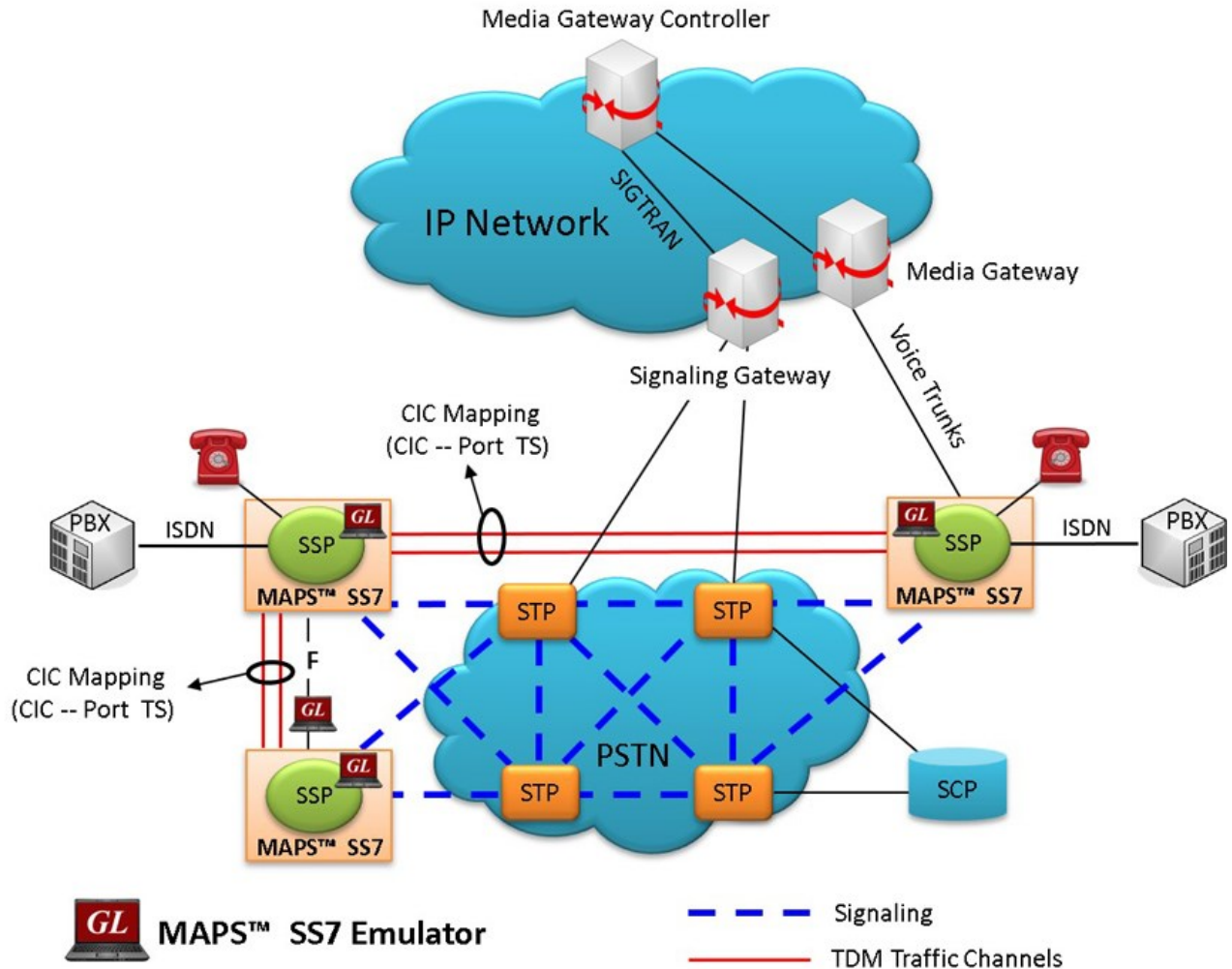


# MAPS™ SS7 over TDM/ATM

(Scripted ISUP Simulator)



## Overview

GL's MAPS™ SS7 is an advanced protocol simulator/tester for SS7 simulation over TDM/ATM. The tester can simulate Service Switching Point (SSP) and ISUP signaling specification as defined by the ITU-T, ANSI, ETSI, and CHINA standards.

The tester supports testing network elements, error tracking, regression testing, conformance testing, load testing/call generation and generation of high volumes of ISUP traffic. The MAPS™ SS7 functionality covers the ITU, ANSI and CHINA variant of SS7 implementing MTP2, MTP3, ATM, and ISUP protocols. It is able to run pre-defined test scenarios against ISUP test objects in a controlled & deterministic manner.

MAPS™ SS7 ATM uses SSCOP server for establishing SSCOP links over which IN signaling will be carried further for making calls. SSCOP Server is GL's WCS based server module and provides SSCOP, and AAL5 layer services. It uses AAL5 Traffic Generator for traffic generation. Various traffic types like Tone, Digits and File playback are supported.

MAPS™ SS7 supports client-server functionality through Command Line Interface (CLI) such as the Python and Java scripting tools. CLI provides the capability of remote operation, automation, and multi-site connectivity.

The MAPS™ SS7 conformance scripts, suitable for conformance tests and functional tests, where test objects can be accurately, reliably and comfortably validated for compliance with ITU-T standard Q.761-764 and Q.784.

For more information, refer to [MAPS™ SS7 Emulator](#) webpage.



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## Main Features

- SS7 (SSP) simulation over ATM/TDM (T1/E1)
- Supports transmission and detection of TDM traffic - digits, voice file, single /dual tones and fax
- Multiple T1/E1 line interfaces supported
- User-friendly GUI for configuring the SS7 MTP/ATM Layers and user Configurable Signaling Links
- User-configured Circuit Mapping, i.e. defines Circuit Identification Codes (CIC) and map these CICs to Timeslots/Trunks in order to enable Voice/Data traffic
- Supports MTP2 and MTP3 protocol machine. User controlled access to optional ISUP parameters such as timers
- Subsequent Address Message (SAM) configurations available
- Fully Supported Continuity Testing (COT) that includes COT messages
- Supports client-server functionality through CLI such as the Python and Java (requires additional license)
- Script based and protocol independent MAPS™ architecture supports all common framework features.

## Testbed Setup Configuration

Test Bed setup is provided to establish communication between MAPS™ SS7 and the DUT over TDM/ATM. It includes Source and Destination SSP Node configurations, Signaling port and timeslot, and CIC group parameter configurations. Default profile is used to configure MAPS™ SS7 with end user parameters.

Once the test parameters are configured properly, ISUP messages over MTP, ATM layer can be transmitted and received successfully.

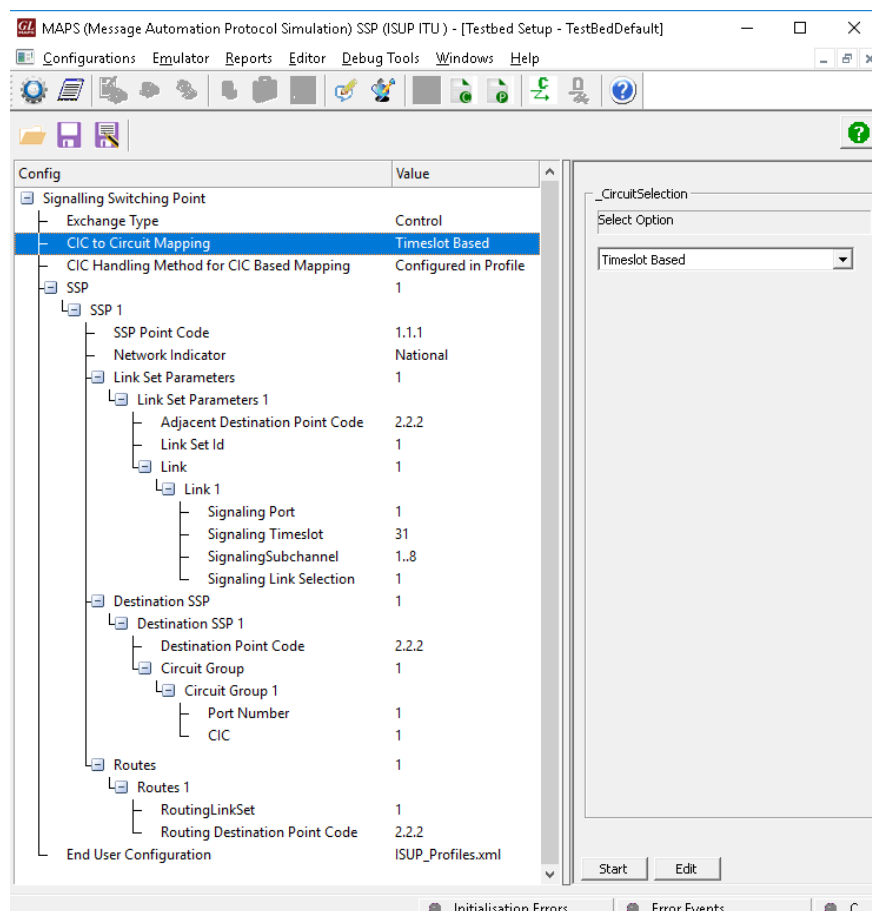


Figure: Testbed Configuration

## 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.

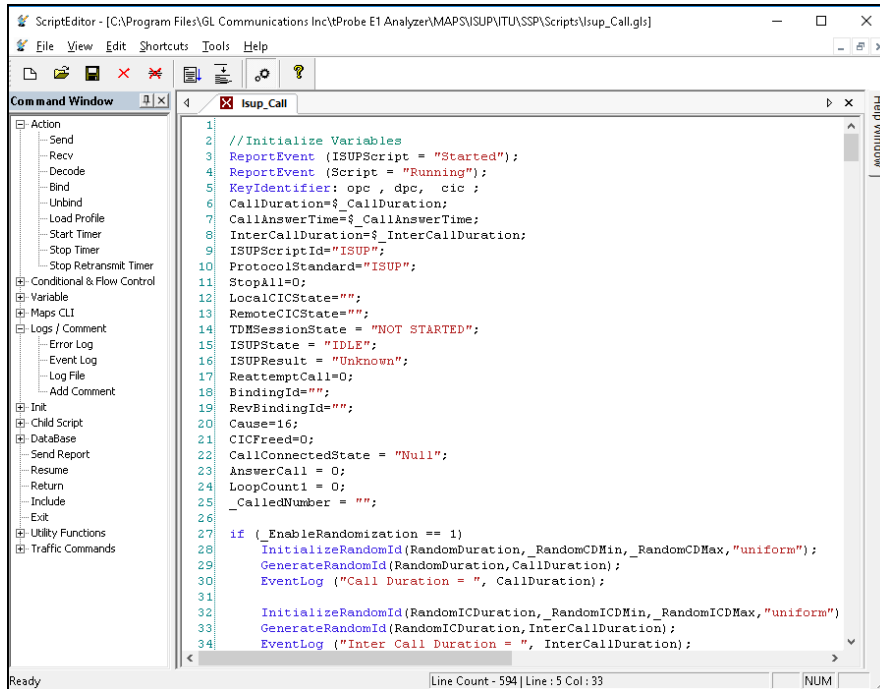


Figure: Script Editor

**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.

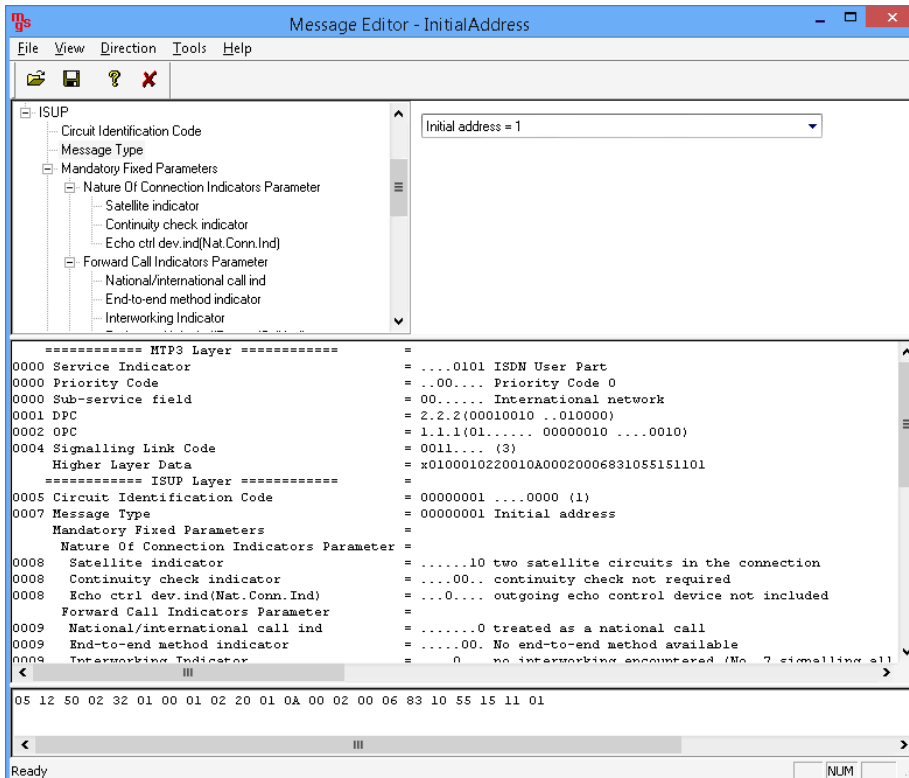


Figure: Message Editor

**Profile Editor** - This feature allows loading profile to edit the values of the variables using GUI. Profiles provide input parameters during script execution 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.

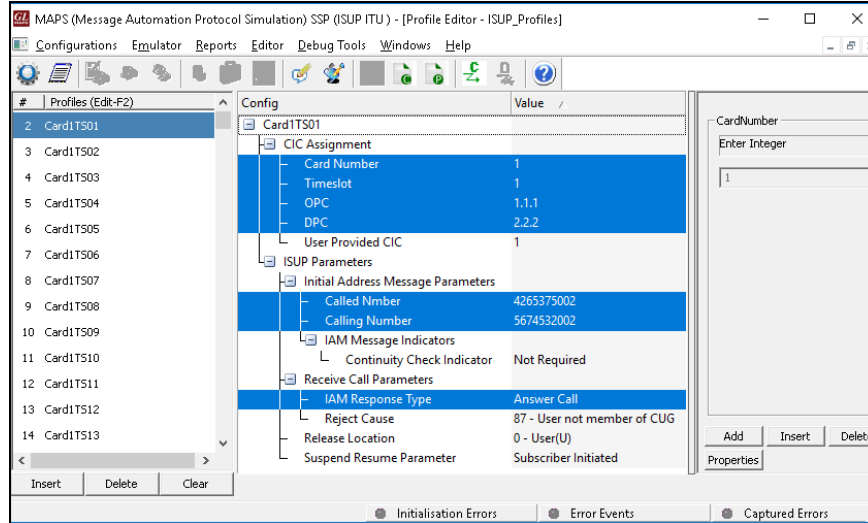


Figure: Profile Editor

## 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.

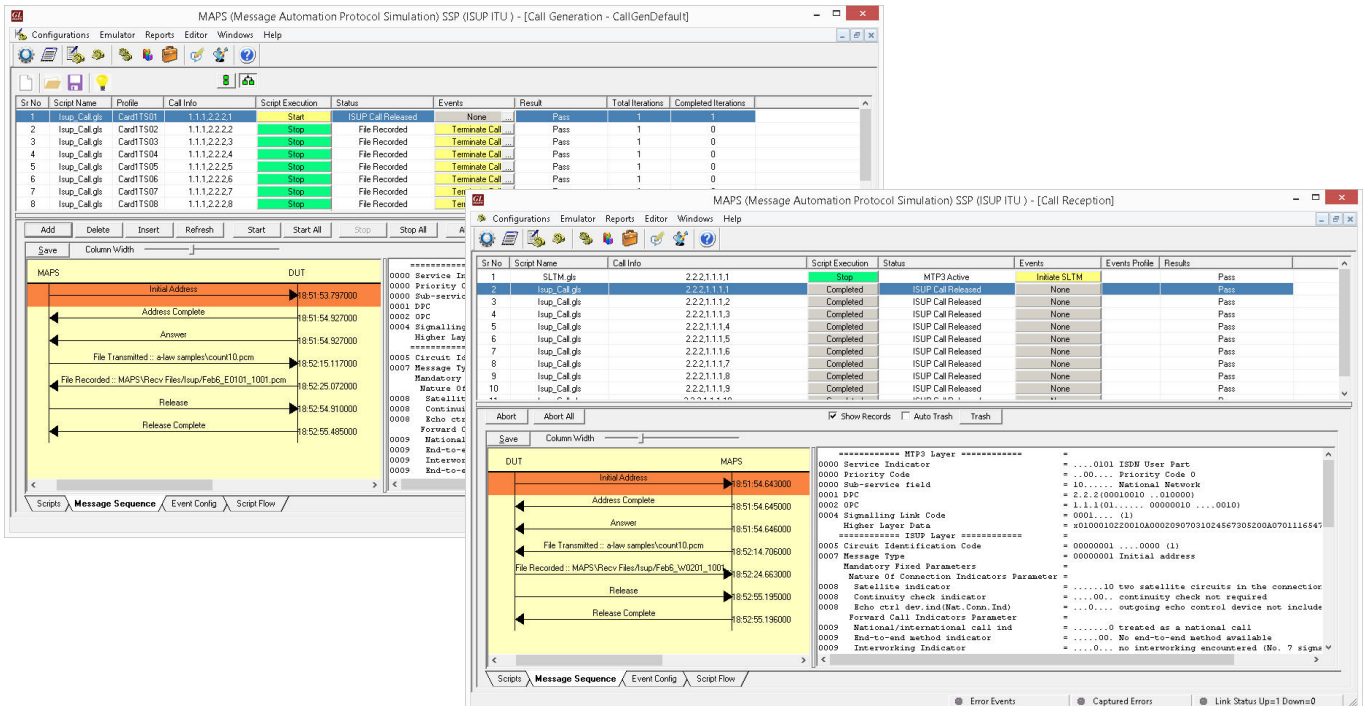


Figure: Call Generation & Call Reception

## SS7 Conformance Testing

MAPS™ include inbuilt conformance scripts (\*.gls), suitable for conformance and functional testing, where test objects can be accurately, reliably and comfortably validated for compliance with ITU-T standard Q.761-764 and Q.784.

Some of the supported test cases are:

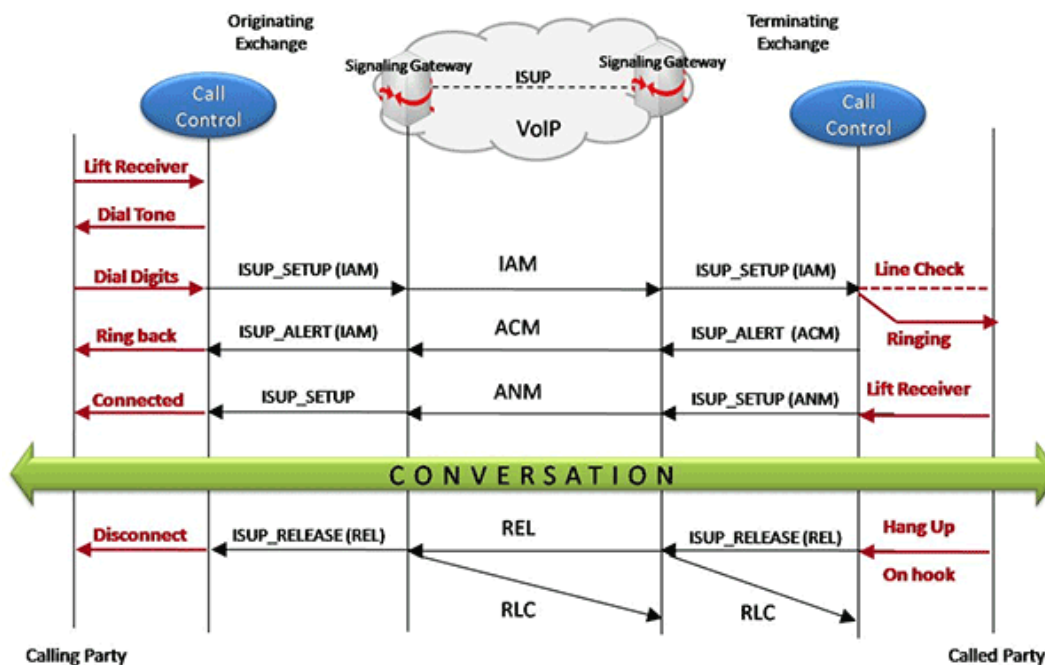
- Test 1.1 (Non-allocated circuits)
- Test 1.2.1 (Reset of circuits)
- Test 1.3.2.1 (Circuit blocking /unblocking)
- Test 1.7.1.3 (Receipt of unknown messages)
- Test 2.1.1 (Both way circuit selection)
- Test 3.1 (Normal call release)
- Test 4.1 (Unsuccessful call setup)
- Test 6.1.3 (Continuity check call)
- Test 7.1.1 (Successful call setup)
- Test 7.1.2 (Unsuccessful call setup) and others

## Typical SS7 Call Procedure

MAPS™ SS7 can be configured as Caller (Signaling Point - SP) and initiates the call flow by sending Initial Address Message (IAM) to the DUT.

MAPS™ SS7 can also be considered at the Network as DUT to receive the incoming request messages and process the call by generating responses.

The **Isup\_Call.gls** call control script is configured at the call generation and reception terminal to handle ISUP signaling and TDM traffic over established call.



## Command Line Interface (CLI)

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

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

```

2018-2-6 11:46:09.164000 : Start "Sig-Card1_B-Port_1.xml";
2018-2-6 11:46:10.581000 : LoadProfile "ISUP_Profiles.xml"
2018-2-6 11:46:20.975000 : ServerHSRequest;
2018-2-6 11:46:21.082000 : Apply Global Configuration # "_EnableCLI "=1;
2018-2-6 11:46:21.083000 : StartScript 1 "Isup_Call.gls" "Card1TS01" 1;
2018-2-6 11:46:21.521000 : UserEvent 1 "IsTransportUp";
2018-2-6 11:46:21.631000 : UserEvent 1 "SetVariable"# "CardNumber"="1";
2018-2-6 11:46:21.741000 : UserEvent 1 "SetVariable"# "Timeslot"="1";
2018-2-6 11:46:21.850000 : UserEvent 1 "Place Call";
2018-2-6 11:46:22.067000 : UserEvent 1 "GetCallStatus";
2018-2-6 11:46:23.164000 : UserEvent 1 "GetCallStatus";
2018-2-6 11:46:24.253000 : UserEvent 1 "GetCallStatus";
2018-2-6 11:46:24.362000 : UserEvent 1 "GetCallStatus";
2018-2-6 11:46:25.456000 : UserEvent 1 "Hold";
2018-2-6 11:46:27.534000 : UserEvent 1 "Retrieve";
2018-2-6 11:46:29.613000 : UserEvent 1 "Suspend";
2018-2-6 11:46:31.696000 : UserEvent 1 "Resume";
2018-2-6 11:46:35.740000 : UserEvent 1 "Terminate Call";
2018-2-6 11:46:36.832000 : UserEvent 1 "GetMessage";
2018-2-6 11:46:36.943000 : UserEvent 1 "GetLastRece";
2018-2-6 11:46:37.052000 : UserEvent 1 "GetMessage";
2018-2-6 11:46:37.161000 : UserEvent 1 "GetMessage";
2018-2-6 11:46:37.269000 : UserEvent 1 "GetMessage";
2018-2-6 11:46:37.378000 : UserEvent 1 "GetMessage";
2018-2-6 11:46:37.490000 : UserEvent 1 "GetMessage";
2018-2-6 11:46:37.598000 : UserEvent 1 "GetMessage";
2018-2-6 11:46:37.711000 : UserEvent 1 "GetMessage";
2018-2-6 11:46:37.925000 : UserEvent 1 "GetMessage";
2018-2-6 11:46:38.037000 : UserEvent 1 "GetMessage";

Python 2.7.9 Shell
File Edit Shell Debug Options Windows Help
Python 2.7.9 (default, Dec 10 2014, 12:28:03) [MSC v.1500 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
Isup Server Connection... True
Isup Testbed Starting... True
Isup Profile Loading... True
MTP3 Health Status Checking... True
MTP3 Link is UP... True
Set CardNumber: 0
Set Timeslot: 0
Isup Call Placing On CARD1TS1... True
Isup Call Connecting... True
Isup Call Status...ISUP CALL CONNECTED
Isup Hold Call... True
Isup Retrieve Call... True
Isup Suspend Call... True
Isup Resume Call... True
Isup Call Terminating... True
Isup MsgCount: 15
Isup LastMSGrcv: 11:46:36.323 <- Release Complete
===== MTP3 Layer =====
0000 Service Indicator          = ...0101 ISDN User Part
0000 Priority Code              = ..00.... Priority Code 0
0000 Sub-service field         = 10..... National Network
0001 DPC                        = 1.1.1(00001001 ..001000)
0002 OPC                        = 2.2.2(10..... 00000100 ....0100)
0004 Signalling Link Code      = 0001.... (1)
      Higher Layer Data        = x02001000
===== ISUP Layer =====
0005 Circuit Identification Code = 00000010 ...0000 (2)
0007 Message Type              = 00010000 Release Complete
0008 Pointer to optional parameters = x00 (0)
      Mandatory Variable Length Parameters = None
      Optional Variable Length Parameters = None

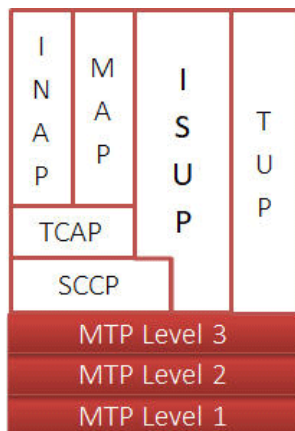
***** Isup Call Flow *****
Time Stamp      Route      Message
11:46:21.988    ->        Initial Address
===== MTP3 Layer =====

```

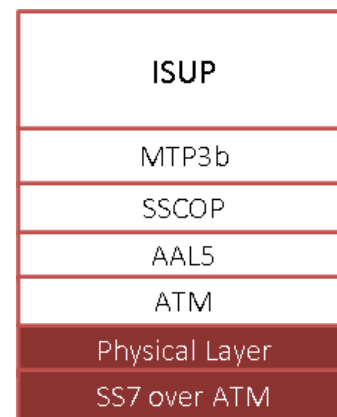
Figure: Sample Python API Server and Client console

## Supported Protocol and Specifications

Supported Protocols	Standard / Specification Used
<b>TDM</b>	
MTP3 (ITU)	ITU-T Q.704
ISUP (ITU)	ITU - Q.761, Q.762, Q.763 and Q.764
ISUP Conformance testing	ITU - Q.784.1
ISUP CHINA	Ministry of Posts and Telecommunications of the People's Republic of China, Technical Specification of ISUP, 1996
MTP3 (ANSI)	T1.111.4-1996
ISUP (ANSI)	ANSI - T1.113.1 to T1.113.4
Test & Network Management Messages (ITU, China)	ITU-T Q.703, Q.704
Test & Network Management Messages (ANSI)	ANSI T1.111.4, ANSI T1.111.7
ISUP ETSI	EN 300 356 -1 V3.2.2 (1998-08) Part 1
<b>ATM</b>	
ISUP (ITU)	ITU - Q.761, Q.762, Q.763 and Q.764
ATM	ITU-T I.361
SSCOP	ITU-T Q.2110
MTP3b	ITU-T Recommendation Q.2210
AAL5	Class C & D (ITU-T I.363.5)



**SS7 Protocol Stack over TDM**



**SS7 Protocol Stack over ATM**



## Buyer's Guide

Item No	Product Description
<a href="#">XX649</a>	MAPS™ SS7 Emulator
<a href="#">XX647</a>	MAPS™ SS7 Conformance Test Suite (Test Scripts)
<a href="#">XX643</a>	MTP2 Simulator
<a href="#">xx610, xx620</a>	TDM Traffic Options
<a href="#">XXFTO</a>	WCS Fax Emulation Software

Item No	Related Software (TDM Network)
<a href="#">XX694</a>	MAPS™ MAP (B, C, D, E, F, G, and H interfaces)
<a href="#">PKS132</a>	MAPS™ MAP Emulation over IP
<a href="#">XX648</a>	MAPS™ ISDN Emulator
<a href="#">XX692</a>	MAPS™ GSM -A Interface Emulator
<a href="#">XX693</a>	MAPS™ GSM- Abis Interface Emulator
<a href="#">PKS135</a>	MAPS™ ISDN -SIGTRAN (ISDN over IP)

Item No	Related Software (IP Network)
<a href="#">PKS120</a>	MAPS™ SIP
<a href="#">PKS121</a>	MAPS™ SIP Conformance Test Suite (Test Scripts)
<a href="#">PKS122</a>	MAPS™ MEGACO
<a href="#">PKS123</a>	MAPS™ MEGACO Conformance Test Suite (requires PKS122)
<a href="#">PKS124</a>	MAPS™ MGCP (with MGCP Conformance Test Scripts)
<a href="#">PKS130</a>	MAPS™ SIGTRAN (SS7 over IP)
<a href="#">PKS132</a>	MAPS™ MAP Emulation over IP
<a href="#">PKS135</a>	MAPS™ ISDN -SIGTRAN (ISDN over IP)

Item No	Related Hardware
<a href="#">PTE001</a>	tProbe™ Dual T1 E1 Laptop Analyzer with Basic Analyzer Software
<a href="#">XTE001</a>	Dual T1 E1 Express (PCIe) Boards (requires additional licenses)
<a href="#">FTE001</a>	QuadXpress T1E1 Main Board (Quad Port– requires additional licenses)
<a href="#">ETE001</a>	OctalXpress T1E1 Main Board plus Daughter Board (Octal Port– requires additional licenses)

For more information, refer to [MAPS™ SS7 Emulator](#) web page.



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