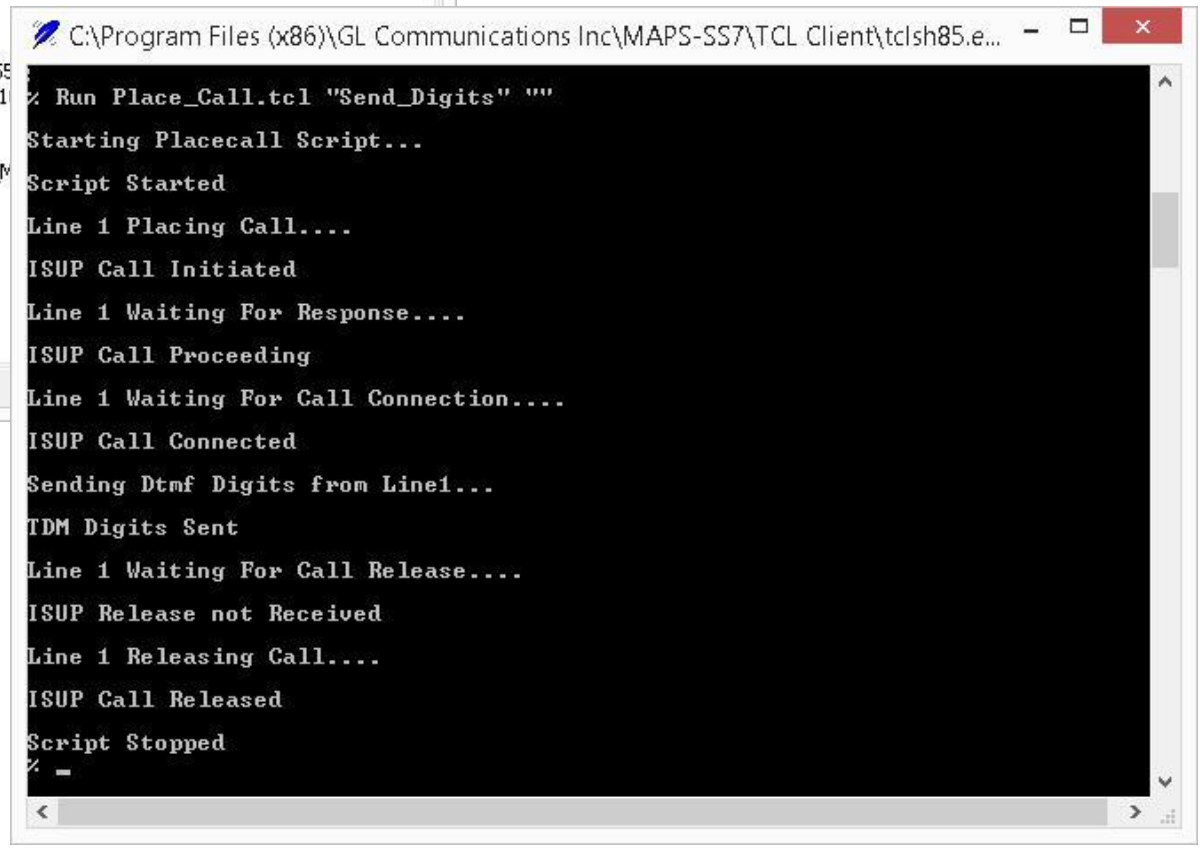
CLI Sample Scripts





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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

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Thank you

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