

Supports S6a, S13,S13', Cx/Dx, Gx, Rx, & Gy Interfaces

LoCation Services (LCS) over SLh, SLg Interfaces

Authentication, Location Management, Notification, & Faulty Recovery S6a Interface Procedures

Authorization, Abort-Session, & Session-Termination Rx Interface Procedures

ME (Mobile Equipment) Identity Check S13/S13' Interface Procedure

IPCAN Session Establishment & Modification Gx Interface Procedure

AA, Re-Auth, Abort-Session, and Session-Termination Request/Answer Rx Interface Procedures

Simulate Thousands of Smartphones (UEs) Powering Up & Down

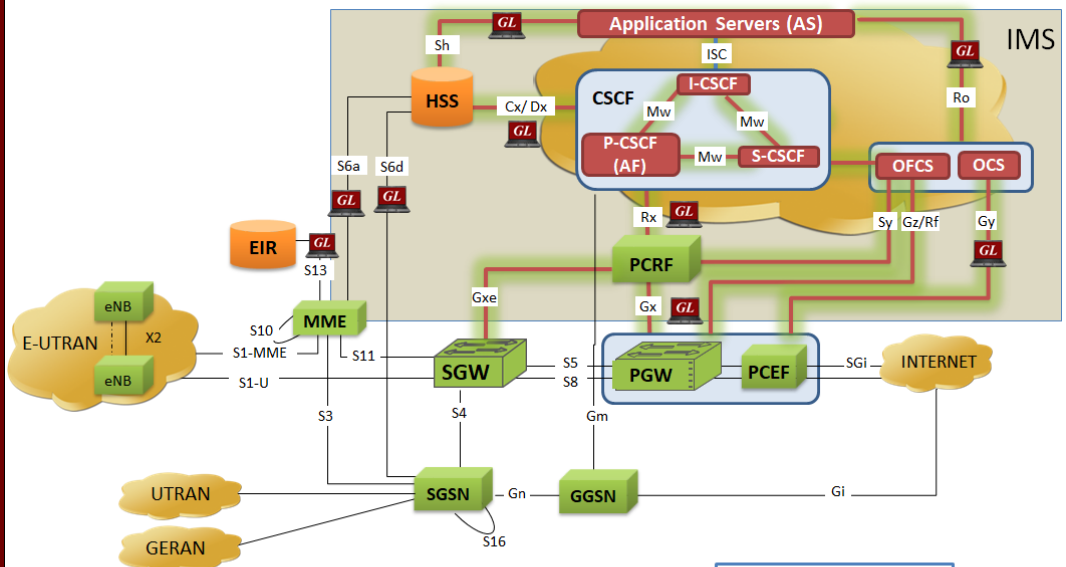
Secured Information Transfer over TLS

Temporary Addressing Management for Mobility & Security

MAPS™ Diameter Supports the API command lien interface

MAPS™ Diameter Emulator

(Scripted Diameter Interfaces Emulation)



GL PacketScan™ IMS Protocol Analyzer
(S6a, S13, S13', Cx/Dx, Gx, Rx, Gy, SLg and SLh)

Overview

Within LTE IMS network, Message Automation & Protocol Simulation (MAPS™) Diameter can simulate S6a, S13, S13', Cx/Dx, Gx, Rx, and Gy interfaces and test network elements such as the MME (Mobility Management Entity), HSS (Home Subscriber Server), AF (Application Function), PCRF (Policy and Charging Rules Function), CSCF (Call Session Control Function), SGSN (Serving GPRS Support Node), PCEF (Policy and Charging Enforcement Function), EIR (Equipment Identity Register), PDN GW (Packet Data Network Gateway), AS (Application Server), CTF (Charging Trigger Function), and OCS (Online Charging System).

MAPS™ Diameter gives the users the unlimited ability to edit messages on supporting interfaces generating procedures such as Location Management, Subscriber Data Handling, Authentication, Fault Recovery, and Notification procedures over **S6a interface**; AA-Request/Answer, Re-Auth-Request/Answer, Abort-Session-Request/Answer, and Session-Termination-Request/Answer procedure over **Rx interface**; Mobile Equipment Identity Check procedure over **S13/S13' interface**; Authentication Authorization (AA) procedure over **Rx and Gx interface**; Credit Control-Request/Answer and Re-Auth-Req procedures over **Gy interface**.

MAPS™ Diameter is enhanced to simulate **Location Service (LCS)** based SLh and SLg interfaces between the GMLC <-> HSS and GMLC <-> MME defined for the Control Plane as per 3GPP TS 23.271 specifications.

MAPS™ Diameter Emulator supports communication over both **SCTP (Stream Control Transmission)** and **TCP (Transmission Control Protocol)** transport protocol layers. The TCP used along with IP provides reliable message transfer between interconnected computer communication networks. MAPS™ Diameter also supports **TCP/TLS (Transport Layer Security)** for the secured information transfer.

MAPS™ Diameter Emulator supports powerful utilities like Message Editor, Script Editor, and Profile Editor which allow new scenarios to be created or existing scenarios to be modified using Diameter messages and parameters.

For more information on MAPS™ Diameter, refer to <http://www.gl.com/maps-diameter-protocol-emulator.html>



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Main Features

- Supports simulation of real-time LTE network using “[MAPS 4G Wireless Lab Suite](#)”.
- Emulator can be configured as MME, HSS, PCRF, PCEF, CSCF, SGSN, PDN GW, EIR, AS, AF, CTF, and OCS entities to emulate S6a, S13, S13,' Cx/Dx, Gx, Rx, and Gy interfaces.
- Supports simulation of Location Services (LCS) based SLh and SLg interfaces between the GMLC <-> HSS and GMLC <->MME entities.
- The Diameter now supports CLI interface based on a client-server model allows user to control all features through APIs.
- Provides support for TCP/TLS for the secured information transfer. SCTP/DTLS (Datagram Transport Layer Security) support coming soon.
- Generates hundreds of UE Signaling (Load testing).
- Ready scripts for procedures over interfaces such as -
 - Procedures over S6a interface: Location Management, Subscriber Data Handling, Authentication, Fault Recovery, and Notification
 - Procedures over Rx interface: AA-Request/Answer, Re-Auth-Request/Answer, Abort-Session-Request/Answer, and Session-Termination-Request/Answer
 - Procedure over Gx interface: IPCAN Session Establishment and Modification
 - Procedure over S13 interface: ME (Mobile Equipment) Identity Check procedure
 - Procedure over Gy interface: Credit Control-Request/Answer and Re-Auth-Req
 - Procedure over SLh, SLg interfaces: Location Request/Response, Emergency Location Request/Response, Repeated Location Report
- Provides call statistics and associated events status.
- Automation, Remote access, and Schedulers to run tests 24/7



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Testbed Configuration

The testbed setup window allows users to setup the required test environment with SCTP configuration in Diameter interface.

SCTP Configuration parameters consists of Source / Destination IP address, Port, to configure MAPS™ to simulate MME, HSS, PCRF, PCEF, CSCF, SGSN, PDN GW, EIR, AS, AF, CTF, OCS, and GMLC entities to emulate S6a, S13, S13', Cx/Dx, Gx, Rx, Gy, SLh, and SLg interfaces.

End user configuration profile used to configure MAPS™ Diameter with supported node parameters.

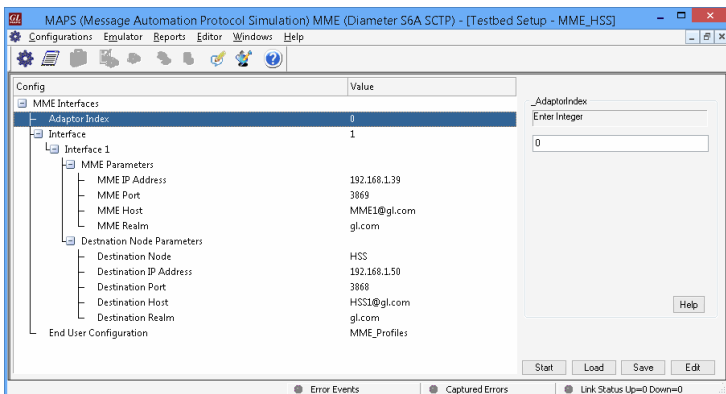


Figure: Testbed Configuration

Pre-processing Tools

PROFILE EDITOR - The profile editor allows user to edit or create profiles in order to define run-time values to the variables for the message templates. The users can edit the values of the variables thus 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.

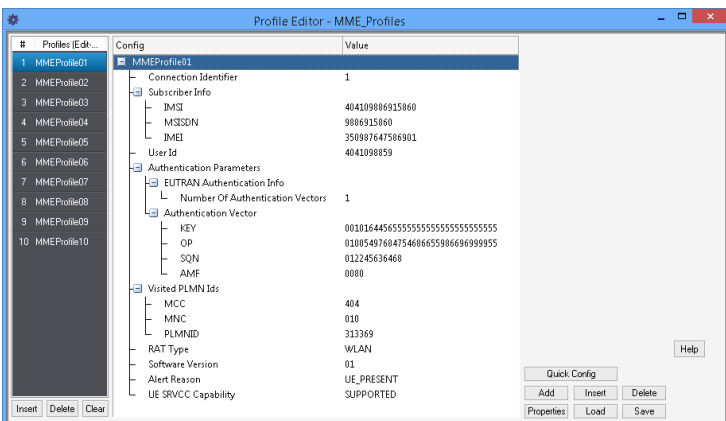


Figure: Profile Editor

Pre-processing Tools...

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, & optional variable parameters.

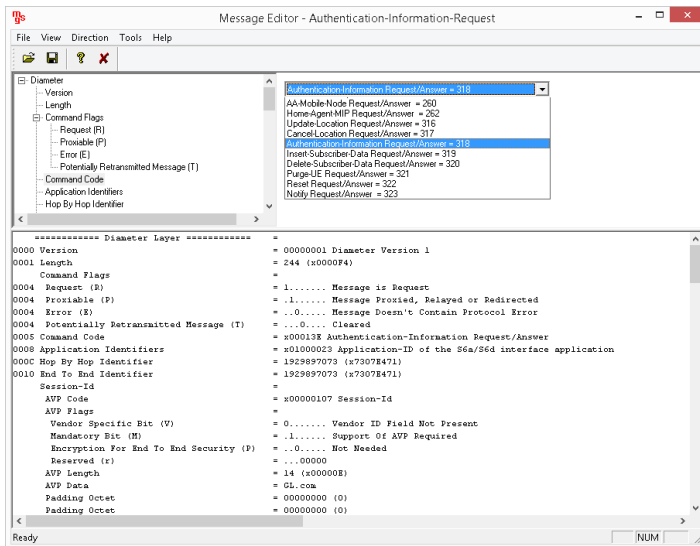


Figure: Message Editor

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).

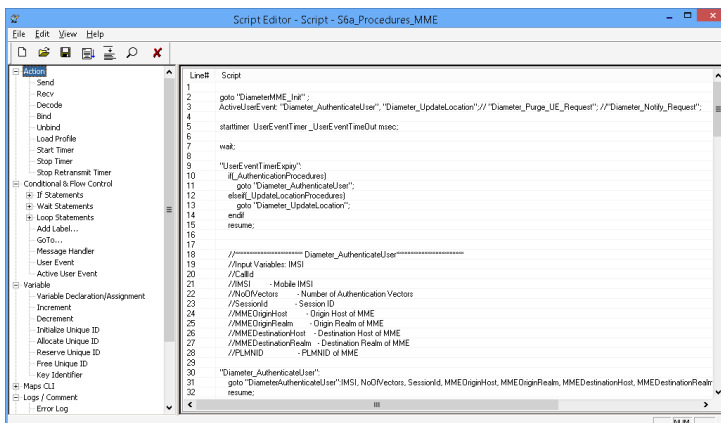


Figure: Script Editor



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Call Generation and Call Reception

In call generation, MAPS™ is configured for the outgoing 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.

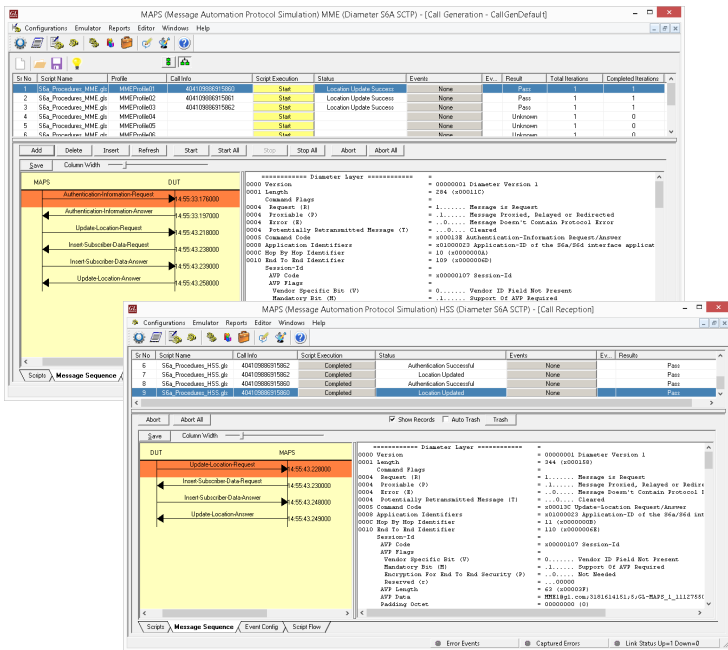


Figure: Call Generation & Reception

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.

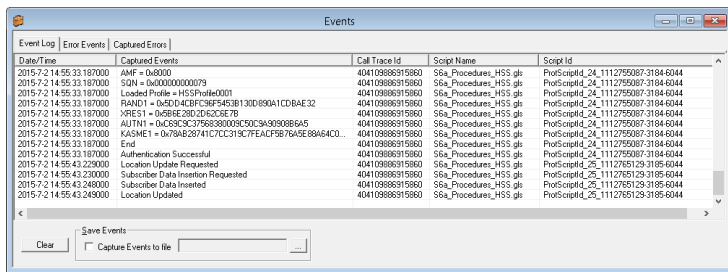


Figure: Event Log

Diameter Procedures

Supported procedures over Diameter interfaces are -

- Procedure over S6a interface
 - Location Management, Subscriber Data Handling, Authentication, Fault Recovery, and Notification
- Procedure over Rx interface
 - AA-Request/Answer, Re-Auth-Request/Answer, Abort-Session-Request/Answer, and Session-Termination-Request/Answer.
 - See [Rx Interface Call Generation](#) screenshot
 - See [Rx Interface Call Reception](#) screenshot
- Procedure over Gx interface
 - IPCAN Session Establishment and Modification
- Procedure over S13/S13' interface
 - ME (Mobile Equipment) Identity Check procedure
- Procedure over Cx Dx interface
 - Server Assignment Request and Server Assignment Answer
- Procedure over Gy interface
 - Credit Control-Request/Answer, Re-Auth-Request for Session based Charging and One-time Event based Charging
- Procedure over SLh, SLg interfaces
 - Location Request/Response
 - Emergency Location Request/Response
 - Repeated Location Report
 - See [SLh Interface Call Simulation](#) screenshot
 - See [SLg Interface Call Simulation](#) screenshot

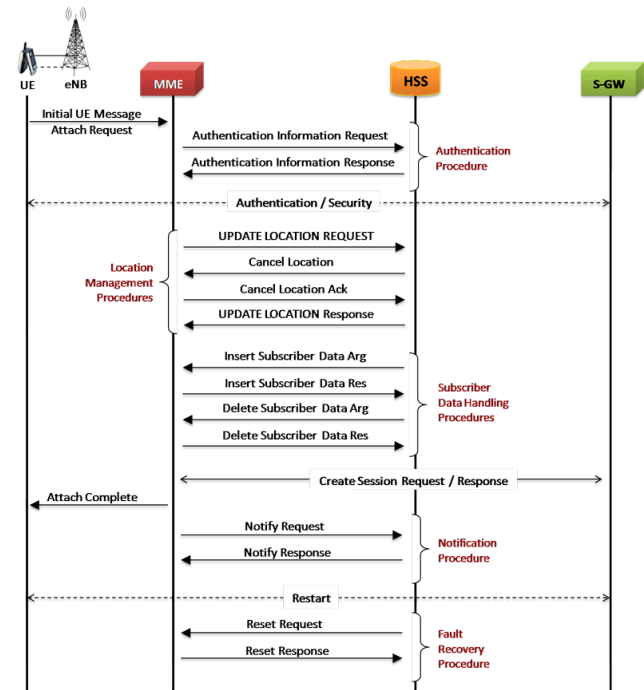


Figure: S6a Interface Procedure



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MAPS™ CLI Support

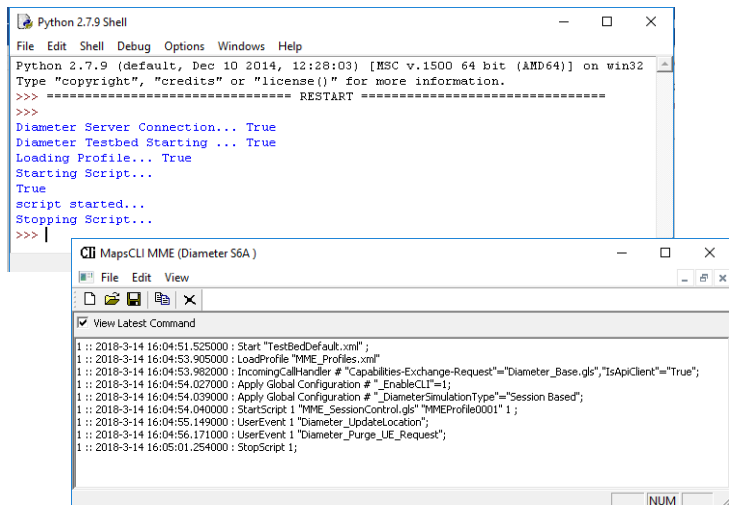
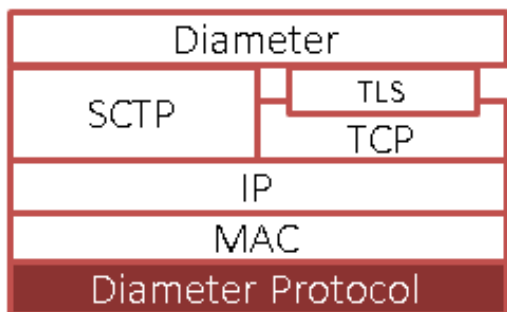


Figure: Call Generation & Reception

Supported Protocols and Specifications



Supported Protocols	Standard / Specification Used
Diameter	IETF RFC 3588 S6a, S13, S13' - 3GPP TS 29.272 V10.3.0 Rx - 3GPP TS 29214-b10 Cx/Dx - 3GPP TS 29.228 & TS29.229 Gx - 3GPP TS 29.212 & TS 23.203 Gy (DCCA)- 3GPP TS 32.225, 3GPP TS 32.299 and IETF RFC 4006 SLg - 3GPP TS 29.172 SLh - 3GPP TS 29.173
SCTP	RFC 4960
TCP	RFC793
TLS	RFC5246

MAPS™ Diameter can be configured as server-side application, to enable remote controlling through multiple command-line based clients. Supported clients include Java, VBScripts, TCL, Python and others. The Diameter APIs allows for programmatic and automated control over all Diameter protocols. Each MAPS™ Diameter server can receive multiple client connections and offer independent execution to each client. Likewise, a single client can connect to multiple MAPS™ Diameter servers, including servers running different protocols, permitting complex cross-protocol test cases.

Buyer's Guide

[PKS139](#) - MAPS™ Diameter Emulator

[ETH100](#) - Mobile Traffic - PacketCheck™

[ETH101](#) - MobileTrafficCore - GTP

[ETH102](#) - MobileTrafficCore - Gateway

Related Software

[PKS132](#) - MAPS™ MAP Protocol Emulation over IP

[PKS147](#) - MAPS™ Lb Interface Emulator

[PKS148](#) - MAPS™ LTE SLs Interface Emulator

[PKS164](#) - MAPS™ UMTS – Iu-PS Interface Emulation

[PKS160](#) - MAPS™ UMTS – Iu-CS and Iuh Interface Emulation

[XX165](#) - T1 or E1 UMTS Protocol Analyzer

[OLV165](#) - Offline UMTS Protocol Analyzer

[LTS206](#) - OC-3 / STM-1 UMTS Protocol Analysis

[LTS306](#) - OC-12 / STM-4 UMTS Protocol Analysis

[PKS130](#) - MAPS™ SIGTRAN (SS7 over IP)

For complete list of MAPS™ products, refer to <http://www.gl.com/maps.html> webpage.



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