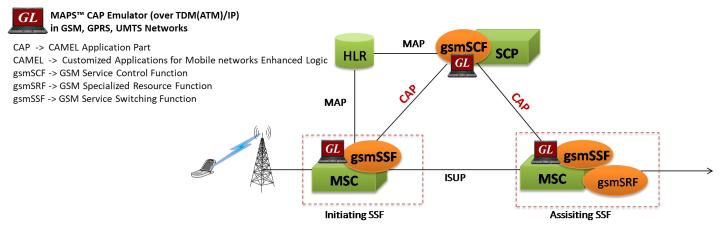
# MAPS<sup>™</sup> CAP Emulator (over TDM,ATM, IP)

(CAMEL Application Part)



### Overview

GL's MAPS<sup>™</sup> CAP can emulate CAMEL Application Part (CAP) supplementary services such as unified messaging, prepaid, low balance, and toll-free (Freephone). CAMEL services are available in TDM, ATM and IP based GSM, GPRS, UTMS networks. CAP information flow is defined between functional entities such as Service Control Function (SCF) and Service Switching Function (SSF) entities. It is suitable for controlling telecommunication services. CAP is transported over Message Transfer Protocol (MTP) in TDM ATM and M3UA, M2PA in IP.

MAPS<sup>™</sup> CAP ATM uses SSCOP server for establishing SSCOP links over which IN signaling will be carried further for making calls. SSCOP Server is GL's WCS based server module and provides SSCOP, and AAL5 layer services. It uses AAL5 Traffic Generator for traffic generation. Various traffic types such as Tone, Digits and File playback are supported.

The tester supports testing network elements SSF and SCF, error tracking, regression testing, conformance testing, and load testing/call generation. It can run pre-defined test scenarios against CAP interface test objects in a controlled and deterministic manner.

MAPS<sup>™</sup> CAP emulator supports powerful utilities such as Message Editor, Script Editor, and Profile Editor which allow new scenarios to be created or existing scenarios to be modified using CAP messages and parameters.

For more information, please visit <u>MAPS<sup>™</sup> CAP Protocol Emulator</u> webpage.

### **Main Features**

- CAP protocol simulation over TDM, ATM (T1/E1) and over IP based GSM, GPRS, UMTS networks
- Supports 3GPP variant of CAP protocol over GSM, ATM, GPRS, UMTS
- CAP messages are conveyed as the component part of TCAP messages
- Supported Procedures
  - Apply Charging for GSM call sessions
  - Apply Charging GPRS sessions for Data transfer
  - Connect to Resource
  - Establish Temporary Connection
  - Check Balance
  - CAMEL SMS, Toll free and Initiate Call Attempt (ICA) Service
- Scripted call generation and call reception
- Access to all MTP3, M3UA, M2PA, SCTP, SCCP, and CAP protocol fields such as Routing Number, Called Party Number and more
- User controlled access to optional parameters such as timers
- Test Service Usage Charging for Voice, Data, SMS, etc
- Cost-of-call verification through balance check
- Test Premium Calling and Toll-Free Services

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### **Test Bed Setup Configuration**

Test Bed Setup provides options to establish communication between MAPS<sup>™</sup> CAP and the DUT.

MAPS<sup>™</sup> CAMEL TDM/ATM includes MTP signaling configuration, Source and Destination Node Point Code, Subsystem Number, and End-user configurations.

MAPS<sup>™</sup> CAMEL IP includes SCTP layer parameters configuration to transmit and receive CAP messages over M3UA and M2PA transport layers.

Once the testbed setup is configured properly, CAMEL messages can be transmitted and received over MTP, M3UA, M2PA layers. Default profile is used to configure MAPS<sup>™</sup> CAP Emulator as end terminals SCF and/or SSF.

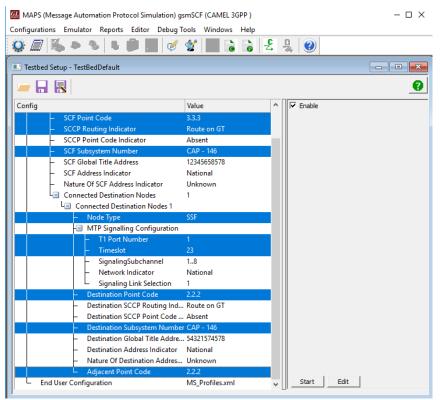


Figure: Testbed Setup Configuration over T1 E1

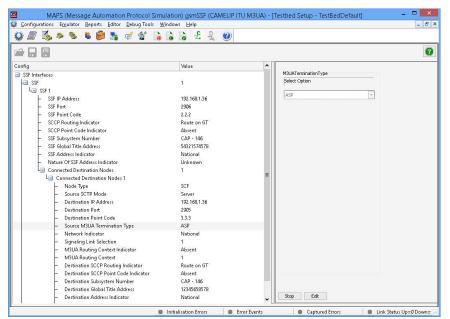
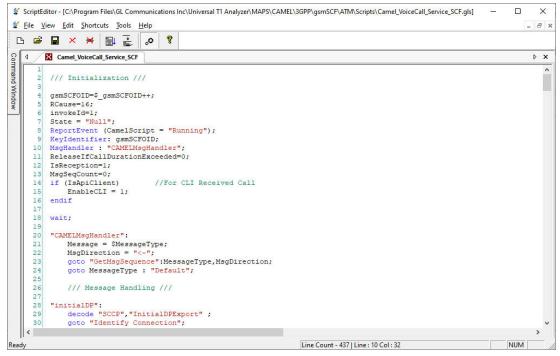


Figure: Testbed Setup Configuration over IP

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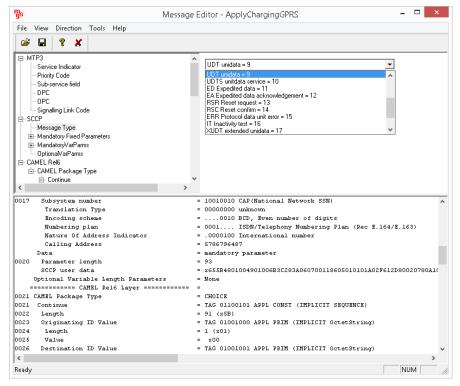
### **Pre-processing Tools**

**SCRIPT EDITOR** - The script editor allows the user to create/edit scripts and access protocol fields as variables for the message template parameters. The script uses pre-defined message templates to perform send and receive actions.



**Figure: Script Editor** 

**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.



**Figure: Message Editor** 

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**PROFILE EDITOR** - The profile editor 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.

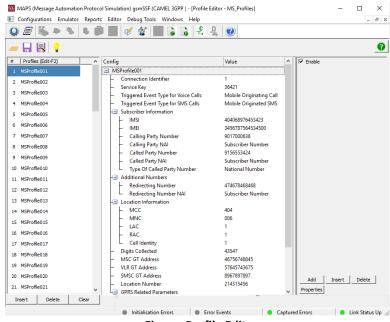


Figure: Profile Editor

### Call Generation and Call Reception

In call generation, MAPS<sup>™</sup> CAP 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 may be started manually or they can be automatically triggered by incoming messages.

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2 Camel_SMS_Service_SSF.gls	MSProfile002		Start		None		Unknown	1	0
3 Camel_GPRS_Service_SSF.gls	MSProfile003	0x5E468A76	Start	Call Charging Rep	None		Pass	1	1
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**Figure: Call Generation** 

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# **Call Generation and Call Reception**

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**Figure: Events log** 

### GL Communications Inc.

### **CAMEL Procedures (over IP and TDM)**

MAPS<sup>™</sup> CAP emulator can be configured to emulate procedures over IP and TDM. Supported services includes Prepaid Voice Call, Apply Charging GPRS, Low balance Voice Call, Toll-free Call, Initiate Call Attempt (ICA), and Camel SMS.

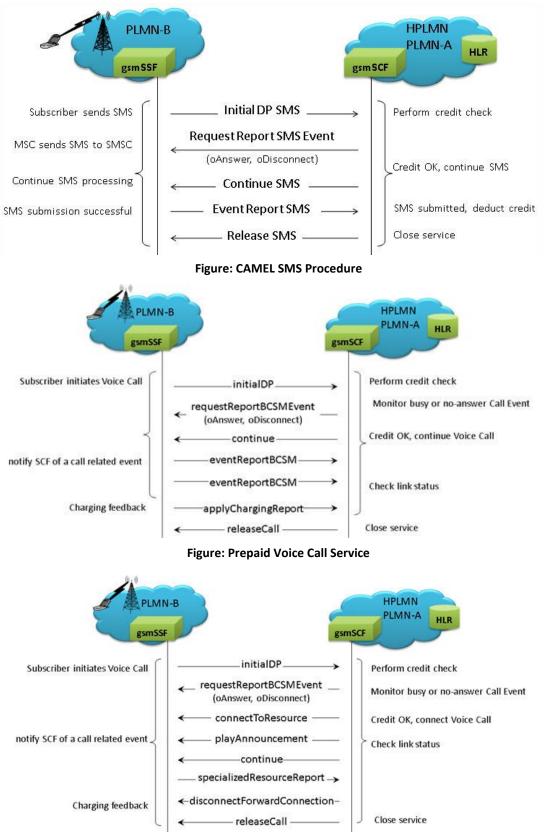
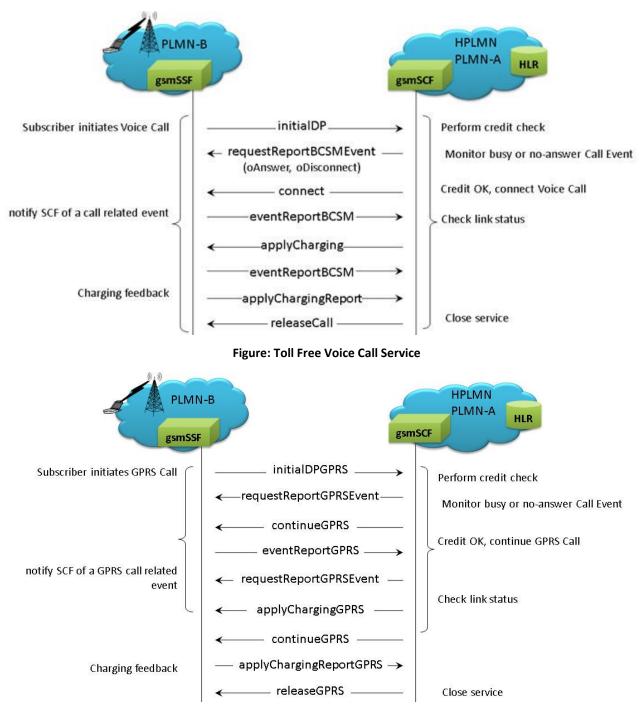


Figure: Low Balance Voice Call Service

# 🌑 GL Communications Inc.





**Figure: Camel GPRS Service** 



### **Command Line Interface**

MAPS<sup>™</sup> can be configured as server-side application, to enable remote controlling of the application through multiple command-line based clients. Supported clients include TCL, Python, VBScript, Java, and .Net.

Clients can remotely perform all call control functions various traffic using commands. This client application is distributed along with MAPS<sup>™</sup> Server application.

CIi MapsCLI gsmSSF (CAMELIP ITU M3UA)	_		×	
📰 File Edit View			- 8	×
				_
View Latest Command				—
				_
1 :: 2018-3-13 18:56:22.341000 : Start "TestBedDefault.xml" ;				^
1 :: 2018-3-13 18:56:24.731000 : LoadProfile "MS_Profiles.xml"				
1 :: 2018-3-13 18:56:24.832000 : IncomingCallHandler # "ASP Up"="M3UA.gls", "IsApiClient"="True";				
1 :: 2018-3-13 18:56:24.855000 : IncomingCallHandler # "SST subsystem-status-test"="SCMG.gls","IsA	4piClien	t"="Tru	ie";	
1 :: 2018-3-13 18:56:24.879000 : Apply Global Configuration # "_EnableCLI"=1;				
1 :: 2018-3-13 18:56:24.891000 : ServerHSRequest ;				
1 :: 2018-3-13 18:56:24.913000 : StartScript 1 "Camel_GPRS_Service_SSF.gls" "MSProfile014" 1 ;				
1 :: 2018-3-13 18:56:27.989000 : UserEvent 1 "IsTransportUp";				
1 :: 2018-3-13 18:56:28.013000 : UserEvent 1 "Initiate IDPGPRS";				
1 :: 2018-3-13 18:56:33.076000 : UserEvent 1 "Establish PDP Context";				
1 :: 2018-3-13 18:56:43.111000 : UserEvent 1 "Disconnect PDP Context";				
1 :: 2018-3-13 18:56:48.207000 : UserEvent 1 "GetMessageCount";				
1 :: 2018-3-13 18:56:48.231000 : UserEvent 1 "GetLastReceivedMessage";				
1 :: 2018-3-13 18:56:48.287000 : UserEvent 1 "GetMessageCount";				
1 :: 2018-3-13 18:56:48.300000 : UserEvent 1 "GetMessageInfo"# "Index"=0;				
1 :: 2018-3-13 18:56:48.334000 : UserEvent 1 "GetMessageInfo"# "Index"=1;				
1 :: 2018-3-13 18:56:48.368000 : UserEvent 1 "GetMessageInfo"# "Index"=2;				
1 :: 2018-3-13 18:56:48.401000 : UserEvent 1 "GetMessageInfo"# "Index"=3;				
1 :: 2018-3-13 18:56:48.447000 : UserEvent 1 "GetMessageInfo"# "Index"=4;				
1 :: 2018-3-13 18:56:48.493000 : UserEvent 1 "GetMessageInfo"# "Index"=5;				
1 :: 2018-3-13 18:56:48.515000 : UserEvent 1 "GetMessageInfo"# "Index"=6;				6
1 ·· 2018.3-13 18:56:48 548000 · HearEvant 1 "CatMaccadeTofo" # "Today"-7				Ψ.
		NUM		1

Figure: MAPS CLI Server

18:56:43.136     <-     eventReportGPRSRes       18:56:43.143     <-     releaseGPRS       Stopping Script True	🌛 Python 2.7.9 Shell		-		×
Type "copyright", "credits" or "license()" for more information. >>> ==================================					
RESTART         RemeilP Server Connection True         CamelIP Testbed Starting True         Chading Profile True         Checking CLI Server Status True         Starting Script True         Check H3UA Status True         Chitiating - InitiatePPGPRS True         Camel GPRS Service Initiated         Waiting for PDP Context establishment True         Camel GPRS Service Initiated         Waiting for PDP Context Reported         Waiting for PDP Disconnect Event True         Camel LestMSCRev         Time Stamp       Route         Nessage         18:56:43.143       <-				on win32	
<pre>CamelIP Server Connection True CamelIP Testbed Starting True Loading Profile True Checking CLI Server Status True Starting for script to start True Check N304 Status True Initiating - InitiateDPGPRS True Camel GPRS Service Initiated Waiting for - RequestReportGPRSEvent True Camel GPRS Event reporting Requested Waiting for PDP Context Reported Waiting For PDP Disconnect Event True Camel Establish PDP context Reported Waiting For PDP Disconnect Event True Camel LastMSGRev Time Stamp Route Hessage 18:56:43.143 &lt;- releaseGPRS ****** Camel Message Flow ***** Time Stamp Route Nessage 18:56:28.023 -&gt; InitialDPGPRS 18:56:33.003 -&gt; EventReportGPRSEvent 18:56:33.102 &lt;- requestReportGPRS 18:56:33.100 &lt;- continueGPRS 18:56:33.100 &lt;- continueGPRS 18:56:33.110 &lt;- continueGPRS 18:56:41.117 -&gt; ApplyChargingGPRS 18:56:41.117 -&gt; ApplyChargingGPRS 18:56:41.118 &lt;- continueGPRS 18:56:41.117 -&gt; ApplyChargingGPRS 18:56:41.118 &lt;- continueGPRS 18:56:41.118 &lt;</pre>					
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Stopping Script True	18:56:43.136	<-			
	18:56:43.143		releaseGPRS		
>>>		True			
	>>>				

**Figure: Sample Python Client** 

# **GL** Communications Inc.

Support	ed Protocols	s and Spe	cifications
Г (			

CAP
TCAP
SCCP
MTP3
TDM

САР
ТСАР
SCCP
MTP3b
SSCOP
AAL5
ATM
Physical Layer
CAP over ATM

Supported Protocols	Standard / Specification Used			
	TDM			
САР	3GPP TS 29.002 V4.18.0 (2007-09)			
ТСАР	ANSI T1.114-1996			
SCCP	Q.713, CCITT (ITU-T) Blue Book			
MTP3	Q.703, ITU-T Blue Book			
	ATM			
САР	3GPP TS 29.002 V4.18.0 (2007-09)			
ТСАР	ANSI T1.114-1996			
SCCP	Q.713, CCITT (ITU-T) Blue Book			
MTP3b	ITU-T Q.2210			
SSCOP	ITU-T Q.2110			
AAL5	Class C & D (ITU-T I.363.5)			
ATM	ITU-T I.361			

C/	ŧР
TC	AP
SC	СР
MTP3	
M2PA	M3UA
SC	ТР
	Р

Supported Protocols	Standard / Specification Used
САР	3GPP TS 29.078 6.3.0 (2004-09)
ТСАР	ANSI T1.114-1996
SCCP	Q.713, CCITT (ITU-T) Blue Book
M2PA	RFC 4165
M3UA	RFC 3332
SCTP	RFC 4960

# **Buyer's Guide**

Item No	Product Description
<u>XX696</u>	MAPS <sup>™</sup> CAP Emulation (CAMEL Application Part)
<u>PKS151</u>	MAPS <sup>™</sup> CAP IP Emulation (CAMEL Application Part)
Item No	Related Software
<u>XX694</u>	MAPS <sup>™</sup> MAP Emulation (B, C, D, E, F, G, and H interfaces)
<u>PKS132</u>	MAPS™ MAP IP Emulator
Item No	Related Hardware
<u>PTE001</u>	tProbe™ Dual T1 E1 Laptop Analyzer (Require Basic Software)
<u>FTE001</u>	QuadXpress T1 E1 Main Board (Quad Port)
<u>ETE001</u>	OctalXpress T1 E1 Daughter boards (Octal Port)
<u>XTE001</u>	Dual Express (PCIe) T1 E1 Boards
TTE001	tScan16™ T1 E1 Boards

For more information, please visit <u>MAPS<sup>™</sup> CAP Protocol Emulator</u> webpage.



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