Overview
GL’s MAPS™ SIP IMS test suite provides an advanced full-fledged network environment that enables users to test their applications, devices, and services prior to deployment on a real-time network. It can be used to simulate all or specific elements within IMS network infrastructure using simple ready-to-use testbed setup.

The network architecture shown above outlines the IMS Core Network elements which can be simulated using GL’s MAPS™ SIP IMS test tool.

MAPS™ SIP IMS test suite is capable of simulating multiple UEs and IMS core elements such as P-CSCF, I-CSCF, S-CSCF, PCRF, MGCF which provides the IMS core network. With the help of mobile phones, and other simulated wireless networks, the VoLTE Lab setup can be operated in real-time for making Voice calls over LTE and also for interworking with PSTN and VoIP networks. It includes ready-to-use scripts, as per IETF specification. Test scripts include general messaging and call flow scenarios for multimedia call session setup and control over IP networks. Logging and pass/fail results are also reported. Test cases verify conformance of actions such as registration, call control, proxies and other servers.


Main Features
- Simulates P-CSCF, I-CSCF, S-CSCF, PCRF, HSS, BGCF, MGCF elements in LTE IMS network supporting Cx/Dx, Rx, Gx, Gm, Mg, SGI, Mi, and Mj interfaces
- Simulate multiple UEs
- Supports IMS multi interface configuration simulating end-to-end Online and Offline charging procedures
- Supports both signaling and traffic simulation (RTP from simulated UE’s and GTP from Real UE’s) between any two IMS nodes
- Supports simulation of core network, access network, roaming architecture, interworking with other networks
- Complete IMS lab for End to End test solution
- Test environment allows user to test each IMS network elements independently using single interface simulation or multi interface simulation
- Any of the network element within the lab environment can be replaced by DUT to test particular node working
- Integrate IMS core network easily with 2G, 3G, 4G or any PSTN networks to test any call scenario using remote MAPS™
- Build customized call scenarios as MAPS™ provides complete script based solution
- Test any applications and services using IMS core network
- Remotely control/monitor all the interwork interfaces and elements using Remote MAPS™ application
Supported procedures
- IMS Registration via SIP interface (with AKA Authentication, with Digest authentication) over TCP/UDP
- IMS Registration from Visited Network
- Mobile induced deregistration - SIP
- SIP Audio Call from Non Roaming user to Non Roaming user across the network
- SIP Audio Call from Non Roaming user to Non Roaming user on the same network
- SIP Audio Call from Roaming user to Non Roaming user across the network
- SIP Audio Call from Roaming user to Non Roaming user on the same network
- Call from IMS to PSTN
- Registration and IMS call with Signalling Compression (sigcomp)

Call from UE1 in ATT Network to UE2 in the Same Network

Call from UE1 in ATT Network to UE2 in PSTN Network
Call between UEs in different networks
The following network is an illustration of a Call simulation from Non Roaming User to another Non Roaming User across different LTE – IMS Network (UE1 in ATT network to UE2 in Verizon network).

Remote MAPS Server
The Remote MAPS Server feature within MAPS™, is a client server module, designed for multi-node multi-interface simulation. In IMS network, MAPS™ can be configured to simulate multiple nodes situated at various locations, which can be controlled using a single Remote Client GUI. The client application connects to the server and remotely accesses the MAPS™ functionalities simulating the configured nodes. The client communicates with the remote MAPS™ Server via the Listener running at the server location.

SIP/IMS Registration & Call Control Procedure
Below diagram shows the Registration flow at S-CSCF which handles SIP Registrations for ATT Network interacting with I-CSCF and HSS. And the Call flow at I-CSCF interacting with S-CSCF of ATT Network, and HSS and S-CSCF of Verizon Network.

Figure: Remote MAPS Server Configuration

Figure: End-to-end Registration & Call Control Procedures
End-to-End Online and Offline Charging Simulation

The IMS network architecture outlining the IMS Core Network elements interconnected with SIP elements can be simulated using GL's MAPSTM IMS Multi Interface test tool.

MAPSTM IMS Multi Interface is designed to simulate end-to-end Online and Offline Charging procedures. This above setup depicts MAPSTM S-CSCF Multi-Interface node configured to handle end-to-end charging procedures.

MAPSTM S-CSCF Multi Interface node interacts with the MAPSTM SIP (UEs) receiving the request and responding using SIP protocol. Registration and Authentication of the UEs is performed at MAPSTM HSS. And MAPSTM S-CSCF interacts with the OCF for processing Online charging procedure and with the OFCS for processing Offline charging procedure. MAPSTM Diameter is configured as the charging systems (OCS and OFCS) for Rf and Ro (DCCA) interfaces.
Supported Protocol Standards

<table>
<thead>
<tr>
<th>Supported Protocols</th>
<th>Standard / Specification Used</th>
</tr>
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<tbody>
<tr>
<td>SIP</td>
<td>RFC 3261</td>
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SIP Extensions

- RFC 3262 - Reliability of Provisional Responses in the Session Initiation Protocol (SIP)
- RFC 3311 - The Session Initiation Protocol (SIP) UPDATE Method
- RFC 3455 - Private Header (P-Header) Extensions to the Session Initiation Protocol (SIP) for the 3rd-Generation Partnership Project (3GPP)
- RFC 3515 - The Session Initiation Protocol (SIP) Refer Method
- RFC 3310 - HTTP/SIP Digest Authentication Using Authentication and Key Agreement (AKA)
- RFC 3263 - Session Initiation Protocol (SIP): Locating SIP Servers

Diameter

- RFC 3588 - Diameter Base Protocol
- S6a, S6d, 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

Buyer's Guide

- **PKS127** - MAPS™ SIP-IMS Text IP
- **PKS301** - MAPS™ IMS Multi Interface (S-CSCF)

Related Software

- **PKS120** - MAPS™ SIP
- **PKS139** - MAPS™ Diameter Emulator
- **PKS126** - MAPS™ SIP-I
- **PKS122** - MAPS™ MEGACO
- **PKS124** - MAPS™ MGCP
- **PKS135** - MAPS™ ISDN-SIGTRAN (ISDN over IP)
- **PKS130** - MAPS™ SIGTRAN (SS7 over IP)
- **PKS140** - MAPS™ LTE - S1 Interface
- **PKS142** - MAPS™ LTE- eGTP (S11, S5/S8) Interfaces
- **PKS164** - MAPS™ UMTS – IuPS (over IP) Interface Emulation
- **PKS160** - MAPS™ UMTS – IuCS and IuH Interface Emulation

Buyer's Guide...

- **PKS102** - RTP Soft Core for RTP Traffic Generation
- **PKS103** - RTP IuUP Softcore
- **PKS107** - RTP EUROCAE ED137
- **PKS108** - RTP Voice Quality Measurements
- **PKS106** - RTP Video Traffic Generation
- **PKS200** - RTP Pass Through Fax Emulation
- **ETH100** - Packet Traffic Simulation - GTP
- **ETH101** - Mobile Traffic Core-GTP
- **ETH102** - Mobile Traffic Core-Gateway
- **ETH103** - Mobile Traffic - Gb

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