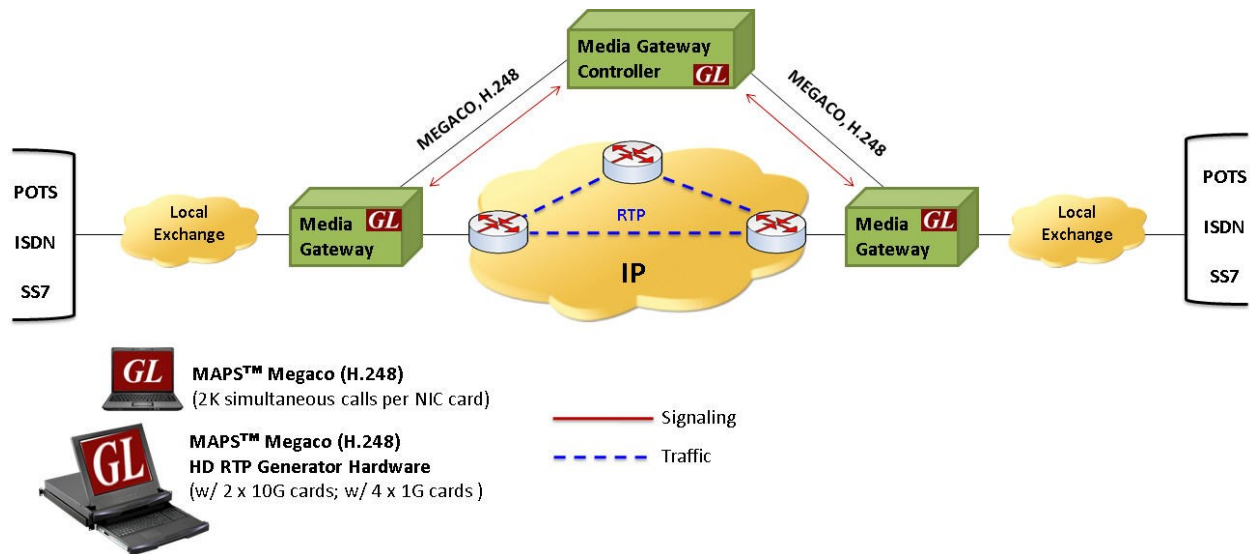


MAPS™ MEGACO/H.248 Protocol Emulator



Overview

GL's **Message Automation & Protocol Simulation (MAPS™)** is an advanced protocol simulator/tester designed for Megaco (H.248) testing, which can simulate MGC to test Media Gateway with various types of calls. It can also control scenario involved in Media conversion.

MAPS™ MEGACO (H.248) simulates Trunking Gateway and Residential Gateway using binary based H.248 protocol or text based MEGACO protocol in Digital and Analog network respectively.

The MEGACO/H.248 protocol is implemented in binary encoding over 2G/3G core network. However, it can be still used in traditional text based encoding in IP networks as well. It supports **binary encoding** simulating MSC/GMSC Servers (MGC) and MG across Mc interface in 2G/3G and IP networks. This supports multimedia streams across the network, providing VoIP services like voice and fax.

MAPS™ MEGACO supports transmission and detection of various RTP traffic and the maximum simultaneous Calls up to 2500, and Calls per Second up to 250 is achievable and all voice codecs are supported.

The **MAPS™ MEGACO/H.248 Conformance Scripts** is designed with 200+ test cases, as per ETSI TS 102 374-2 specifications. Test suite includes in-built scripts which tests the functionality of the Media Gateway for Megaco/H.248 protocol valid and in-valid behavior.

MAPS™ **MEGACO** also supports high volume of calls with traffic simulation using GL's HD RTP Generator Hardware, which has four 10G Ethernet ports. MAPS™ HD (High Density) network appliance is designed to easily achieve up to 20,000 endpoints per appliance (5000 per port).

For more information, please visit [MAPS™ MEGACO Protocol Simulator](http://www.gl.com/Maps/Megaco/H248) webpage.

Main Features

- Simulates Media Gateway Controller (MGC) and Media Gateway (MG) functionalities.
- Both text based and binary based syntax are supported in MEGACO (H.248)
- Supports more than 500+ simultaneous bulk call generation simulating gateways in digital and analog network.
- Complete end to end test environment for 2G, 3G and VoIP networks.
- Supports RTP media (digits, voice file, tones, IVR, FAX, and Dynamic VF) over TDM lines.
- High density of up to 20,000 calls with traffic is easily achievable per appliance.
- Simulates Trunking Gateway interfacing VoIP and TDM networks converting RTP traffic to TDM and vice-versa.
- Simulates Residential Gateway interfacing analog line and packet networks converting Analog traffic to RTP and vice-versa.
- Supports commands such as Add, Subtract, Notify, Modify, Move, ServiceChange, AuditValue, and Audit Capabilities.
- Supports almost all industry standard codecs G.711 (mu-Law and A-Law), G.722, G.729, G.726, GSM, AMR, EVRC, SMV, iLBC, SPEEX, and more. AMR and EVRC variants require additional licenses.



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Scenario 1: MAPS™ acting as MG for MGC Conformance Testing

MAPS™ can be configured to act as MG, so that entire MGC testing can be automated.

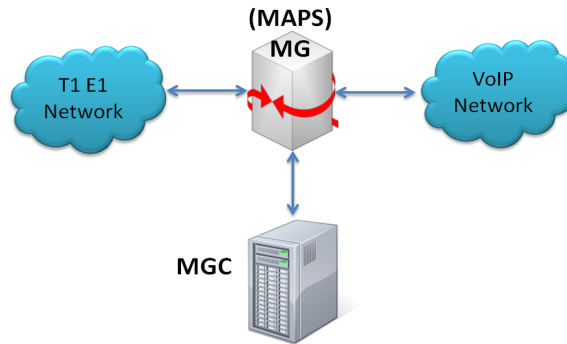


Figure: MAPS™ as MG

Scenario 2: MAPS™ acting as MGC for MG Conformance Testing

MAPS™ can be configured to act as MGC, so that entire MG (Media Gateway) testing can be automated.

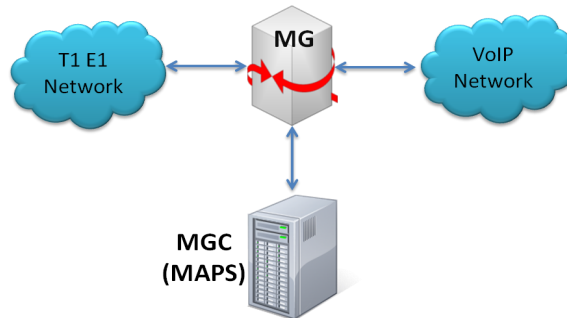


Figure: MAPS™ as MGC

Scenario 3: Testing ATAs and Gateways

MAPS™ MEGACO/H.248 Conformance test tool is an ideal tool to evaluate Gateway / ATA product features such as call connectivity, call signaling, traffic generation, voice quality testing, codec, and hundreds of other features.

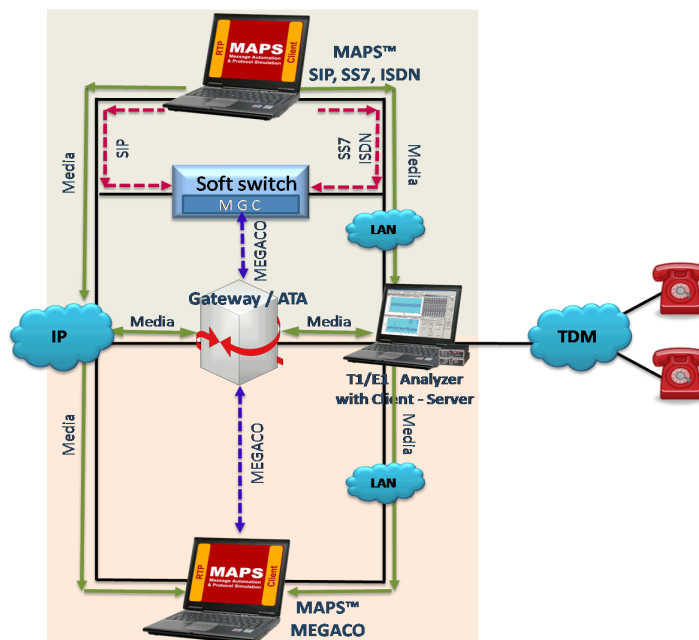


Figure: Testing ATA and Gateway

Pre-processing Tools

Testbed Setup Configuration

The configuration window allows users to setup the required test environment to simulate messaging from different Megaco/H.248 entities such as the Media Gateway Controller (MGC) and Media Gateway (MG). Testbed can be configured for MAPS™ to act as Residential Media Gateway (RGW), and Trunking Media Gateway (TGW).

End user configuration profile used to configure MAPS™ Megaco/H.248 with RGW and TGW parameters.

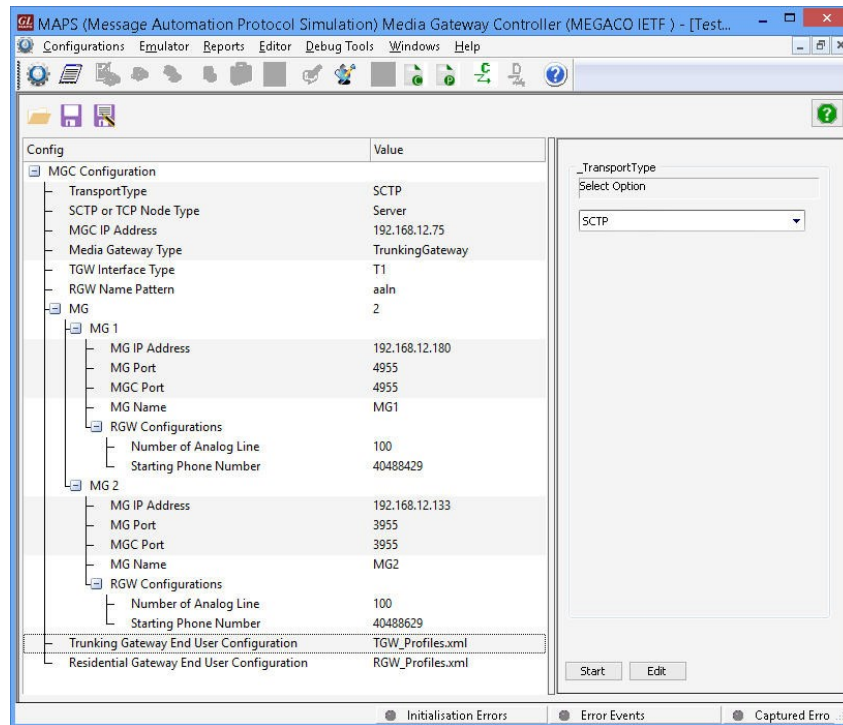


Figure: Testbed Setup Configuration

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 (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).

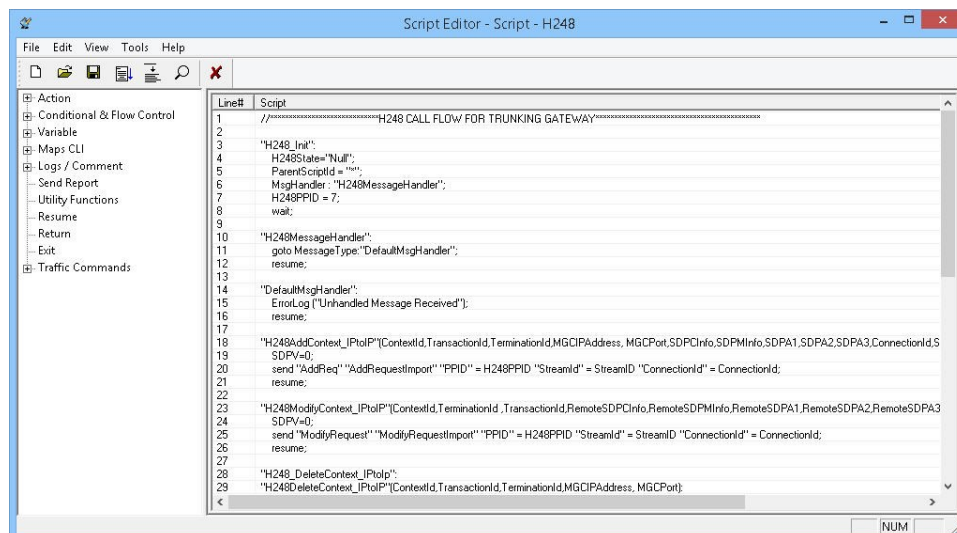


Figure: Script Editor

Pre-processing Tools (Contd.)

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.

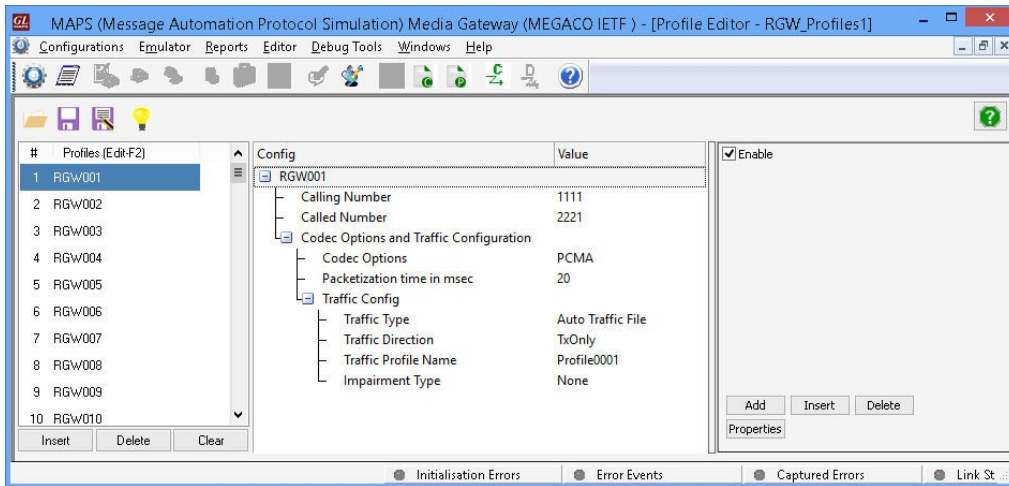


Figure: Profile Editor

Typical Megaco (H.248) Call Procedures

Call between Residential Gateways (RGW) in Analog Network

The following call flow procedure illustrates simulation of Residential Gateway (RGW) containing one or two Analogue lines interworking an Analog line to a Packet network. In this call scenario, Terminations A and B are communicating via MGC, Residential Gateway generates messages for enabling media flow (RTP).

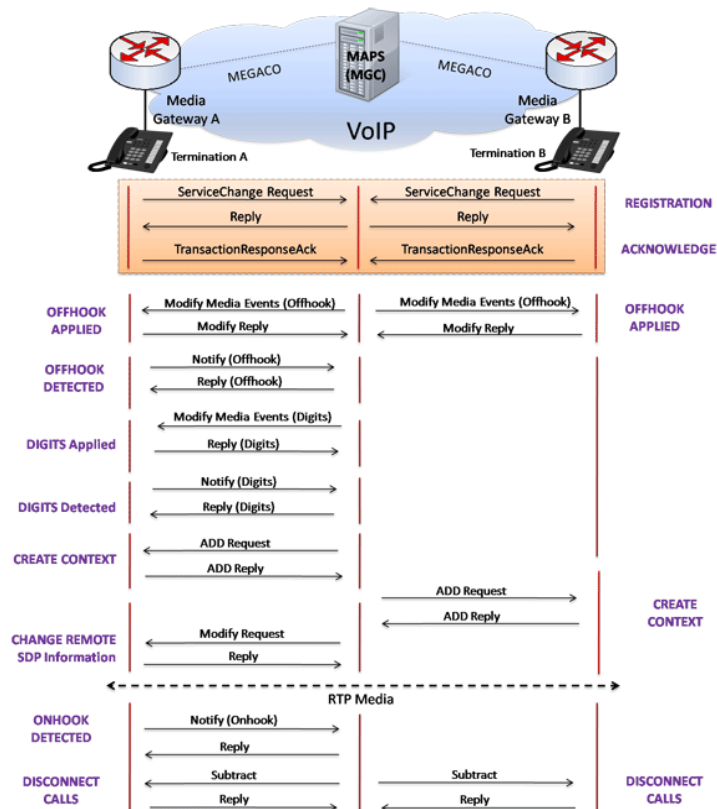


Figure: Residential Gateway Simulation in Analog Network

Call between Trunking Gateways (TGW) in Digital (TDM) Network

The following call flow procedure illustrates simulation of Trunking Gateway, which lies between Switched Circuit Network (SCN) and Packet Network controlled to the same MGC. In this call scenario MGC generates messages for enabling media flow.

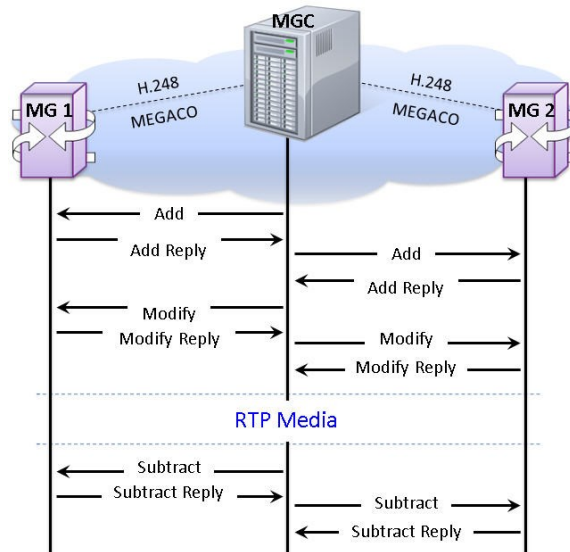


Figure: Trunking Gateway Simulation in Digital Network

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 are started manually at call generation; and at the call reception, the script is automatically triggered by incoming messages.

The following MAPS™ Call Generation GUI depicts the RGW call simulation with binary and textual message decodes as shown below:

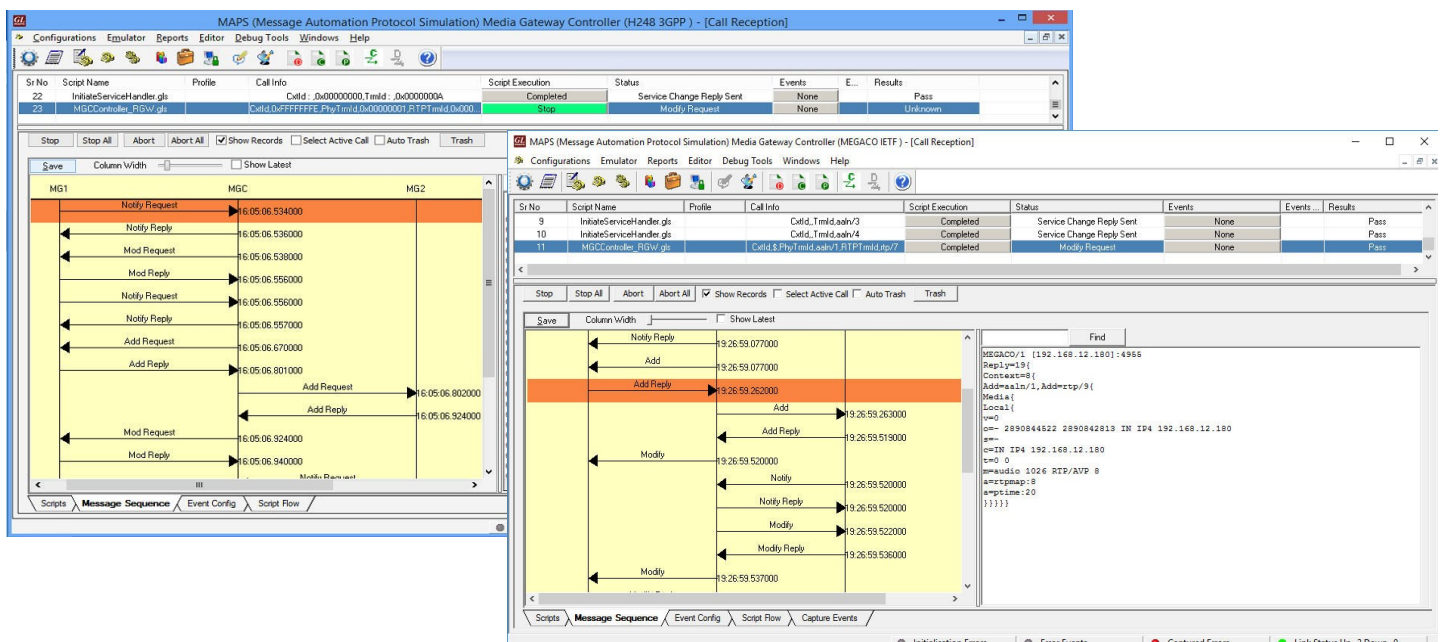


Figure: RGW Simulation with Binary and Text Decodes

Call Generation and Reception (Contd.)

The following MAPS™ Call Generation GUI depicts the TGW call simulation with binary and textual message decodes as shown below

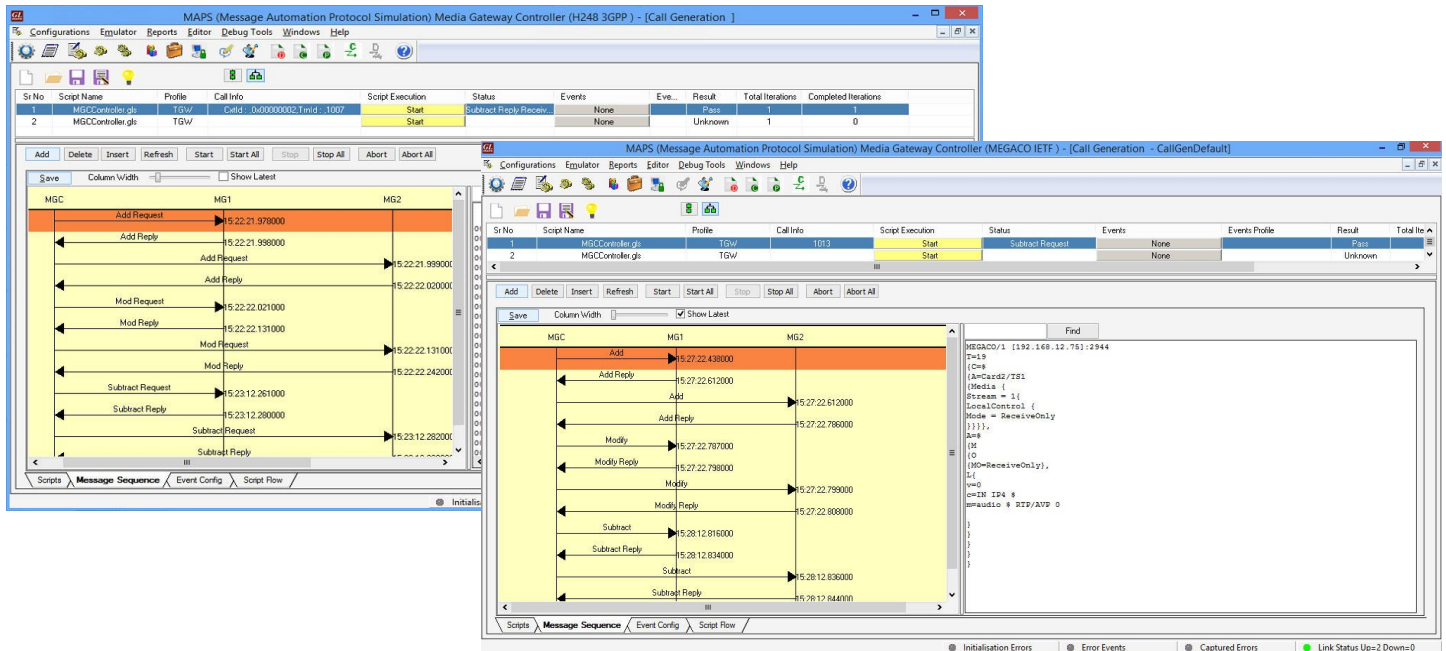
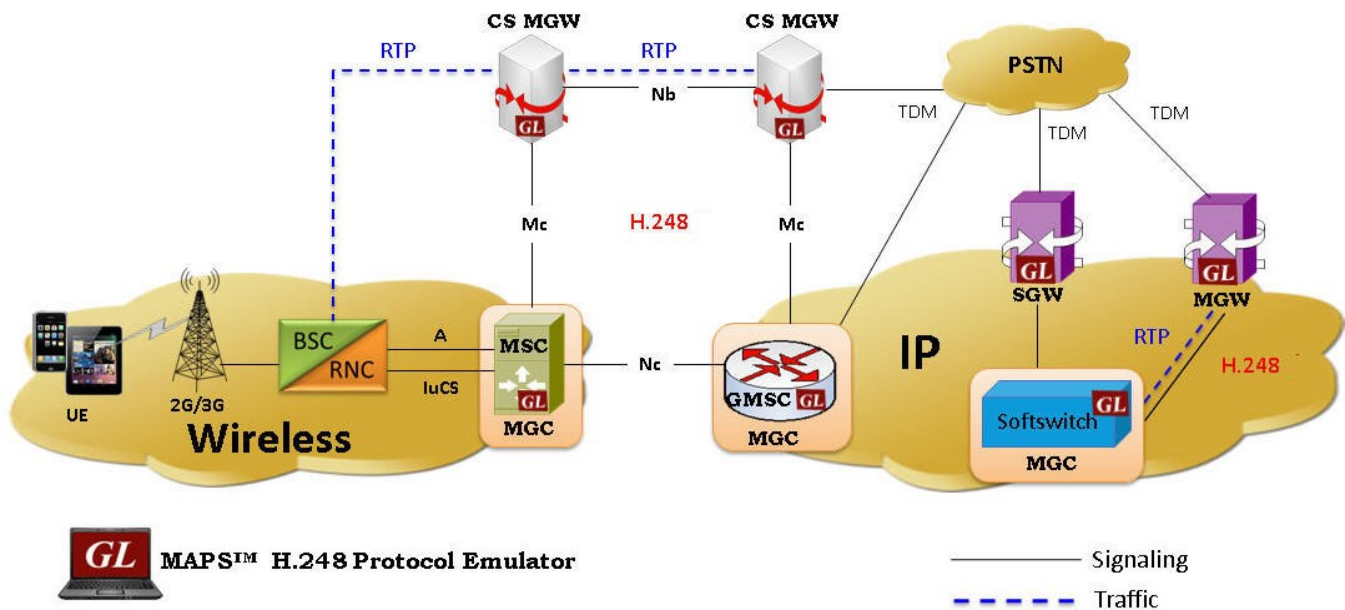


Figure: TGW Simulation with Binary and Text Decodes

MAPS™ Megaco (H.248) in 2G/ 3G Network

GL's MAPS™ MEGACO (H.248) protocol emulator can simulate both MSC/GMSC (MGC) and MG network elements across Mc interface in 2G/3G and VoIP networks. The MSC servers and GMSC servers are connected via Nc interface. Any suitable call control protocol may be used over the Nc interface (e.g. BICC Protocol). The GMSC server and MSC server supports the call control and mobility management functions, and the media gateway provides the bearer control and transmission resource functions.



Typical Megaco (H.248) Call Procedure in 2G/3G

The Megaco/H.248 (with binary encoding) call procedure depicted in the diagram is initiated from the UE in the 2G/3G network and is processed at MSC/GMSC nodes communicating with the MGW handling the RTP traffic.

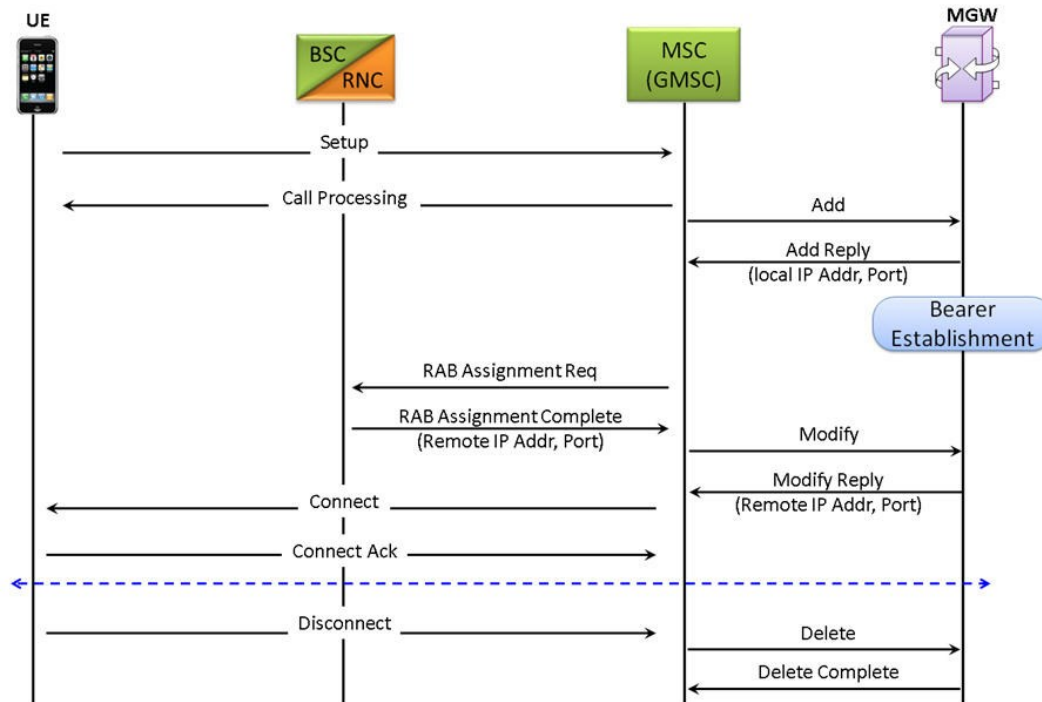


Figure: Megaco/H.248 Call Procedure in 2G/3G Network

The following MAPS™ Call Generation application GUI depicts the typical Megaco (H.248) call simulation with binary message decodes. The Call ID details in the Call Info column identifies the calls at the receiving and at the generation end.

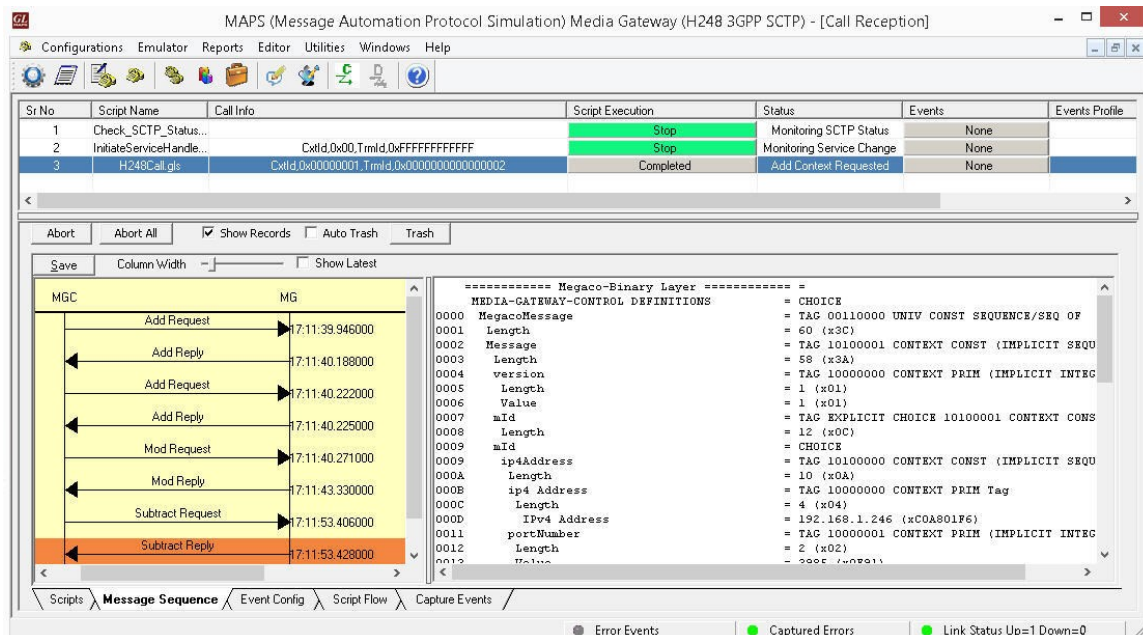


Figure: MAPS™ Megaco/H.248 Call Simulation in 2G/3G

MAPS™ Megaco (H.248) Conformance Testing

MAPS™ include inbuilt MGC-conformance, and MG conformance, scripts (*.gls) that allow testing the MGC and MG Megaco (H.248) entities as per IETF RFC 3261 standard.

MAPS™ supports Add, Subtract, Notify, Modify, Move, ServiceChange, AuditValue, and AuditCapabilities.

Sequences Tested

Test Purposes For Media Gateway (MG)

- Procedures using Add command (AD)
- Procedures using Modify command (MD)
- Procedures using Subtract command (SU)
- Procedures using Move command (MO)
- Procedures using Audit Value command (AV)
- Procedures using Audit Capabilities command (AC)
- Procedures using Notify command (NO)
- Procedures using Service Change command (SC)
- Administration and Maintenance procedures (AM)
- Transport related procedures (TR)

Test Purposes For Media Gateway Controller (MGC)

- Procedures using Add command (AD)
- Procedures using Subtract command (SU)
- Procedures using Move command (MO)
- Procedures using Audit Value command (AV)
- Procedures using Audit Capabilities command (AC)
- Procedures using Notify command (NO)
- Procedures using Service Change command (SC)
- Administration and Maintenance procedures (AM)
- Transport related procedures (TR)

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. Clients can remotely perform all functions and generate traffic, simulate calls through commands. This client application is distributed along with MAPS™ Server application.

The image shows two overlapping windows. The left window is titled 'CLI MapsCLI Media Gateway Controller (MEGACO IETF)' and displays a log of commands and responses. The right window is titled 'Python 2.7.12 Shell' and shows the execution of a Python script.

```

CLI MapsCLI Media Gateway Controller (MEGACO IETF)
File Edit View
View Latest Command
1:: 2019-2-22 19:00:31.547000 : Start "TestBedDefault_TGW_MGC.x
1:: 2019-2-22 19:00:31.826000 : LoadProfile "TGW_Profiles.xml"
1:: 2019-2-22 19:00:31.838000 : Apply Global Configuration # "_Enab
1:: 2019-2-22 19:00:31.839000 : IncomingCallHandler # "ServiceChar
1:: 2019-2-22 19:00:32.044000 : IncomingCallHandler # "ServiceChar
1:: 2019-2-22 19:00:32.045000 : IncomingCallHandler # "ServiceChar
1:: 2019-2-22 19:00:33.365000 : IncomingCallHandler # "ServiceChar
1:: 2019-2-22 19:00:53.336000 : StartScript 1 "MGCController.gls" "T
1:: 2019-2-22 19:00:53.588000 : UserEvent 1 "PlaceCall";
1:: 2019-2-22 19:00:54.108000 : UserEvent 1 "GetCallStatus";
1:: 2019-2-22 19:01:54.122000 : UserEvent 1 "TerminateCall";
1:: 2019-2-22 19:01:54.178000 : UserEvent 1 "GetCallStatus";
1:: 2019-2-22 19:01:54.202000 : StopScript 1;

Python 2.7.12 Shell
File Edit Shell Debug Options Window Help
Python 2.7.12 (v2.7.12:d33e0cf91556, Jun 27 2016, 15:24:40) [MSC v.1500 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\MAPS-MEGACO\PythonClient\examples\MEGACO\MegacoBasicCall_TGW_MGC.py
MGC SERVER INITIALIZED
MGC Server Call handle = 67308865
MGC Server Call result = 0
ICR 1 SUCCESS
MGC Server Call handle = 67308866
MGC Server Call result = 0
ICR 2 SUCCESS
MGC Server Call handle = 67308867
MGC Server Call result = 0
ICR 3 SUCCESS
MGC Server Call handle = 67308868
MGC Server Call result = 0
ICR 4 SUCCESS
MGC Server = STARTED
MGC Call handle = 67108865
START SCRIPT SUCCESS
MGC Call Status = ESTABLISHED
MGC Call Status = MG2_CONTEXTREQUESTED
MGC Call Status = MG2_CONTEXTSUBTRACT
MGC Stop script.
Client disconnected from MGC server.
>>>
Ln:26 Col:4

```

Figure: MAPS™ CLI Server & Sample Python Client Script

Buyer's Guide

| Item No | Product Description |
|------------------------|--|
| PKS122 | MAPS™ MEGACO/H.248 Protocol Emulator |
| PKS123 | MAPS™ MEGACO/H.248 Conformance Test Suite (Test Scripts) |
| PKS101 | SIP Core (additional) |
| PKS102 | RTP Soft Core for RTP Traffic Generation |
| PKS103 | RTP luUP Soft Core |
| PKS107 | RTP EUROCAE ED137 |
| PKS108 | RTP Voice Quality Measurements |
| PCD103 | AMR Narrowband codec for MAPS™ |
| PCD104 | EVRC codec for MAPS™ |
| PCD105 | EVR_B codec for MAPS™ |
| PCD106 | EVR_C codec for MAPS™ |
| PCD107 | AMR Wideband codec for MAPS™ |
| PCD108 | EVS codec for MAPS™ |
| PCD109 | OPUS codec for MAPS™ |

| Item No | Related Software |
|------------------------|--|
| PKS120 | MAPS™ SIP |
| PKS121 | MAPS™ SIP Conformance Test Suite (Test Scripts) |
| PKS124 | MAPS™ MGCP & Conformance Test Suite |
| 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 luPS (over IP) Interface Emulation |
| PKS160 | MAPS™ UMTS luCS and luH Interface Emulation |
| PKS126 | MAPS™ SIP-I Protocol Emulation |
| XX651 | MAPS™ CAS Emulator (requires T1/E1 Analyzer, includes CLI) |

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more information, please visit [MAPS™ MEGACO Protocol Simulator](#) webpage.



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