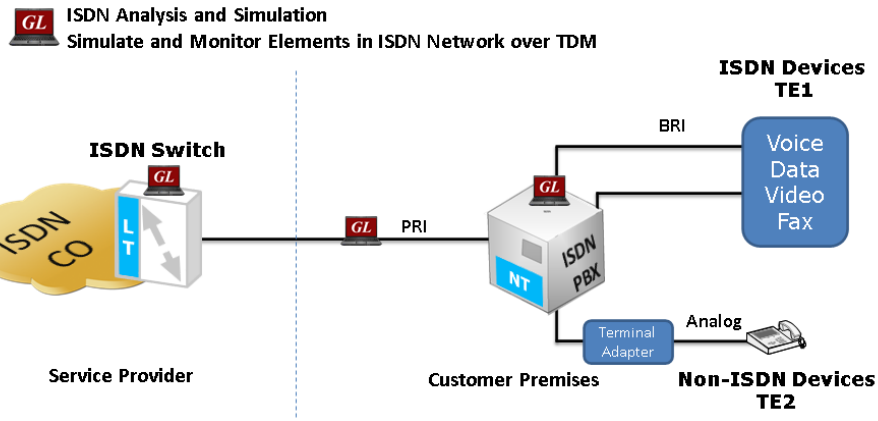
MAPS™ ISDN and LAPD Simulator

(Basic and Conformance Test Suite)



Overview

GL's **MAPS™ ISDN** is an advanced protocol simulator/tester for ISDN simulation over TDM (T1 E1) and generates high volumes of ISDN traffic. The tester can simulate ISDN signaling as defined by the ITU-T, 5ESS, 4ESS, BELL, DMS-100, DMS-250, and QSIG ECMA standards. MAPS™ application can also emulate signaling as per Q.921, referred to as LAPD (Link Access Protocol - D Channel), a Data Link protocol used over ISDN's D channel. MAPS™ ISDN can be configured to simulate ISDN calls on the trunks containing D-Channel using NFAS options.

With additional licensing **MAPS™ ISDN Conformance Test Suite** (# XX642) is also available to conform various ISDN and LAPD call states over T1 E1 as defined in the Q.931 and Q.921 standards.

MAPS™ emulates the ISDN network and generates high volumes of ISDN traffic. Using MAPS™ tool, users can place calls on a single or on all timeslots manually. Once the calls are established, the user may send/capture PCM voice files, send/detect DTMF/MF digits, and send/detect Tones. MAPS™ ISDN also incorporates the flexibility to modify ISDN and LAPD call parameters & message contents.

MAPS™ ISDN can be configured to simulate ISDN calls on the trunks that contain D-Channel using NFAS options. This allows a single D channel to control multiple PRI trunks.

For more details, refer to MAPS™ ISDN Protocol Emulator webpage.

Main Features

- ISDN Switch and Subscriber simulation over TDM (E1/T1)
- Ability to generate high volumes of ISDN traffic over established calls – DTMF/MF digits, voice files, single /dual tones
- Example scenarios supported in ISDN conformance Test Suite
  - Verification of Device behavior for valid, invalid and inopportune events in a given state
  - Verification of Bearer capability negotiation
  - Verification of device behavior for valid and invalid Information elements
  - Verification and Validation of protocol related timers
  - Sequence Number Verification in Lap-D
  - Verification of Re-Transmission of messages in a given state
- Multiple T1 E1 line interfaces supported
- Access to all ISDN Message Parameters such as Call Reference Value, Called Number, Calling Number, Release Cause, and more
- Provides various release cause codes such as rejected, no user response, user busy, congested, and so on to troubleshoot the problems in ISDN
- Send/receive traffic over established calls - PCM voice files, DTMF/MF digits, and tones
- Supports NFAS testing for T1 only
- Bulk Call Simulation for Performance testing, Load testing, Functional testing, and Regression testing of network elements

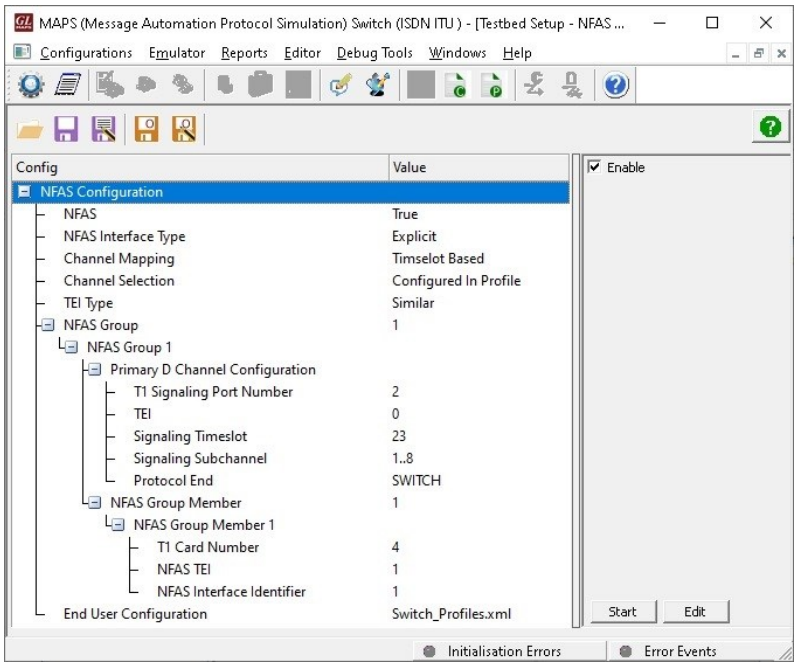
GL Communications Inc.

818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A

(Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com

Testbed Setup Configuration

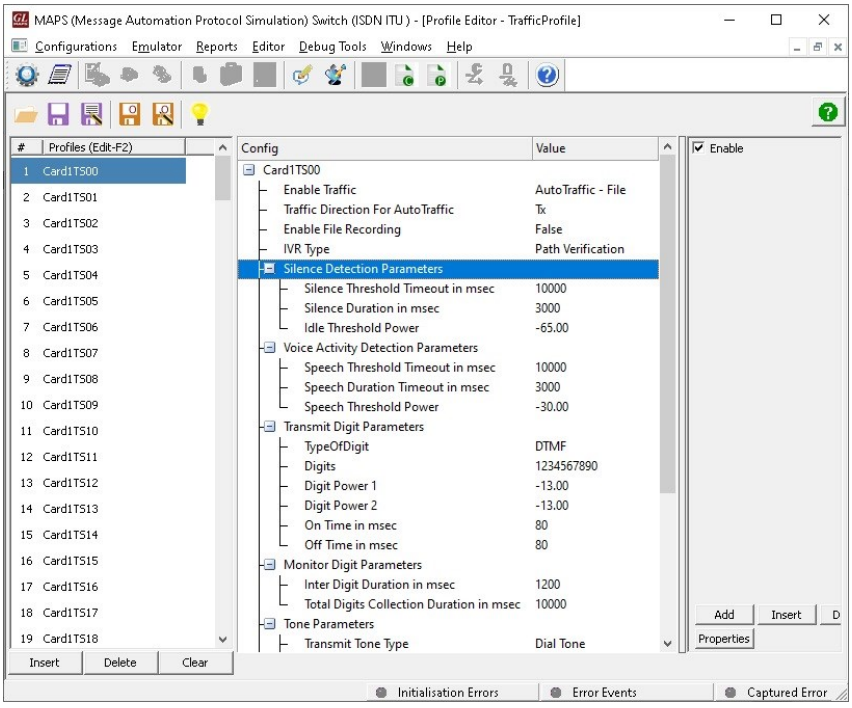
Test Bed setup is provided to establish communication between MAPS™ ISDN and the DUT. It includes NFAS grouping and interface type settings, Primary D channel configurations with signaling ports and timeslots to transmit and receive ISDN messages. Default profile is used to configure end-user (Subscriber or Switch) parameters.



Pre-processing Tools

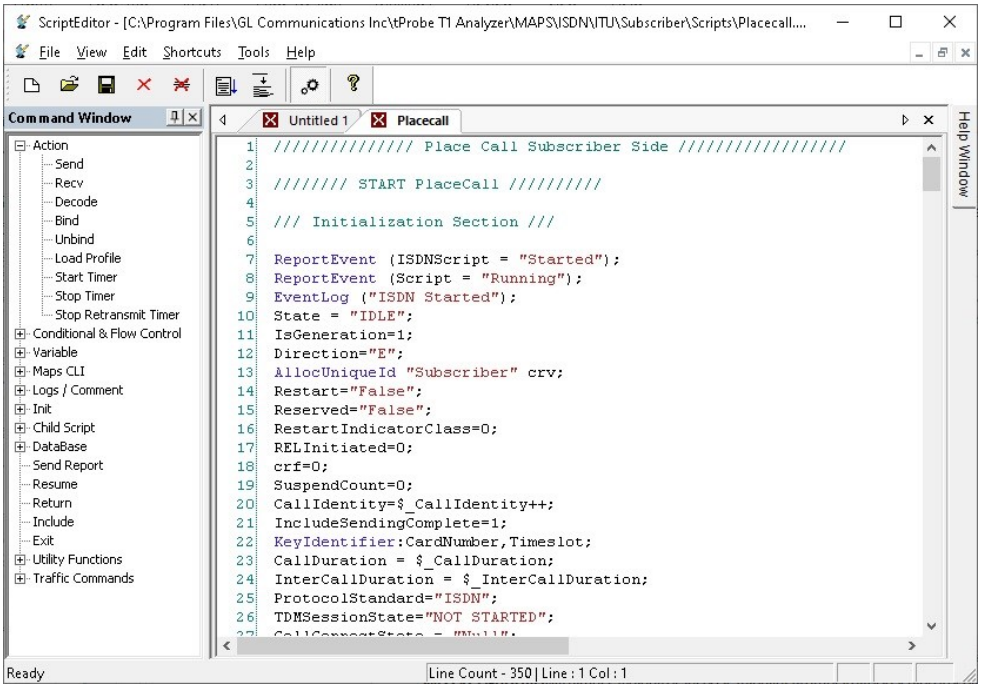
PROFILE EDITOR - This feature allows loading profile to edit the values of the variables using GUI, replacing the original value of the variables in the message template. An XML file defines a set of multiple profiles with varying parameter values that allow users to configure call instances in call generation and to receive calls.

Users can configure the traffic options for Auto traffic type or User-defined traffic type. Supported traffic configuration includes Send/ Receive file, DTMF/MF digits, and Single/Dual tones.

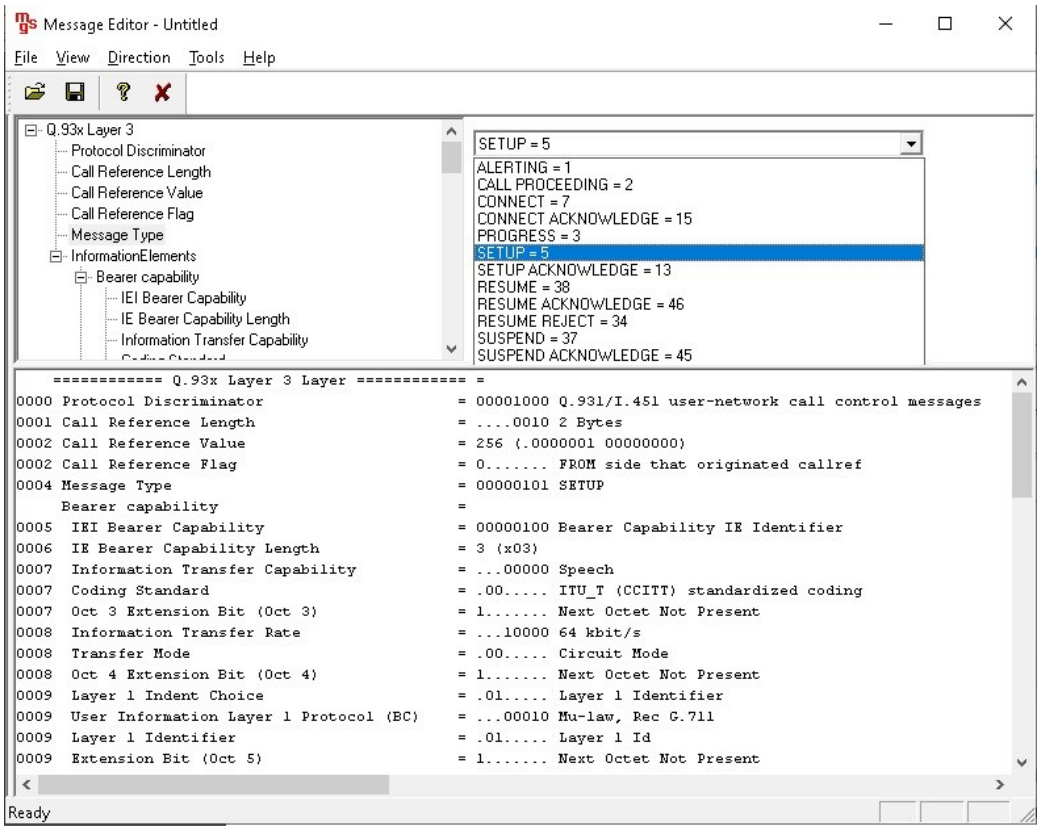


Pre-processing Tools...

SCRIPT EDITOR - The script editor allows the user to create / edit scripts and access protocol fields as variables for the message template parameters. The script uses pre-defined message templates to perform send and receive actions.



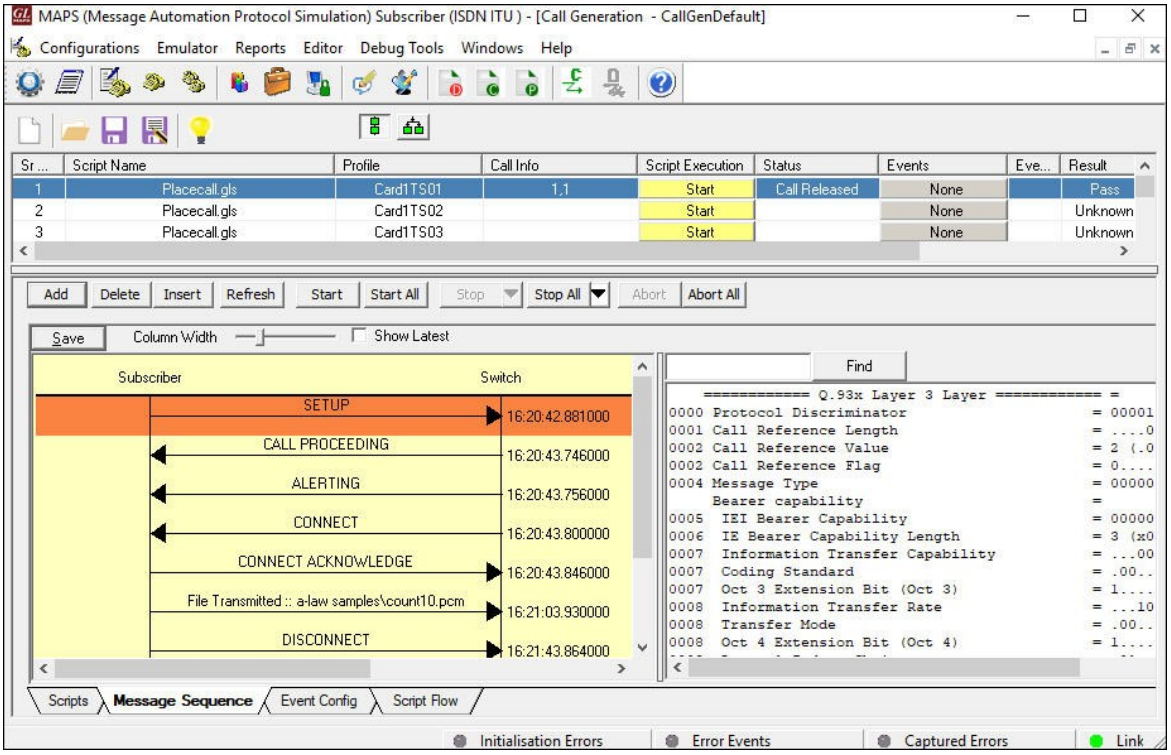
MESSAGE EDITOR - With message editor, users can build a template for each protocol message type. The value for each field may be changed in the message template prior to testing. The protocol fields comprises of mandatory fixed parameters, mandatory variable parameters, and optional variable parameters.



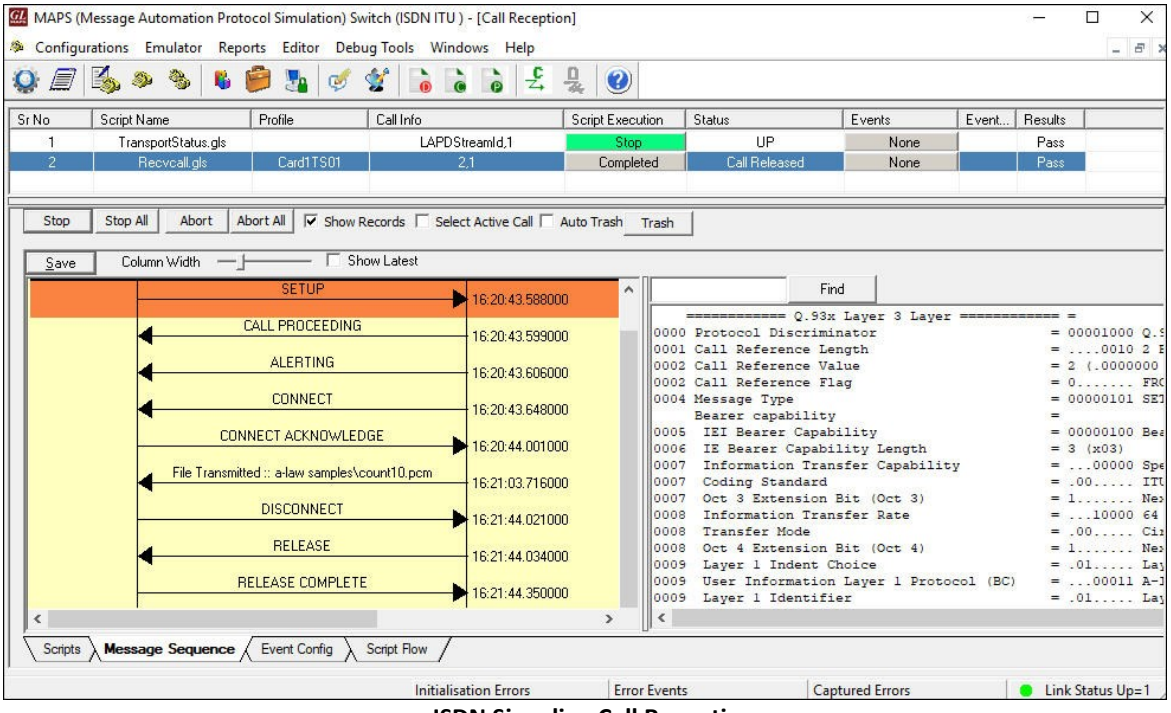
Call Generation and Reception

In call generation, MAPS™ is configured for the out going messages, while in call receive mode, it is configured to respond to incoming messages. Tests can be configured to run once, multiple iterations and continuously. Also, allows users to create multiple entries using quick configuration feature.

The editor allows to run the added scripts sequentially (order in which the scripts are added in the window) or randomly (any script from the list of added script as per the call flow requirements). The test scripts may be started manually or they can be automatically triggered by incoming messages.

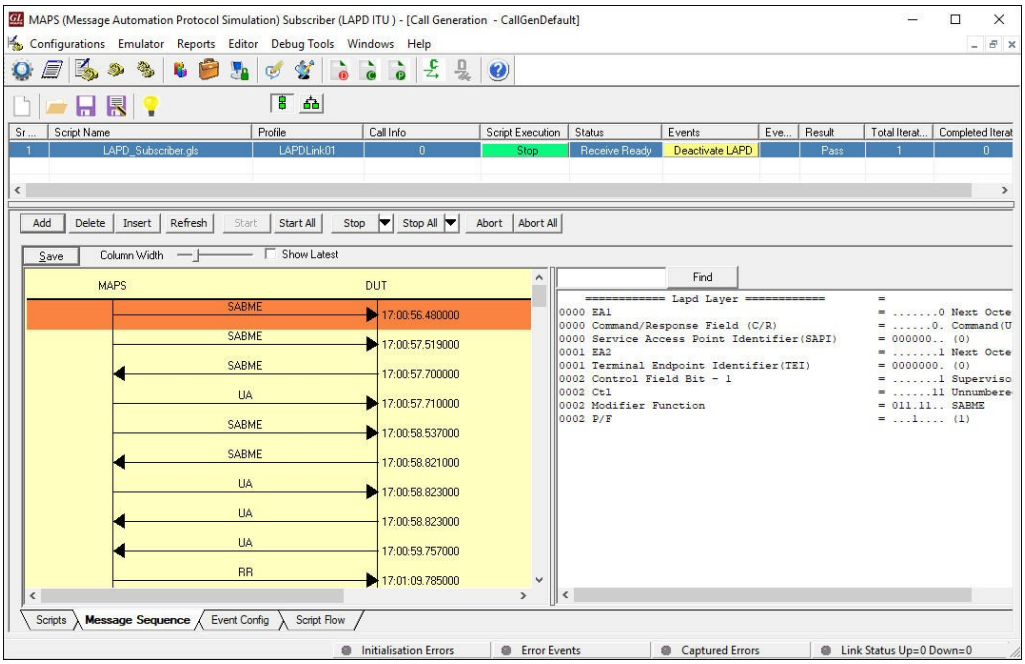


ISDN Signaling Call Generation



ISDN Signaling Call Reception

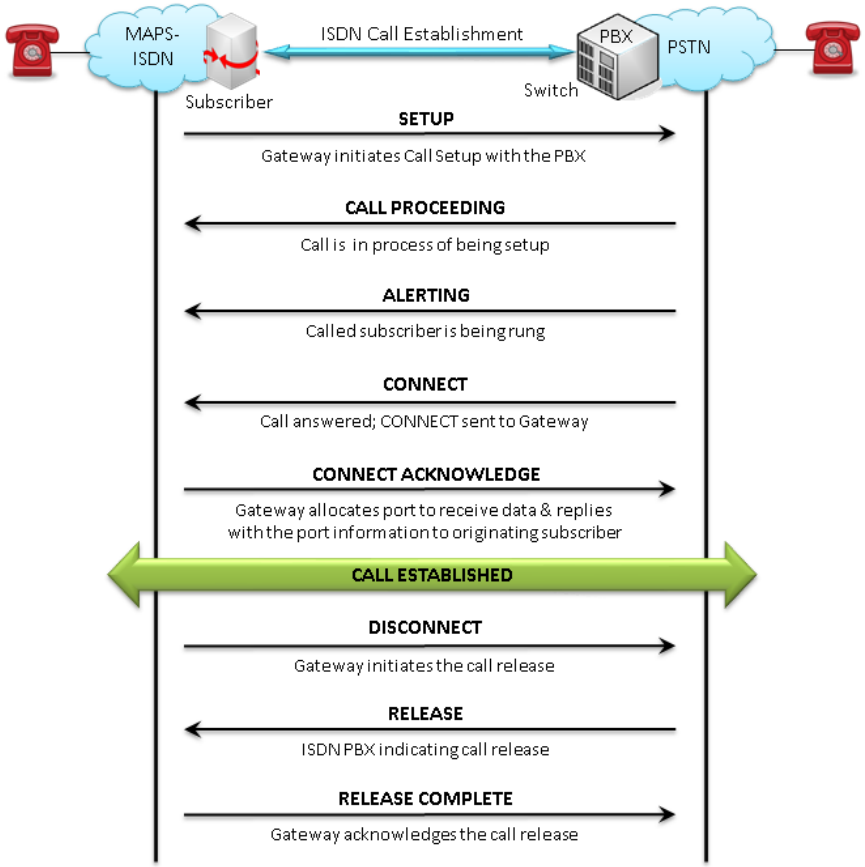
Call Generation and Reception..



LAPD Signaling Call Generation

Typical ISDN Call Signaling

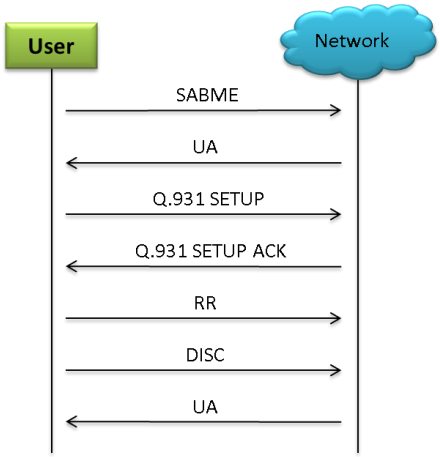
MAPS™ ISDN can be configured to act as Caller (Subscriber) initiating the call by sending SETUP message to the DUT. MAPS™ ISDN can also be configured as Switch (DUT) at network end receiving calls and generating responses.



Typical ISDN Call Scenario

Typical LAPD Call Signaling

MAPS™ LAPD can be configured to act as Caller (Subscriber) initiating the signaling by sending SABME message to the DUT. MAPS™ LAPD application can also be configured on the network side as Switch receiving the calls and generating responses.

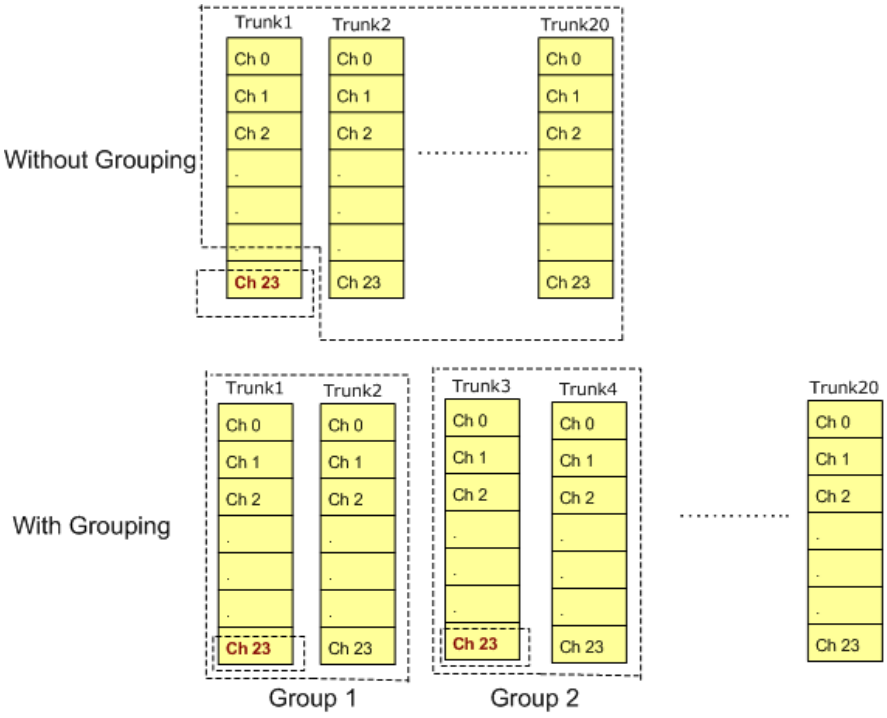


Typical LAPD Call Scenario

NFAS (Non-Facility Associated Signaling)

NFAS is a standard option available for ISDN PRI call processing system that allows a single D channel to control multiple PRI trunks, resulting in freeing up one channel on each trunk to carry other traffic.

NFAS grouping allows number of trunks to be classified into groups, with each group having a unique D-Channel identifier. Each NFAS group can consist of a trunk containing the primary D-channel and up to 19 additional trunks (supporting a maximum of 479 B-channels). This is illustrated as shown in the figure below.



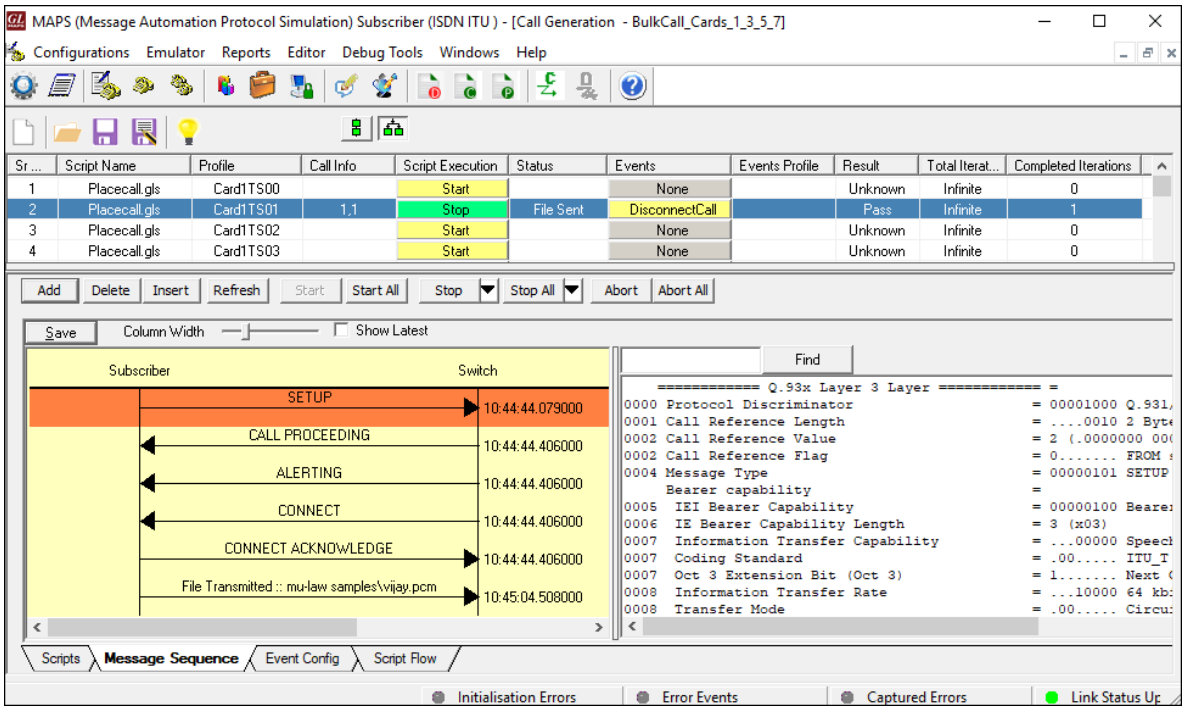
NFAS Grouping Illustration

In the above example, two Dual-HD T1 cards are considered, which provide 4 trunks, say Trunk 1, Trunk 2, Trunk 3, and Trunk 4.

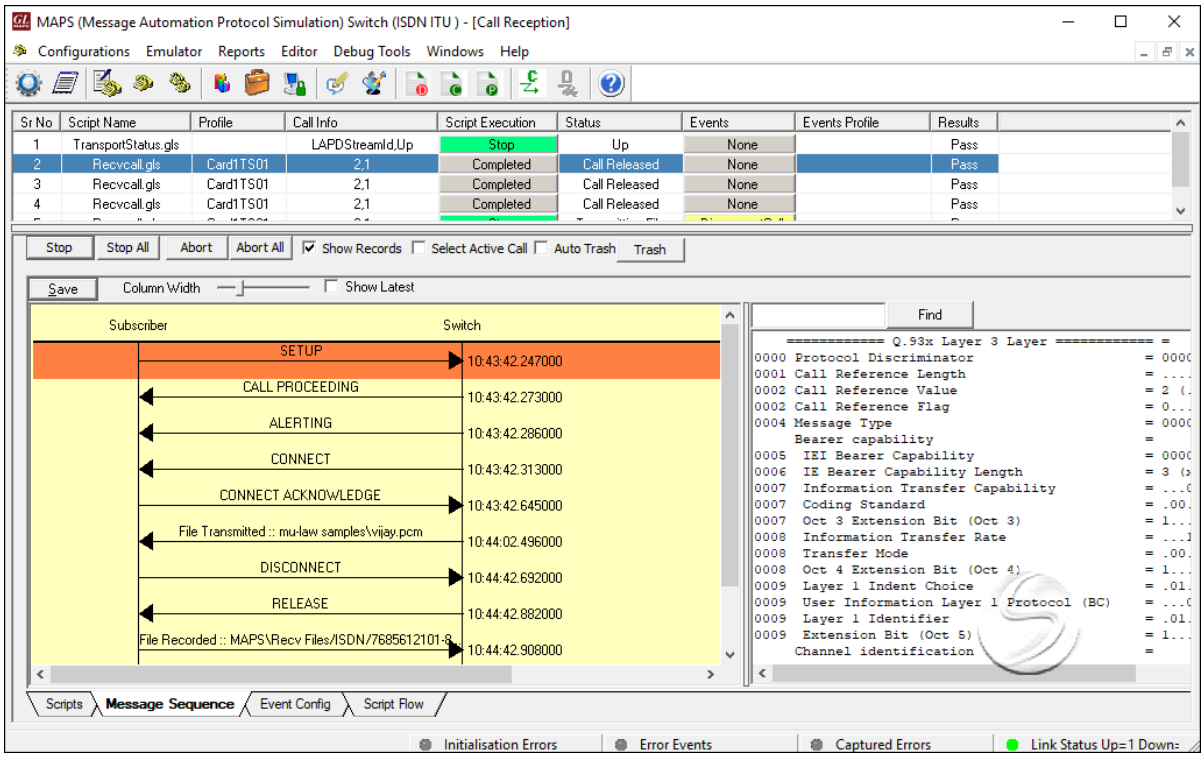
For NFAS grouping of Trunk 1-Trunk 2 (Group 1), and Trunk 2-Trunk 4 (Group 2), one trunk in each NFAS group must be set as 'Primary D-Channel'. Here, Trunk 1 will be the Primary D-Channel in NFAS group 1 and Trunk 3 will be the Primary D-Channel in NFAS group 2.

NFAS Call Simulation

MAPS™ ISDN is capable of simulating ISDN calls with or without NFAS option. MAPS™ ISDN can be configured to simulate ISDN calls on the trunks that contain D-Channel using NFAS options. This allows a single D channel to control multiple PRI trunks. With NFAS option, a single D-channel can control a maximum of 479 B-channels, i.e., up to 20 trunks (or a maximum of 478 with one B-channel as a back-up). In case of GL's Dual T1/E1 Analyzer, a maximum of 95 B-Channels, i.e., up to 4 trunks is supported.



NFAS Call Generation

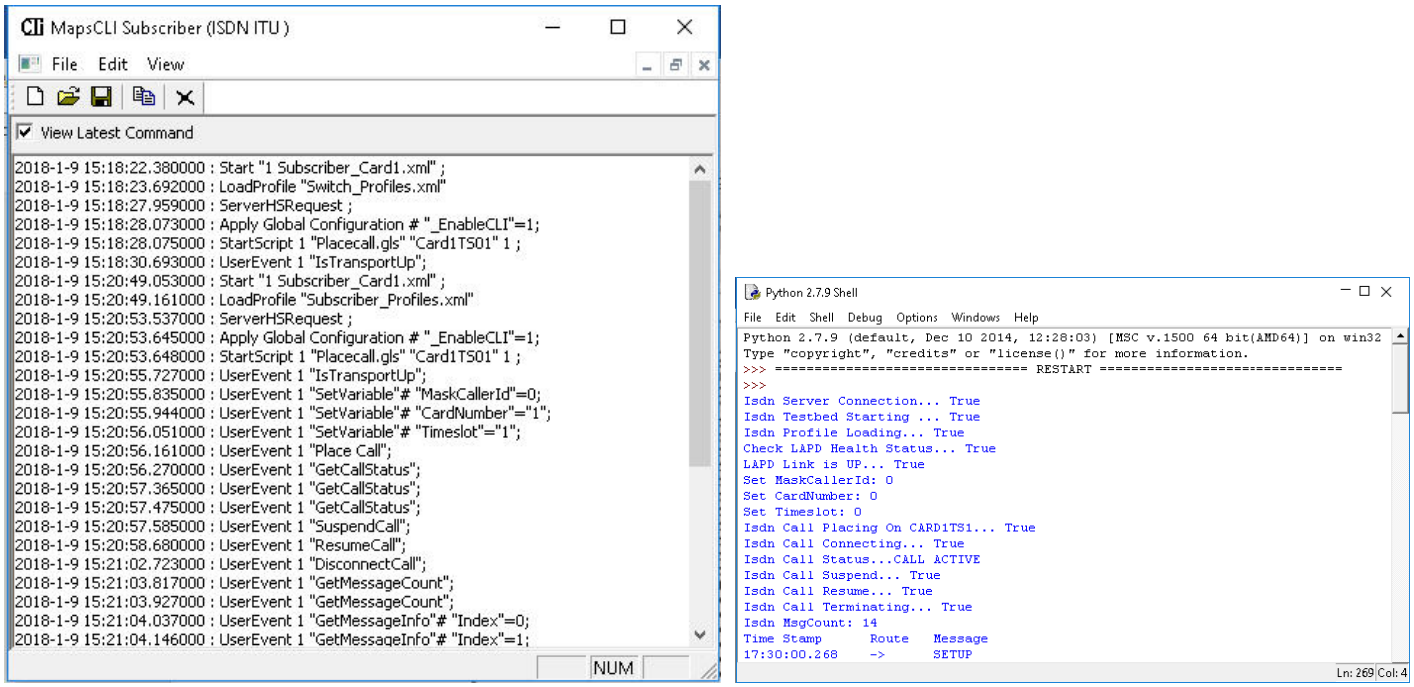


NFAS Call Reception

Command Line Interface

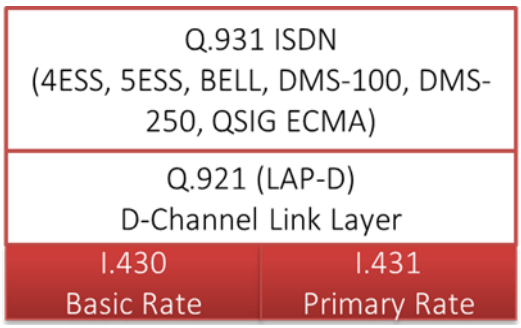
MAPS™ can be configured as server-side application, to enable remote controlling of the application through multiple command-line based clients. Supported clients include TCL, Python, VBScript, Java, and .Net.

Clients can remotely perform all functions such as start testbed setup, load scripts, and profiles, apply user events such as send digits/file/tones, detect digits/file/tones, dial, originate call, terminate call, start and stop traffic and so on. User can also generate and receive calls through commands. This client application is distributed along with MAPS™ Server application.



Sample Python API Server and Client Console

Supported Protocol Standards



Supported Protocols	Standard / Specification Used
Q.921 (LAPD)	ITU-T Q.921
SR-4994	National ISDN PRI Standard
Q.931	ITU-T Q.931 / Q.932(Facility IE) / Q.955.3 (MLPP Procedures)
4ESS	ISDN PRI (TR-41449)
5ESS	ISDN PRI (Lucent Tech - 5ESS 2000)
BELL	ISDN PRI (Bell Core SR-NWT-002343)
DMS-100	Nortel's Switch DMS 100 NIS-A2111-1
DMS-250	Nortel's Switch DMS 250 NIS-A2111-4
QSIG ECMA	Standard ECMA-143 4th Edition - December 2001

Buyer's Guide

Item No	Product Description
XX648	MAPS™ ISDN & LAPD Emulator (includes xx661 for LAPD Emulation and requires xx610 and xx620 for traffic generation)
XX642	MAPS™ ISDN Conformance Emulator (includes XX661)
XX662	MAPS™ LAPD Conformance Emulator (requires XX634)
XX610, XX620	TDM Traffic Options

Item No	Related Software
XX661	LAPD Server
XX634	High Throughput HDLC Tx/Rx Test
XX610	w/ Transmit and Receive File capability
XX620	w/ DTMF/MF/MFC-R2 + answer/place call capability
XXXFT0	Fax Emulation for T1 E1 & Analog Interfaces (FXO & FXS)
XX624	MAPS™ FXO FXS Emulator (only for tProbe)
XX100	ISDN Analyzer Software
OLV100	Offline/ Remote ISDN Analyzer Software

Item No	Related Software
PTE001	*t*Probe™ T1 E1 Base Unit
FTE001	QuadXpress T1 E1 Main Board (Quad Port– requires additional licenses)
ETE001	OctalXpress T1 E1 Main Board plus Daughter Board (Octal Port– requires additional licenses)
XTE001	Dual Express (PCIe) T1 E1 Boards
TTE001	tScan16™ T1 E1 Boards

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For complete list of MAPS™ products, refer to Message Automation & Protocol Simulation MAPS™ webpage.

GL Communications Inc.
818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A
(Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com