Overview

GL’s Message Automation & Protocol Simulation (MAPS™) LTE-eGTP simulator/tester is designed for LTE S11, S5/S8 eGTP interfaces can simulate MME (Mobility Management Entity), SGW (Serving Gateway), and PGW (Packet Data Network Gateway) network elements. The messages exchanged between MME and SGW (S11 Interface) is same as the messages exchanged between SGW and PDN Gateway (S5/S8 Interface), which are as defined in specification 3GPP TS 29.274 Evolved GPRS Tunnelling Protocol for Control Plane (eGTP-c). Additionally, MAPS™ LTE eGTP can support simulation of user-plane packet (GTPv2-U) traffic in LTE network with support of Mobile Traffic Core - GTP (ETH101) application and user-plane Gateway traffic with support of Mobile Traffic Core – Gateway (ETH102) application. The application gives the users the unlimited ability to edit eGTP-c messages and call control scenarios (message sequences).

By mimicking real-world behavior in lab environment, our solutions allow mobile operators and equipment manufacturers to verify wireless networks prior to live deployment. Further, one can setup a virtual real-time LTE network in lab by simulating all the network elements using ‘MAPS 4G Wireless Lab Suite’.

For more information on MAPS™ LTE eGTP, refer to [https://www.gl.com/maps-lte-egtp.html](https://www.gl.com/maps-lte-egtp.html).

Main Features

- Simulates MME, SGW and PDN GW
- Supports simulation of eGTP-c (Control Plane); generate and process GTP-C valid and invalid messages.
- Massive UE simulation (up to 500000) with Auto generation feature for high density load testing
- Supports large number of subscribers with CSV based profiles for bulk call generation.
- Handles Retransmissions
- Supports eGTP-u (User Plane) traffic simulation which includes: verification like BERT testing, HTTP traffic generation capability - requires additional licensing ‘ETH101’
- High-volume eGTP-u (User Plane) traffic simulation possible with support of ‘Packet Load’ appliance; both 4Gbps and 40Gbps variants are available to suit customer needs
- Option to offload GTP traffic to Gateway (GGSN)- requires additional licensing ‘ETH102’
- Generates and responds to hundreds of UE Signaling (Load testing)
- Supports simulation of entire real-time LTE network using “MAPS 4G Wireless Lab Suite”.

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Test Bed Configuration
The testbed setup window allows users to setup the required test environment with SCTP configuration in eGTP interfaces.

**SCTP Configuration** parameters consists of source / destination IP address, port, including GTP traffic parameters to configure MAPSTM to simulate MME, SGW, PGW entities in eGTP interface. MAPSTM can then generate GTP-C (valid and invalid) messages in LTE network.

Auto Generated Users Info configuration required to simulate multiple calls. End user configuration profile used to configure MAPSTM LTE eGTP with supported node parameters.

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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.

Supports Mobile Traffic parameter settings allowing simulation of offline HTTP Traffic using Mobile IP Core TCP Client Server connections. Configurations include TCP Server IP, TCP Port for HTTP and HTTP files names.

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**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.

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**SCRIPT EDITOR** - The script editor allows the user to create / edit scripts and also import/export files that define variables for the message template parameters. The script uses pre-defined message templates to perform send and receive actions. The editor allows to run the added scripts sequentially (in-order) or randomly (any script from the list of added scripts as per the call flow requirements).
Supported LTE eGTP-c Procedures

Given below is a general LTE S3, S4, S5, S8, S10, S11 and S16 interfaces signaling scenario, the messages between MME (Mobility Management Entity), SGW (Serving Gateway), and PGW (PDN Gateway) are simulated using MAPS™ application. MAPS™ LTE eGTP supports Path Management and Tunnel Management procedures over eGTP interfaces as indicated in the call flow below:

Call Generation and Call Reception

In call generation, MAPS™ is configured for the out going calls, and in call receive mode, it is configured to respond to incoming calls. Tests can be configured to run once, multiple iterations or continuously. Scripts can be set to run sequentially according to a call scenario or randomly.

The test scripts may be started manually or they can be automatically triggered by incoming messages. In receive mode, MAPS™ can be automated to respond to messages using script configuration dialog, where a receive script is preset against particular message expected to arrive.

Load Testing (eGTP-c, eGTP-u)

MAPS™ includes Auto UE Generation feature with which each UE is automatically generated with unique IMSI, TMSI, MSISDN and other key parameters in sequential order. While other common parameters such as Bearer Identifier, Bearer QoS, Access Point Name, underlying physical connection method, and mobile traffic parameters required during simulation are accessed from a XML based user profile (AutoGeneratedUser_Profile.xml). This ability to auto generate number of subscribers allow MAPS™ LTE eGTP to simulate high intensity eGTP-u signalling.

In order to achieve much higher density GTP user traffic simulation, GL recommends MAPS™ LTE eGTP with Packet Load appliance. MAPS™ LTE eGTP with PacketLoad generates high density (4 Gbps or 40 gbps options available) stateful HTTP/TCP, UDP Ethernet traffic.

Capture Event Log

MAPS™ provides Events, Error Events, and Captured Errors log encountered during the progress of the call. The events are saved in the database which can be accessed via web interface. Protocol specific signaling events and the traffic events are logged along with the Call Trace ID, Script Name, Script ID, and the Timestamp of the occurred event.

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Call Statistics and Graph

Statistics provides the number of calls passed/failed, which are also plotted as pie-graph, to view the statistics of the messages sent/received; Calls per sec graph, and Simultaneous calls per sec graph, which are displayed as per the pattern type and the parameters set in Load Generation window.

Figure: Call Statistics

Supported Protocols and Specifications

<table>
<thead>
<tr>
<th>Supported Protocols</th>
<th>Standard / Specification Used</th>
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</thead>
<tbody>
<tr>
<td>Evolved GTP (eGTP) for EPS</td>
<td>3GPP TS 29.274 V8.0.0 (2008-12)</td>
</tr>
<tr>
<td>Evolved GTP (eGTP) for EPS</td>
<td>3GPP TS 29.274 V9.2.0 (2010-03)</td>
</tr>
</tbody>
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Buyer’s Guide

PKS142 - MAPS™ LTE eGTP (S3, S4, S5, S8, S10, S11 and S16) Interfaces
ETH100 - Mobile Traffic - PacketCheck™
ETH101 - MobileTrafficCore - GTP
ETH102 - MobileTrafficCore - Gateway

Related Software

PKV107 - LTE Protocol Analyzer
PKS140 - MAPS™ - LTE S1 Interface
PKS164 - MAPS™ - UMTS – IuPS Interface Emulation
PKS160 - MAPS™ - UMTS – IuCS and Iuh Interface Emulation
PKS130 - MAPS™ - SIGTRAN (SS7 over IP)
PKS135 - MAPS™ - ISDN SIGTRAN (ISDN over IP)

Related Software

PKS120 - MAPS™ - SIP
PKS121 - MAPS™ - SIP Conformance Test Suite (Test Scripts)
PKS122 - MAPS™ - MEGACO
PKS123 - MAPS™ - MEGACO Conformance Test Suite (Test Scripts)
PKS124 - MAPS™ - MGCP and Conformance Test Suite (Test Scripts)

For complete list of MAPS™ products, refer to [https://www.gl.com/maps.html](https://www.gl.com/maps.html) webpage.