

Traffic Simulation Software for Wireless, IP, and TDM Networks

Overview

As traffic intensity increases, network elements (including switches and transmission) can impart various impairments such as errors, excessive delay, congestion, blocking, loss, and degraded quality. Simulating traffic can be valuable to characterize the impairment as a function of traffic intensity and traffic types (e.g. Voice, Fax, Data, Video).

Message Automation and Protocol Simulation (MAPS™) is a multi-protocol, multi-technology platform performs signaling and traffic generation for a vast array of communication protocols covering IP, Analog, TDM, and Wireless networks. MAPS™ can be used to test signaling over legacy networks (which use conventional signaling such as CAS, SS7, ISDN, PPP,...), newer generation IP networks (such as SIP, MGCP, MEGACO, SIGTRAN, Diameter...), and also the Wireless networks including GSM, GPRS, UMTS, and LTE.



With MAPS™ Client-Server application, MAPS™ supports a **Command Line Interface (CLI)** such as the Python, and TCL (Tool Command Language) scripting tools, to provide the capability of remote operation, automation, and multi-site connectivity. User can remotely perform all functions such as start test bed 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.

For more details, visit www.gl.com/traffic-simulation.html webpage.

Features

- MAPS™ supports transmission and detection of various traffic types over Analog 2-Wire, TDM and IP - Digits, Tones, Voice
- Fax simulation over T1 E1 digital lines, and over PSTN FXO/FXS lines
- Create, monitor, and terminate TRAU GSM traffic sessions
- RTP traffic simulation supported for almost all standard codecs
- Supports generation and verification of data traffic such as SMS, Email, FTP, Web (HTTP), Video, and more
- Automate the IVR testing process (call establishment and traffic generation / detection) process through scripts
- Generates and verifies user mobile data traffic over GPRS, UMTS and LTE
- Emulation of Packet and Mobile Gateway traffic over GTP-to-GTP and GTP-to-IP
- Command Line Interface for remote access and automation

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Analog and TDM Traffic Simulation

- Send / record voice files, DTMF/MF digits, and single or dual frequency tones over established calls - requires [xx610](#), [xx620](#).
- Fax simulation ([xxFT0](#)) over Analog and T1/E1 network.
- Supports TRAU traffic ([xx646](#))- create, monitor, and terminate TRAU GSM traffic sessions, transmit/receive DTMF digits, file, and tones. [MAPS™ GSM A-bis](#) interfaces supports TRAU GSM traffic simulation.
- TDM traffic simulation using [MAPS™ ISDN](#), [MAPS™ SS7](#), [MAPS™ GSM A](#).
- [MAPS™ CAS](#) includes FXO FXS, R1, MFC-R2, and other variations for both analog 2-wire and T1 E1 – for hundreds of channels.

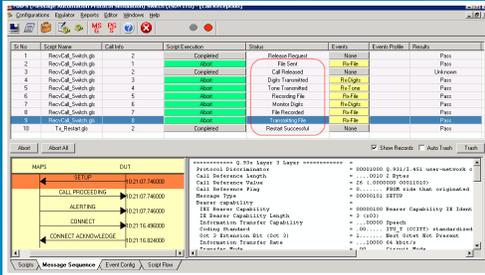


Figure: TDM Traffic Events
RTP Traffic Simulation ([PKS102](#))

- Loopback real-time voice traffic (all received traffic is re-transmitted as sent traffic).
- “Play to Speaker” streams voice of a selected call to a speaker
- “Talk using Microphone” allows the user to generate real-time traffic
- Transmit pre-recorded voice files on the specified RTP sessions.
- Supported [codec types](#) includes G.711, G.729, G.726, GSM, AMR, EVRC, SMV, iLBC, SPEEX, G.722, and more. AMR, EVRC variants requires additional licenses.
- Generation and Detection of RTP Event such as Answering tone, Calling tone, Special Dial tone and other Call Progress tones.
- Generate impairments over established RTP call such as Latency, Packet Loss, and Packet Effects.
- [MAPS™ UMTS IuCS & IuH](#), [MAPS™ SIP](#), [MAPS™ SIP I](#), [MAPS™ MGCP](#), [MAPS™ MEGACO](#), [MAPS™ GSM A over IP](#) applications support RTP traffic simulation.
- Supports RTP traffic implementation over Iu-UP (Iu User Plane Interface) interface of the IuCS Network and as per ED-137B of EUROCAE standards. *Requires additional licenses.

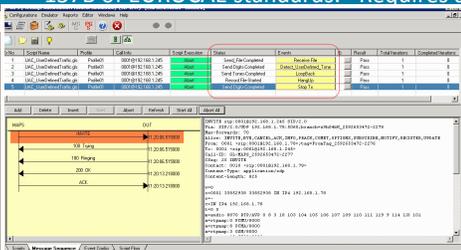


Figure: RTP Traffic Events

Mobile Traffic Simulation

- **Mobile Traffic Core - GTP ([ETH101](#))**
 The module supports user-plane packet transmission and reception services between any two nodes (GTP-U protocol entity) in UMTS (SGSN, GGSN, RNC), and LTE (SGW, PDNGW) networks. It allows simultaneous simulation of multiple sessions per user. Currently, supports HTTP traffic simulation with the base requirements such as port number, server IP address, and pre-canned HTTP traffic file. This module can also support generation and verification of data traffic such as Email, FTP, Video, and more. This module is supported in [MAPS™ GnGp](#), [MAPS™ LTE S1](#), [MAPS™ LTE eGTP-c](#) and [MAPS™ IuPS](#).

- **Mobile Traffic Core - Gateway ([ETH102](#))**
 The module allows simulation of Gateway and transfer user plane data from RNC to GGSN. It handles GTP tunnels on both direction of SGSN. It can also act as GGSN for user-plane traffic by encapsulating IP traffic over GTP.

This module supported in [MAPS™ GnGp](#), [MAPS™ LTE S1](#), [MAPS™ LTE eGTP-c](#).

???: any IP-based protocol used to carry packet radio service
 HTTP: Hypertext Transfer Protocol
 GTP: GPRS Tunneling Protocol
 TCP: Transmission Control Protocol
 UDP: User Datagram Protocol
 IP: Internet Protocol

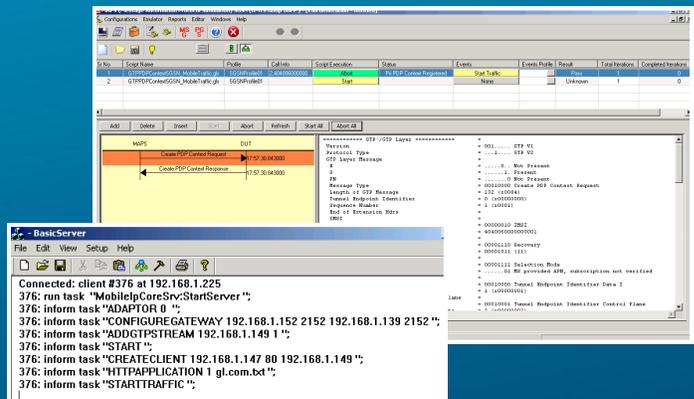
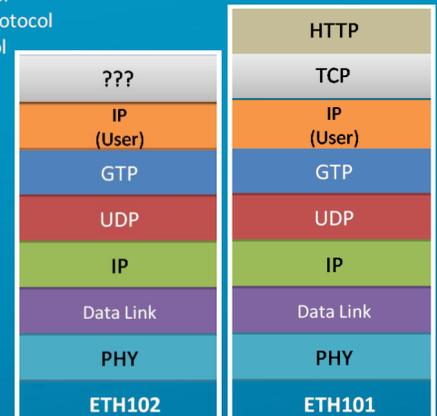


Figure: Mobile Traffic Server Log

Mobile Traffic Simulation (contd.)

• Packet Traffic Simulation - GTP (ETH100)

This module is used to generate IP traffic and verify the same at the other end over GTP (GPRS Tunneling Protocol). The IP traffic can be generated as Sequence Number, Hex string, BER patterns, or playback captured Ethernet traffic (*.HDL) files. This module is supported in [MAPS™ GnGp](#), [MAPS™ LTE S1](#), [MAPS™ LTE eGTP-c](#) and [MAPS™ IuPS](#).

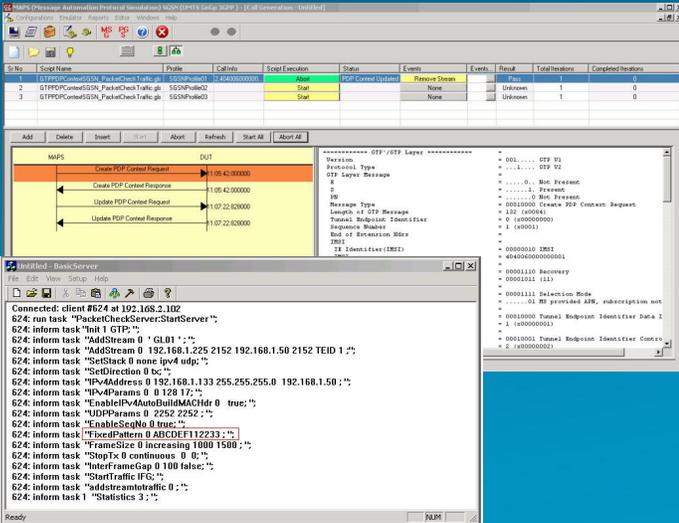


Figure: Packet Traffic Simulation (ETH100)

Mobile Traffic Simulation (contd.)

• Mobile Traffic Simulation - GPRS Gb (ETH103)

The module allows simulation of Mobile traffic over Gb interface between BSC and SGSN. Currently, this module transmits the pre-canned HTTP file (*.txt) between BSC and SGSN nodes. It multiplexes both signaling and traffic over Gb interface. This module is supported in [MAPS™ GPRS Gb](#).

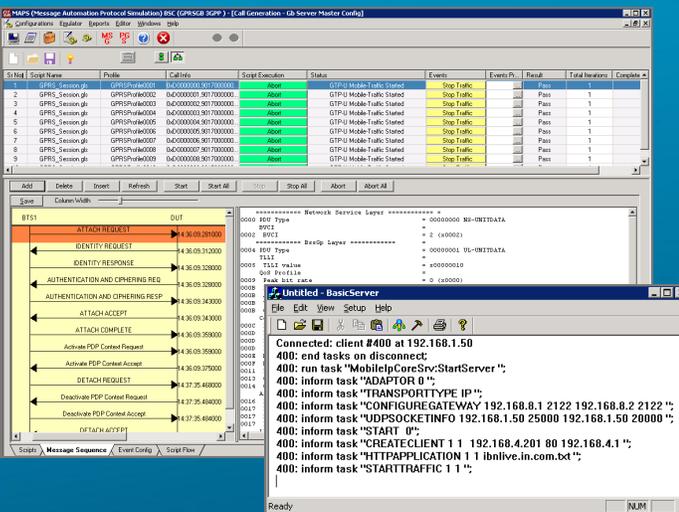


Figure: GPRS Gb Mobile Traffic Simulation (ETH103)

Short Message Service (SMS) Test Solutions

MAPS™ supports testing following SMS types:

- **Short message Mobile Terminated (SMS-MT):** It is the ability of a network to transmit a Short Message to a mobile phone. The message can be sent by phone or by a software application.
- **Short message Mobile Originated (SMS-MO):** It is the ability of a network to transmit a Short Message sent by a mobile phone. The message can be sent to a phone or to a software application. The SMS feature is applicable for [MAPS™ GSM A over IP](#) and [MAPS™ MAP](#) applications.

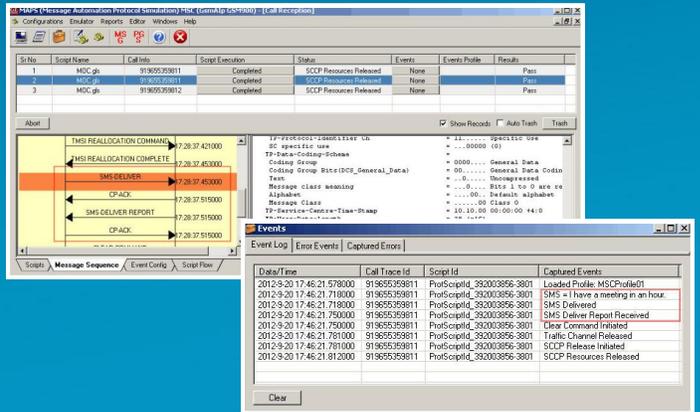


Figure: GSM SMS-MO/SMS-MT Procedure Events

FAX Simulation over T1 or E1 (XXFT0)

• Fax Simulator is used to simulate complete real-time Fax calls over T1 or E1. It is available with [MAPS™ CAS](#), [MAPS™ ISDN](#), and [MAPS™ SS7](#) emulators.

- [Fax Simulator](#) is capable of transmitting and receiving single and bulk (100's) fax calls over many T1/E1 timeslots or through two-wire FXO and FXS lines
- Typical applications of our Fax Emulation software are - load testing of fax servers, qualification testing of T.38 Gateways, testing of ATAs (Analog Terminal Adapters), testing of fax machines, and many more.

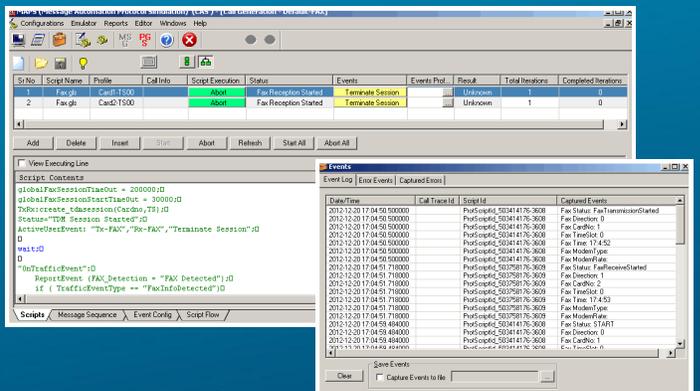


Figure: FAX Simulation



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Automated Traffic Simulation using CLI

In addition to the GUI, MAPS™ can also be operated through a Command Line Interface (CLI). All the GUI based functionalities of the application can be controlled remotely.

Traffic simulation on a local network as well as from a remote location is possible with the client interface.

```

C:\Program Files\GL Communications Inc\MAPS\Tcl Client\tclsh05.exe
% source $ipCasTest.tcl
Connecting to MAPS SIP server...
Connection Established
Connecting to MAPS CAS server...
Connection Established
Starting Scripts...
SIP Line Sending Invite...
Invite Sent
CAS Line Detecting Station Ringing...
CAS Line Offhook
Sip Line Waiting For 200 ok to invite
200 INVITE Received
Sip Line Sending Ack...
Ack Sent
Session Started
Cas Line Sending Digits...
Sip Line Detecting Digits...
Sip Line Sending Bye...
Bye Sent
Call Terminated
Closing SIP Connection...
Connection Closed
Closing CAS Connection...
Connection Closed
  
```

Figure: Traffic Simulation between IP to TDM

Create Traffic Events using Script Editor

Scripting provides the ability to create ready-scripts for TDM and RTP traffic simulation. Various traffic events are applied during the course of a call. Examples include—

- Send/Detect Tones, Digits, Silence, Verify Speech
- Send/Receive Files, Fax
- Different tone types supported- dial tone, special dial tone, stutter dial tone, special information tone, call waiting, call in progress tone, reorder tone, busy tone, congestion tone, confirmation tone, howler tone, and ring-back tone, set region

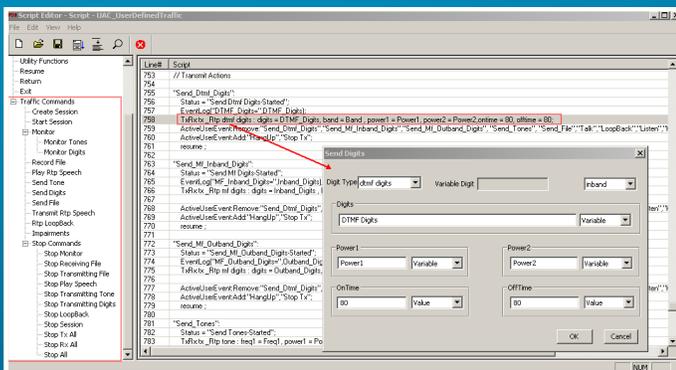


Figure: Set user-defined Traffic Options using Script Editor

Summary of Supported Traffic Types

- **RTP Traffic Simulation** ([PKS102](#))
over UMTS IuCS & IuH, SIP, SIP-I, MGCP, MEGACO, GSM A over IP interfaces
- **TDM Traffic Simulation** ([xx610](#), [xx620](#), [xxFT0](#))
over ISDN, SS7, CAS, GSM A interfaces
- **TRAU GSM Traffic** ([xx646](#))
over GSM A-bis interfaces
- **Mobile Traffic Simulation** ([ETH100](#), [ETH101](#), [ETH102](#), [ETH103](#))
over LTE S1, eGTP and UMTS GnGp, IuPS, GPRS Gb interfaces

Buyer's Guide

[ETH100](#) - Packet Traffic Simulation - GTP

[ETH101](#) - Mobile Traffic Core-GTP

[ETH102](#) - Mobile Traffic Core-Gateway

[ETH103](#) - Mobile Traffic - Gb

[PKS101](#) - SIP Core (additional)

[PKS102](#) - RTP Soft Core for RTP Traffic Generation

[PCD103](#) - AMR codec for MAPS™

[PCD104](#) - EVRC codec for MAPS™

[PCD105](#) - EVR_B codec for MAPS™

[PCD106](#) - EVR_C codec for MAPS™

[XX610](#) - File based Record/Playback (includes xx600)

[XX620](#) - Transmit/Detect digits (Place Call/ Answer Call)

[XXFT0](#) - WCS Fax Emulation Software (requires additional licenses)

[XX646](#) - Multi-Channel TRAU Tx/Rx Emulation and Analysis

Related Software

[XX692](#) - MAPS™ GSM A

[XX693](#) - MAPS™ GSM Abis

[XX648](#) - MAPS™ ISDN

[XX649](#) - MAPS™ SS7

[XX651](#) - MAPS™ CAS

[PKS120](#) - MAPS™ SIP

[PKS122](#), [PKS123](#) – MAPS™ MEGACO

[PKS124](#), [PKS125](#) - MAPS™ MGCP

[PKS126](#) - MAPS™ SIP I

[PKS166](#) - MAPS™ GnGp

[PKS138](#) - MAPS™ GPRS SGSN & GGSN

[PKS131](#) - MAPS™ GPRS Gb over IP

[PKS132](#) - MAPS™ MAP over IP

[PKS137](#) - MAPS™ GSM A over IP

[PKS160](#) - MAPS™ UMTS IuCS & IuH

[PKS164](#) - MAPS™ UMTS IuPS



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