
Introducing GL's VoIP Products

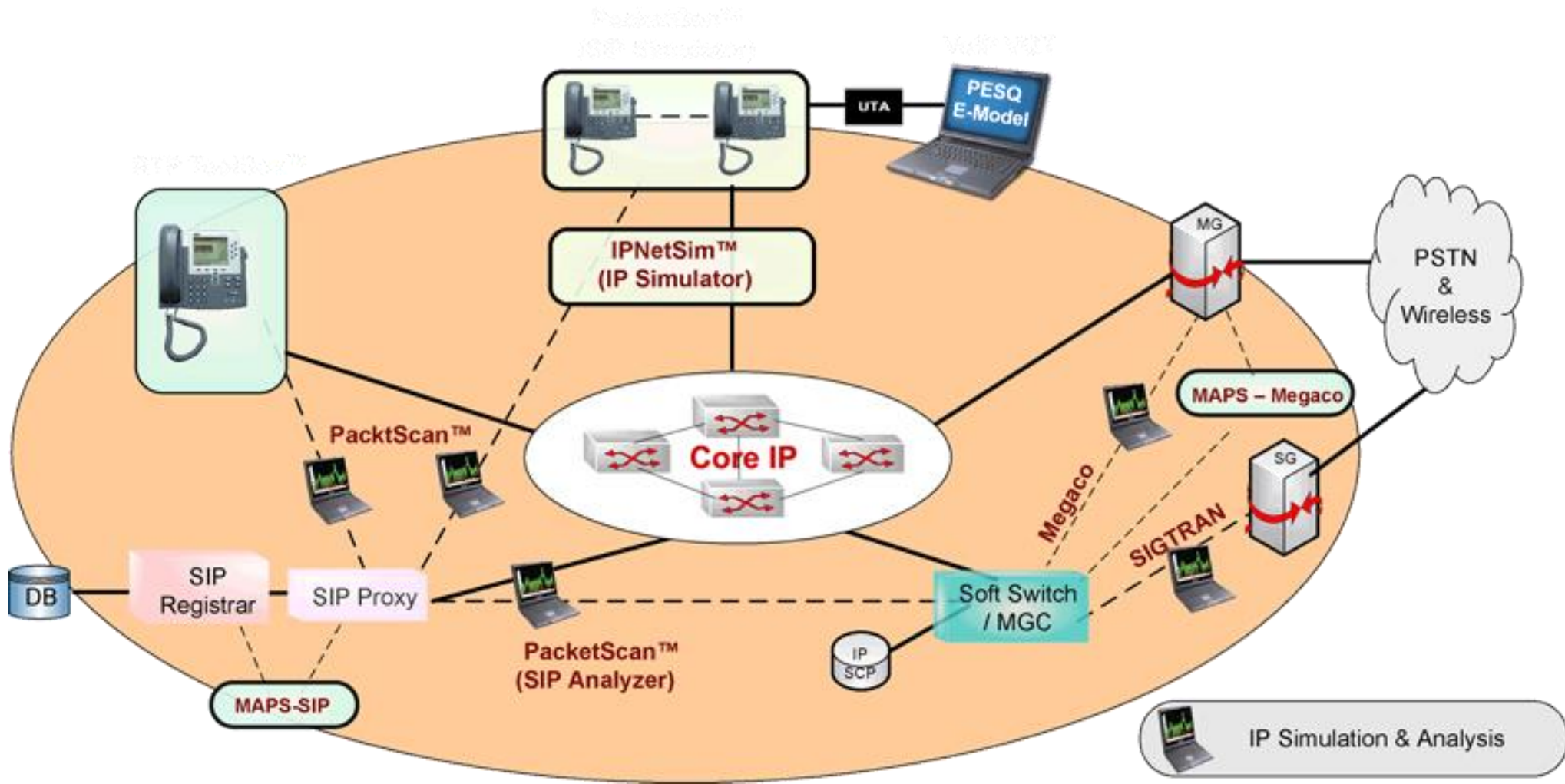


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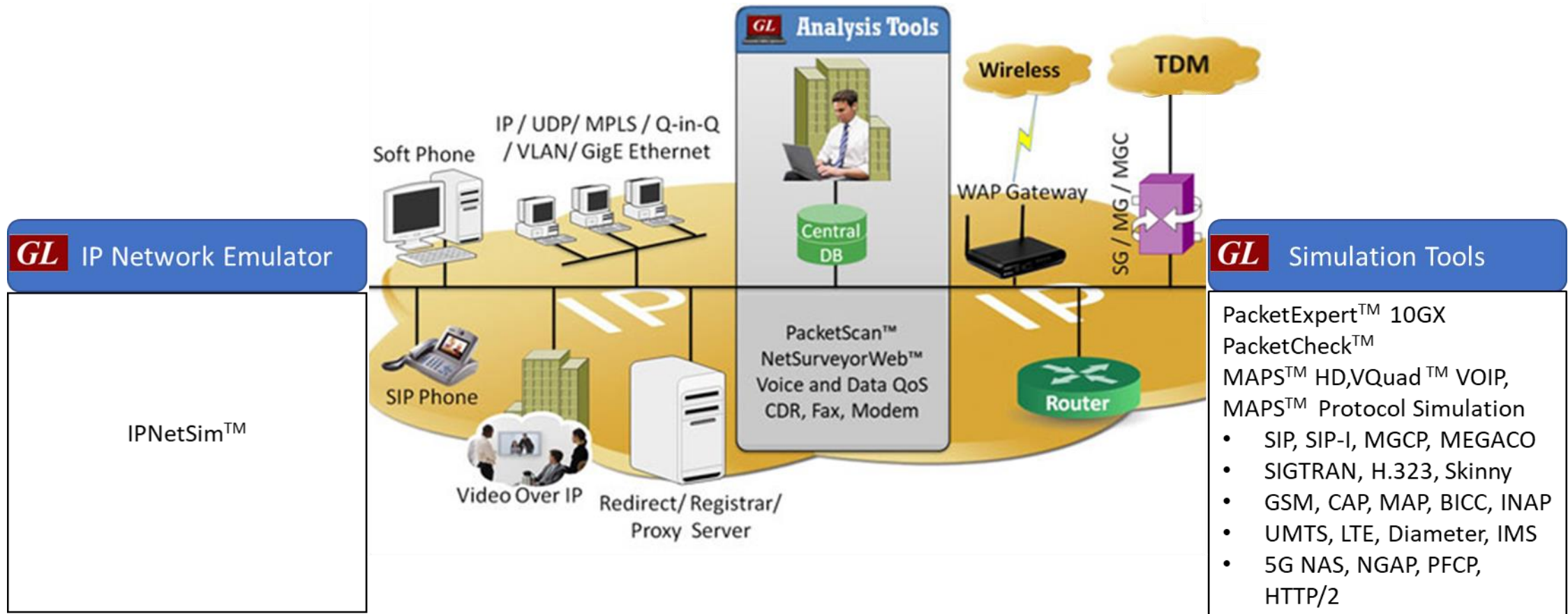
Introduction

- VoIP Traffic Analysis – SIP, RTP, RTCP, MGCP, MEGACO, SIGTRAN
- VoIP Traffic Generation/Simulation– SIP, RTP, RTCP, H.323
- VoIP Network Analysis & Simulation
- Test VoIP Elements – Gateways, ATAs & Signal Processing Devices
- Echo Cancellation Testing & Compliance
- Network Monitoring Solutions
- Remote Access using Client-Server Technology
- Voice Quality Analysis

VoIP Traffic Generation and Analysis



VoIP Network Analysis & Simulation



- **SIP / MEGACO / MGCP / RTP / RTCP / Video Generation and Analysis**
 - PacketScan™ - VoIP Bulk Call Analyzer
 - Message Automation and Protocol Simulator (MAPS) for SIP, MEGACO, and MGCP Conformance Testing
- **IP Analysis & Simulation**
 - IPNetSim™
- **SIGTRAN Analysis**
 - SIGTRAN Analyzer
- **PacketCheck™**

- **Network Monitoring and Voice Quality Testing Solutions**

- PacketScan™ - VoIP Bulk Call Analyzer
- NetSurveyourWeb™
- VQuad™ with SIP Call Control
- VBA

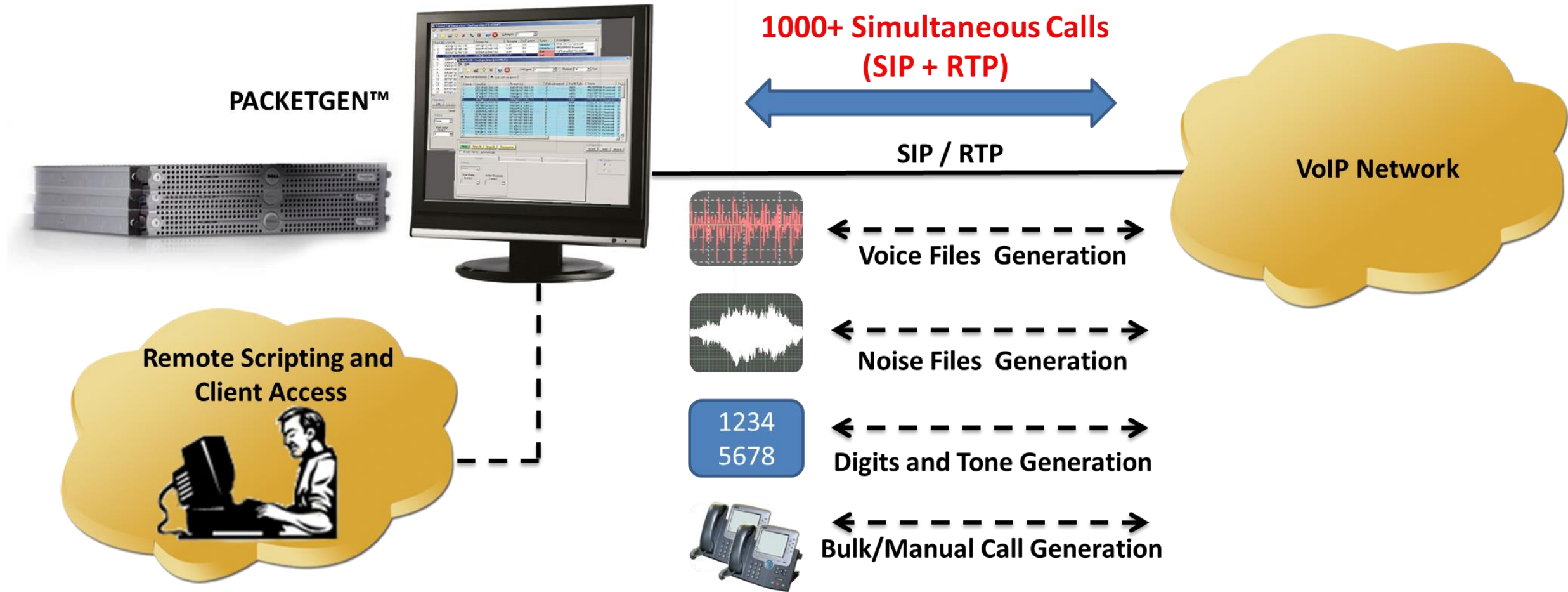
- **Echo Canceller Testing**

- T1/E1 Analyzer
- Client-Server
- AutoEC Test

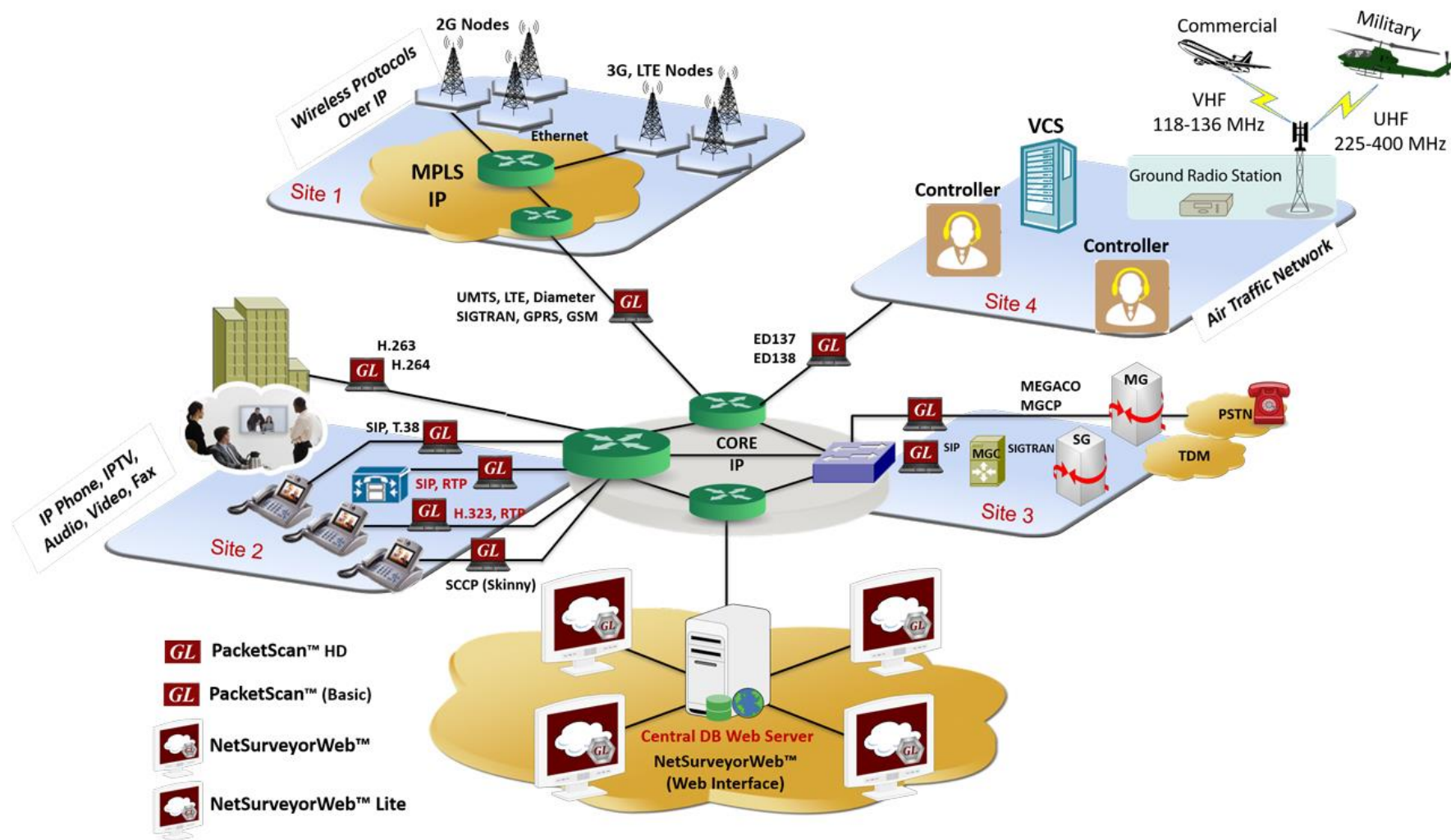
- **Fax & Modem Call Analysis**

- GLInsight™

PacketGen™ SIP Bulk Call Generator

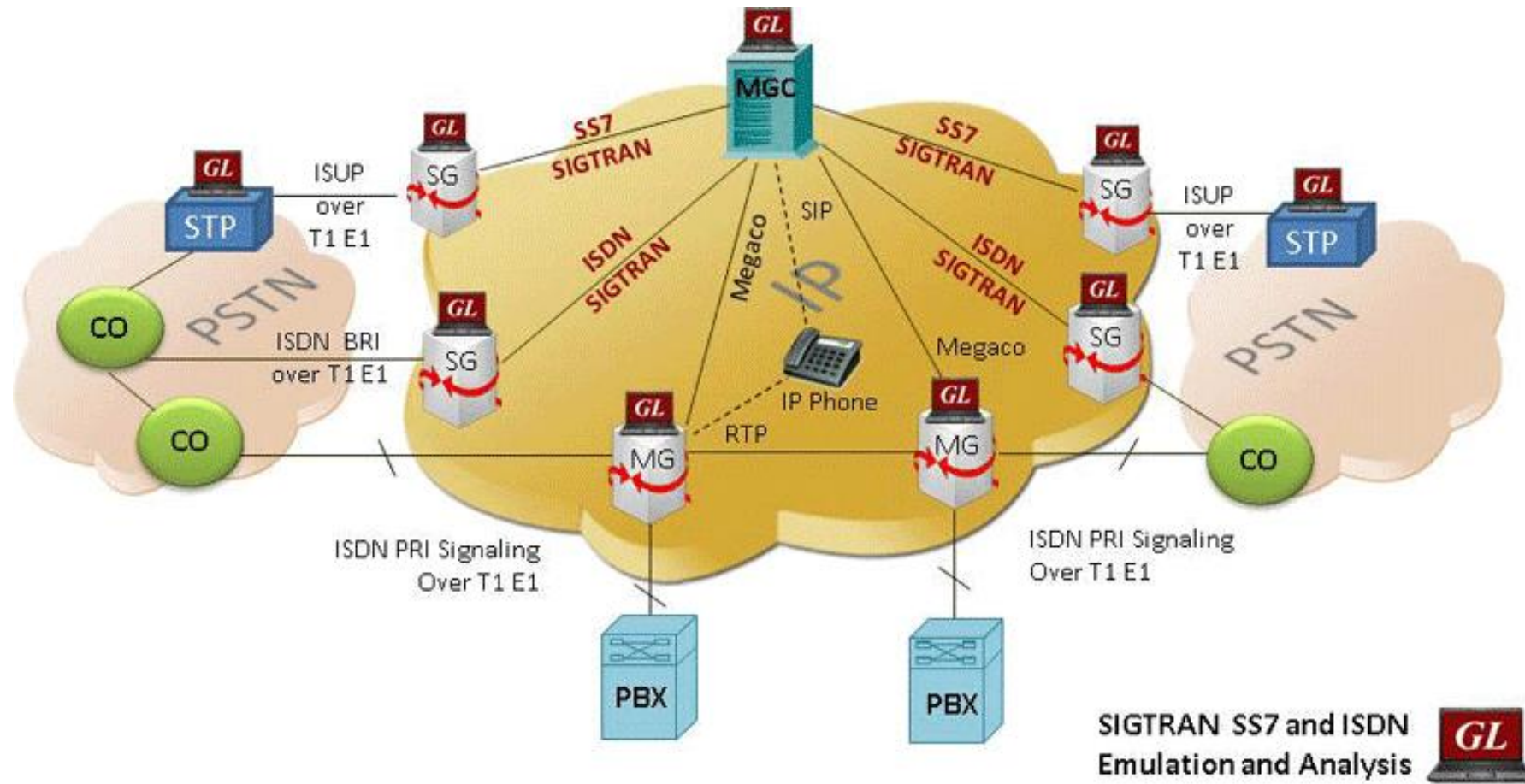


PacketScan™ VoIP Traffic Analysis

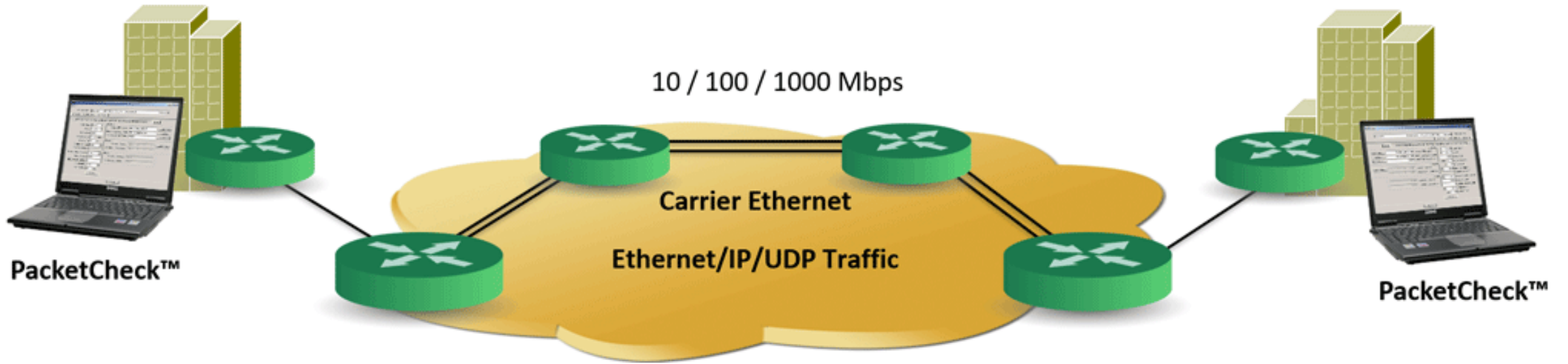


-  PacketScan™ HD
-  PacketScan™ (Basic)
-  NetSurveyorWeb™
-  NetSurveyorWeb™ Lite

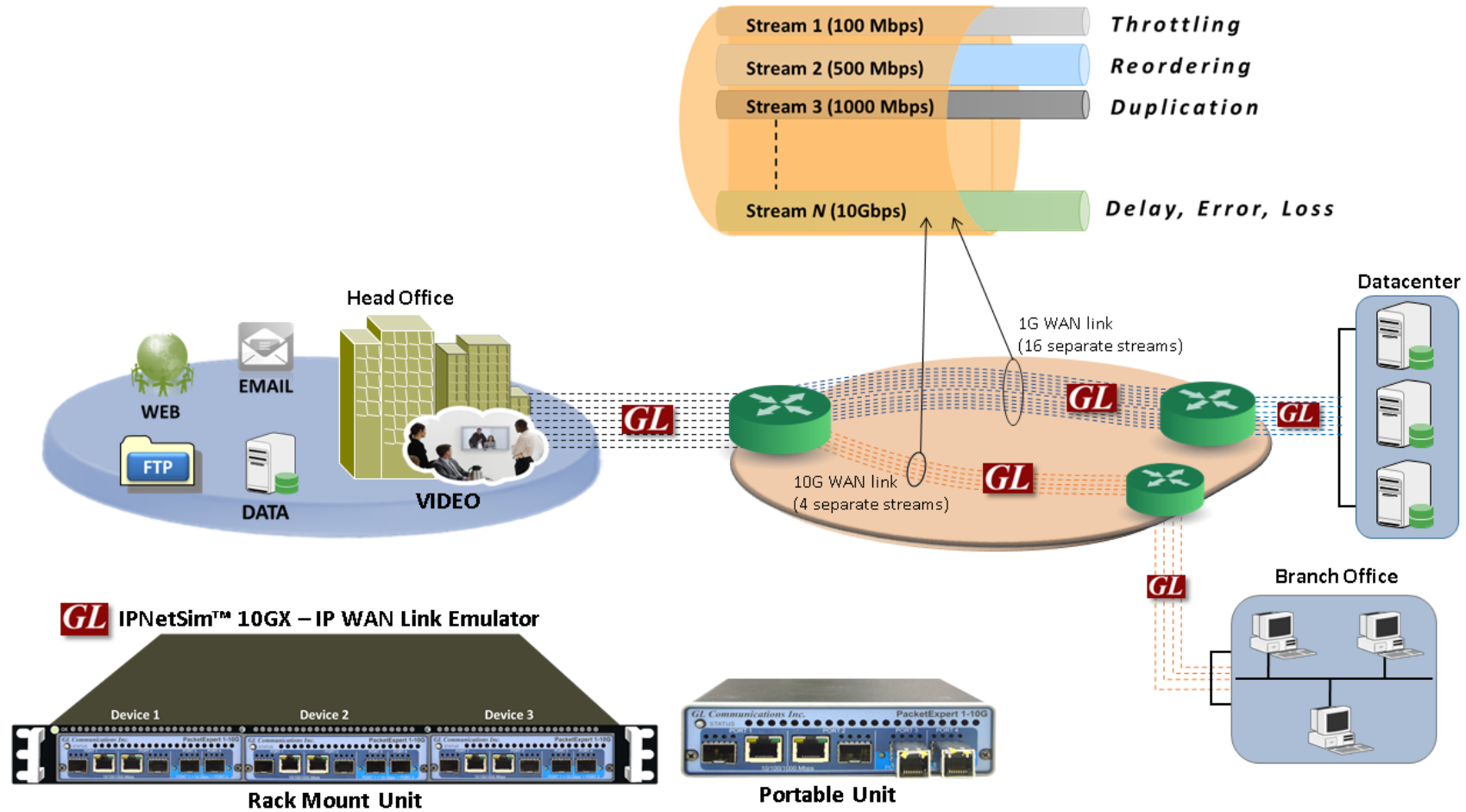
SIGTRAN Protocol Analyzer



PacketCheck™



IPNetSim™ 10GX



Message Automation and Protocol Simulator (MAPS™)

- SIP Protocol Conformance Testing
- MEGACO Protocol Conformance Testing
- MGCP Protocol Conformance Testing

MAPS™ for SIP Testing

- UAC Conformance Testing
- UAS & Redirect Server Conformance Testing
- Redirect Conformance Testing
- Proxy Conformance Testing
- Registrant Conformance Testing
- Registrar Conformance Testing

The screenshot displays the MAPS (Message Automation Protocol Simulation) software interface. The window title is "MAPS (Message Automation Protocol Simulation) (SIP IETF) - [Call Generation - CallGenDefault]". The interface includes a menu bar (Configurations, Emulator, Reports, Editor, Windows, Help) and a toolbar with various icons. Below the toolbar is a table showing the execution status of three scripts:

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events...	Result	Total Iterati...	Completed It...
1	SipRegistrationControl.gls	Profile0001	GL-MAPS_1_18707511-5285-912	Stop	Registered	SIP_DeRegistration	...	Pass	1	0
2	SipRegistrationControl.gls	Profile0002	GL-MAPS_1_18710523-5298-5552	Stop	Registered	SIP_DeRegistration	...	Pass	1	0
3	SipCallControl.gls	Profile0001	GL-MAPS_1_18720757-5311-6072@192.168.1.21	Start	Call Terminated	None	...	Pass	1	1

Below the table is a toolbar with buttons: Add, Delete, Insert, Refresh, Start, Start All, Stop, Stop All, Abort, Abort All. The main area is divided into two panes. The left pane shows a message sequence diagram between MAPS and DUT. The right pane shows a log of events.

Message Sequence Diagram:

- MAPS sends INVITE to DUT at 15:15:59.102000.
- DUT sends 100 Trying to MAPS at 15:15:59.516000.
- DUT sends 180 Ringing to MAPS at 15:15:59.870000.
- DUT sends 200 OK to MAPS at 15:16:00.002000.
- MAPS sends ACK to DUT at 15:16:00.005000.
- MAPS sends Digits Transmitted :: 1234567890ABCD to DUT at 15:16:02.835000.
- DUT sends Digits Detected :: 1234567890ABCD to MAPS at 15:16:05.119000.
- MAPS sends BYE to DUT at 15:17:00.018000.
- DUT sends 200 OK to MAPS at 15:17:00.537000.
- MAPS sends BYE to DUT at 15:17:00.540000.
- DUT sends 200 OK to MAPS at 15:17:00.875000.

Event Log:

- Traffic Type :: Digits
- Traffic Action :: Detect Digits
- Digit Type :: dtmf
- Band :: inband
- Digits Detected :: 1234567890ABCD

The bottom status bar shows "Scripts" selected, with sub-tabs for "Message Sequence", "Event Config", and "Script Flow". The status bar also displays "Error Events", "Captured Errors", and "Link Status Up=0 Down=0".

MAPS™ for MEGACO Testing

- MGC Conformance Testing
- MG Conformance Testing

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total It
1	MGCController.gls	TGW	1013	Start	Subtract Request	None		Pass	
2	MGCController.gls	TGW		Start		None		Unknown	

Message Sequence Diagram:

- MGC → MG1: Add (15:27:22.438000)
- MG1 → MGC: Add Reply (15:27:22.612000)
- MGC → MG2: Add (15:27:22.612000)
- MG2 → MGC: Add Reply (15:27:22.786000)
- MGC → MG1: Modify (15:27:22.787000)
- MG1 → MGC: Modify Reply (15:27:22.798000)
- MGC → MG2: Modify (15:27:22.799000)
- MG2 → MGC: Modify Reply (15:27:22.808000)
- MGC → MG1: Subtract (15:28:12.816000)
- MG1 → MGC: Subtract Reply (15:28:12.834000)
- MGC → MG2: Subtract (15:28:12.836000)
- MG2 → MGC: Subtract Reply (15:28:12.844000)

```
MEGACO/1 [192.168.12.75]:2944
T=19
{C=$
{A=Card2/TS1
{Media {
Stream = 1{
LocalControl {
Mode = ReceiveOnly
}}}},
A=$
{M
{O
{MO=ReceiveOnly},
L{
v=0
c=IN IP4 $
m=audio $ RTP/AVP 0
}
}
}
}
```

MAPS™ for MGCP Testing

- MGC Conformance Testing
- MG Conformance Testing

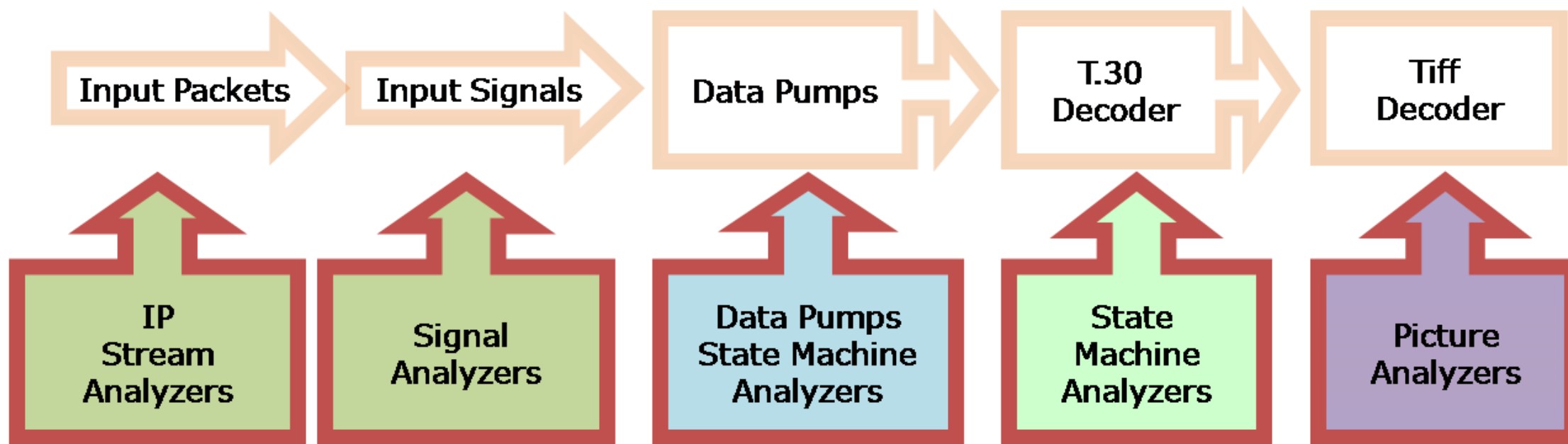
Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iter
1	MGCPControl-TGW.gls	TGWProfile01	5003 <-> 5004	Start	ConnectionDeleted	None	Pass	

MAPS DUT

CRCX 1006 Card2/TS14@AudioCodes.com MGCP 1.0
C: 5004
L: p:10, a:PCMU
M: sendrecv
v=0
c=IN IP4 192.168.12.123
m=audio 1028 RTP/AVP 0
a=rtpmap:0 PCMU/8000

IP Fax Capture and Analysis using GLInsight™

- Analyzes pre-recorded IP fax calls
- Handles both IP G.711 fax calls and IP T.38 fax calls
- In IP T.38 calls, complete decoding and analysis of T.38 packets, T.30 frames, T.4 / T.6, and ECM is performed
- Complete Tiff image reconstruction is provided



IP Fax Capture and Analysis

- IP Analysis Information
- Packet loss
- Jitter histogram
- SID (Silence Descriptor) detector to detect improper use of Voice Activity Detector while transferring data
- Fax Analysis Information
- V.34HD, V.17, V.33, V.29, V.27, V.21, T.30, T4/T6

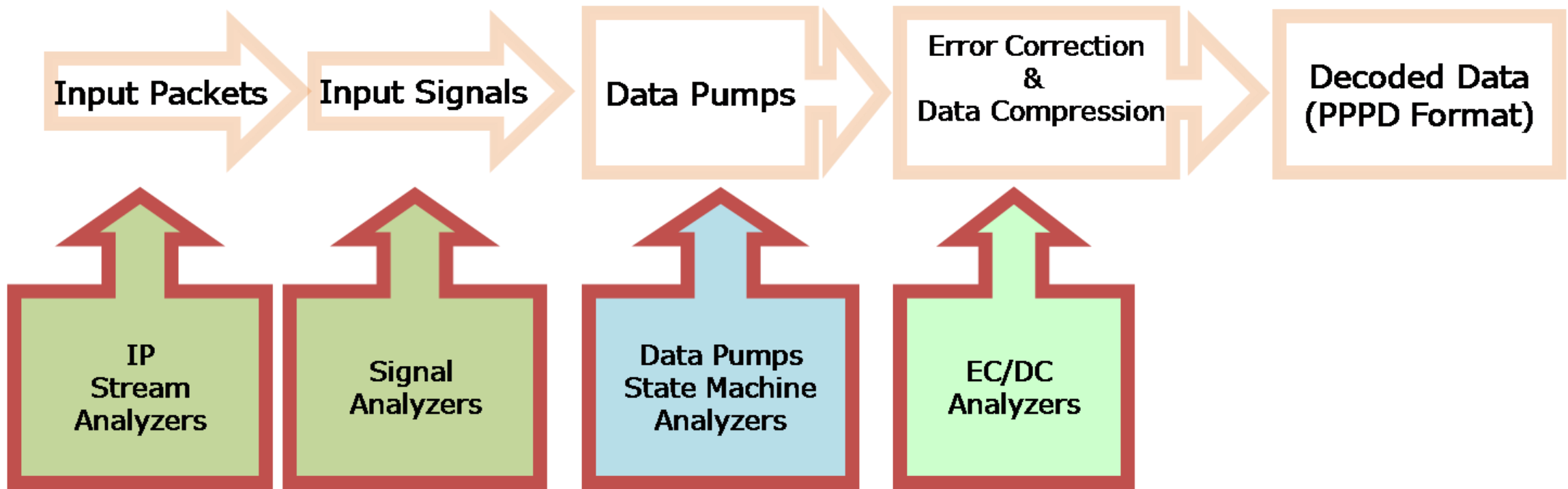
IP Fax Capture and Analysis

Fax Decoding Categories & Sub-categories

- Signal Analyzers
 - Discriminator information
 - Unstable signal detector and more
- Data Pump State Machine Analyzers
 - Fax phase changes, data rates, symbol rate
 - Structures interchange (rate sequences, MP, Info) and complete connection parameters
 - PDSNR (post detection signal quality measurement) improper quality drop detector
 - V.8 incompatibility indication
- T.30 Decoder Analyzers
 - T.30 raw data
 - T.30 frames and information
 - T.4/T.6 page coding information
 - CRC error detector in V.21 and more

IP Modem Capture and Analysis using GLInsight™

- Analyzes pre-recorded modem traffic recordings within IP
- Supports startup protocols V.8, V.8bis, and V.8 short
- Supports Modulations V.92, V.90, V.34, V.32bis/V.32, V22bis/V.22, V.21, V.23, and Bell 103/ Bell 212
- Supports V.42, V.42bis, V.44, MNP2-4, MNP5, and V.14 error correction and data compression protocols



IP Modem Capture and Analysis

- Supported Protocols
 - V.92 (Quick Connect and Modem-on-Hold supported. PCM-upstream not supported)
 - V.90 , V.34
 - V.32bis/V.32, V.22bis/V.22
 - V.21 , V.23
 - Bell 103 / Bell 212
- Start-up Protocols
 - V.8 , V.8bis
- Supported Error Correction & Data Compression Protocols
 - V.42, V.42bis
 - V.44 , MNP2-4
 - MNP5, V.14
 - V.8 short

IP Modem Capture and Analysis

Fax Decoding Categories and Sub-categories

- Signal Analyzers
Discriminator information
Unstable signal detector and more
- Data Pump State Machine Analyzers
Modem phase changes, data rates, symbol rate
Structures interchange (rate sequences, MP, Info) and complete connection parameters
PDSNR (post detection signal quality measurement) improper quality drop detector and more
- Error Correction Data Compression Analyzers
Error-correction and data compression setup information including XID info and more

Network Monitoring and Voice Quality Testing Solutions

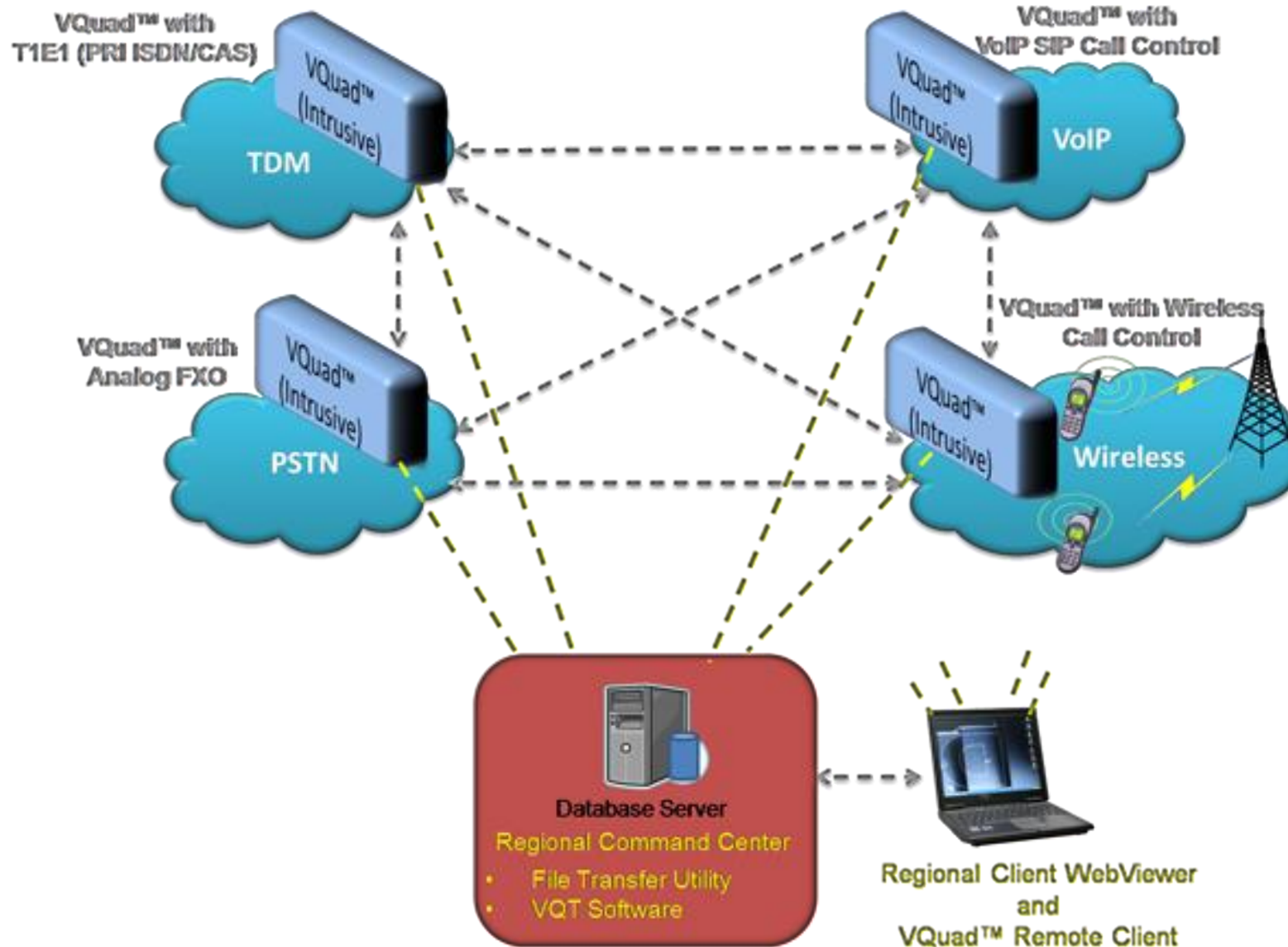
GL's NMS VoIP solutions include –

- Wireless, Wireline, and VoIP Voice Quality Monitoring System (intrusive)
- Packet and VoIP Monitoring and Surveillance System (non-intrusive)

Active/Intrusive Network VQT System

- Intrusive VoIP Probes - Use GL's VQuad™, or PacketGen™ to establish calls and send / receive voice files in real-time in an end-to-end manner
- Voice Quality Testing (VQT) - Compares the two files ('reference' and 'degraded') and provides an ITU-standard score (PESQ, PESQ WB)
- Regional Command Center (RCC) - Controls, schedules, and analyzes the degraded voice traffic received by the nodes
- Remote Client VQT NetViewer™ - Remotely controls the RCC, individual VQuad™ node sites and the VQT Measurement process

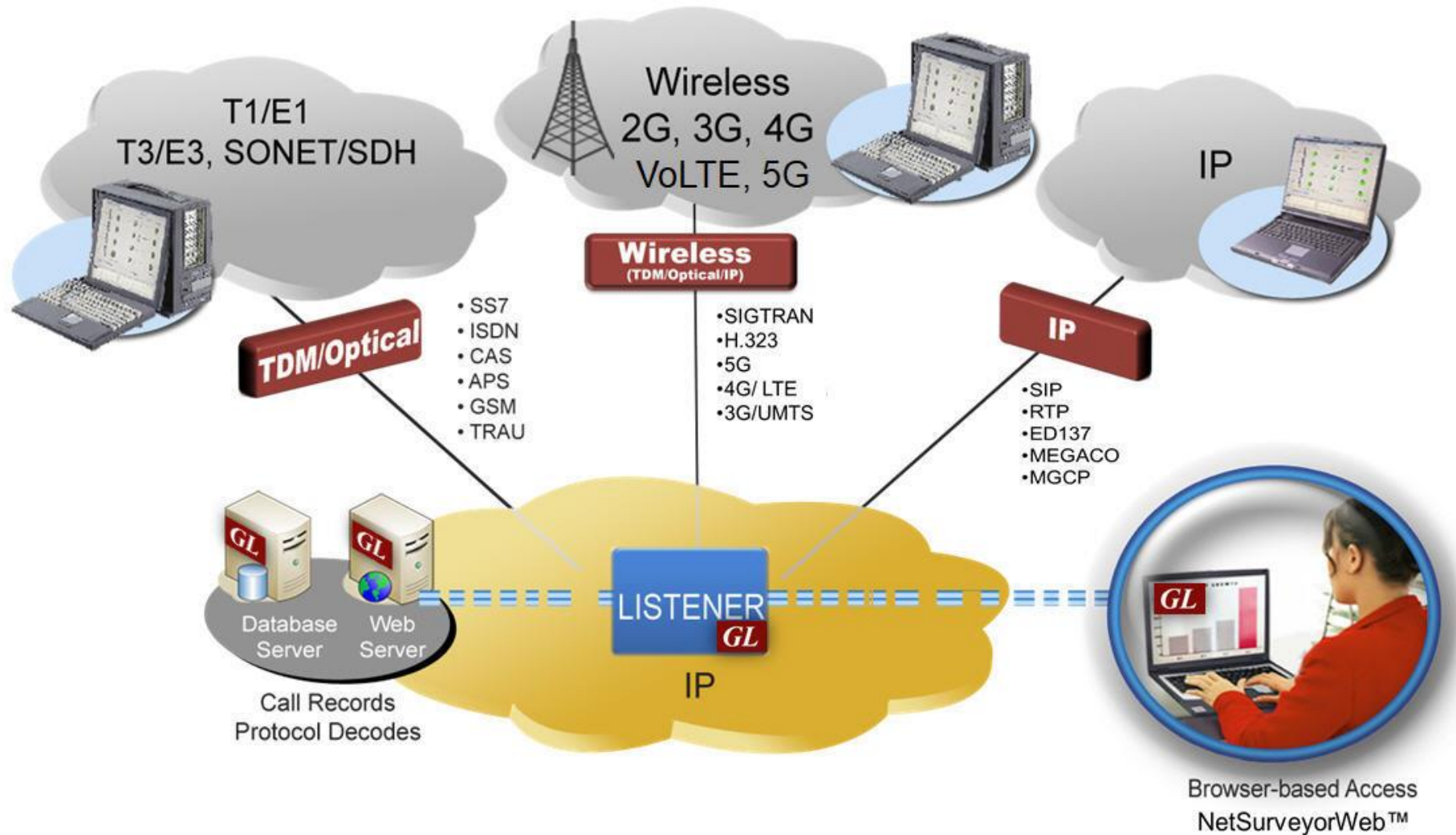
Active / Intrusive Network VQT System



Passive / Non-Intrusive Voice-band Monitoring System

- GL's Voice Band analyzer (VBA) works in conjunction with GL's PacketScan™ (VoIP Analysis Tool) to monitor the quality of voice band traffic over VoIP
- NetSurveyorWeb™ facilitates result display using a web interface

Passive / Non-Intrusive Voice-band Monitoring System



PacketScan and NetSurveyorWeb™

- GL's Ethernet probe called PacketScan™ is used to monitor packet flows in real-time within a VoIP network
- Supports all major VoIP protocols including SIP, H.323, MEGACO, and MGCP
- Performs detailed analysis of voice band streams to gather QOS statistics such as MOS (Mean Opinion Score), total packet count, reordered, duplicate and missing packet counts, and more
- A central database stores the real-time and historic data
- Facilitates various views using a web interface (NetSurveyorWeb™)

CDR View

- To view the calls, under Quick CDR, select All Calls or Passed Calls or Failed Calls

GL NetSurveyorWeb

Refresh Protocol: VOIP (SIP & H323) Type: CDR

System Status at 2020-09-01 02:24:39

Quick CDR \ All Calls

Date: 2020-09-01 Time: 00:00:00 - 23:59:59

Today Yesterday Last 7 Days Last 30 Days All

Query Execution Time : 0.16555 Seconds

Quick Search: Calling Number

Page Size: 20 Sort Order : STARTTIME DESC

SNo	Calling Number	Called Number	Starttime	Duration	Call Success	Failure Cause	Listening Mos1	Listening Mos2	Payload1	Post Dial Delay(ms)	Probename
1	55552203@12.1.1.3	44442203@12.1.1.3	2020-09-01 01:56:30.526	00:00:00.000	0	5			0	0	SIPTest
2	55551105@12.1.1.3	44441105@12.1.1.3	2020-09-01 01:56:30.200	00:00:00.000	0	5			0	0	SIPTest
3	55551109@12.1.1.3	44441109@12.1.1.3	2020-09-01 01:56:29.327	00:00:00.000	0	5			0	0	SIPTest
4	55552206@12.1.1.3	44442206@12.1.1.3	2020-09-01 01:56:29.199	00:00:00.000	0	5			0	0	SIPTest
5	55551101@12.1.1.3	44441101@12.1.1.3	2020-09-01 01:56:28.553	00:00:00.000	0	5			0	0	SIPTest
6	55551107@12.1.1.3	44441107@12.1.1.3	2020-09-01 01:56:28.528	00:00:00.000	0	5			0	0	SIPTest
7	55551102@12.1.1.3	44441102@12.1.1.3	2020-09-01 01:56:28.380	00:00:00.000	0	5			0	0	SIPTest
8	55553302@12.1.1.3	44443302@12.1.1.3	2020-09-01 01:56:27.831	00:00:00.000	0	5			0	0	SIPTest
9	55551104@12.1.1.3	44441104@12.1.1.3	2020-09-01 01:56:27.303	00:00:00.000	0	5			0	0	SIPTest
10	55551101@12.1.1.3	44441101@12.1.1.3	2020-09-01 01:56:26.628	00:00:00.000	0	5			0	0	SIPTest
11	55552210@12.1.1.3	44442210@12.1.1.3	2020-09-01 01:56:24.753	00:00:00.000	0	5			0	0	SIPTest
12	55551103@12.1.1.3	44441103@12.1.1.3	2020-09-01 01:56:23.304	00:00:00.000	0	5			0	0	SIPTest

Date/Time Specific CDR View

- The Date and Time under Quick CDR\All Calls to view the calls of interest like Last 30 days, Last 7 days, Yesterday and Today's call. By default the results displayed per page is 20. Select the required page size (maximum results is 500) from Page Size menu as shown in the figure

The screenshot displays the 'Quick CDR \ All Calls' interface. At the top, there are navigation tabs for 'Data', 'Reports', 'Alarms', and 'Users', along with a 'System Status' indicator. The main content area features a search bar with 'Calling Number' selected and a 'GO' button. Below the search bar, there are navigation icons and a 'Page Size' dropdown menu. The table below shows a list of call records with columns for SIno, Calling Number, Called Number, Starttime, Duration, Call Success, and Probename. The 'Page Size' dropdown menu is open, showing options for 20, 50, 100, and 500. The 'Sort Order' is set to 'STARTTIME DESC'.

SIno	Calling Number	Called Number	Starttime	Duration	Call Success	Probename
1	5552203@12.1.1.3	44442203@12.1.1.3	2020-09-01 01:56:30.526	00:00:00.000	0	SIPTest
2	55551105@12.1.1.3	44441105@12.1.1.3	2020-09-01 01:56:30.200	00:00:00.000	0	SIPTest
3	55551109@12.1.1.3	44441109@12.1.1.3	2020-09-01 01:56:29.327	00:00:00.000	0	SIPTest
4	55552206@12.1.1.3	44442206@12.1.1.3	2020-09-01 01:56:29.199	00:00:00.000	0	SIPTest
5	55551101@12.1.1.3	44441101@12.1.1.3	2020-09-01 01:56:28.553	00:00:00.000	0	SIPTest
6	55551107@12.1.1.3	44441107@12.1.1.3	2020-09-01 01:56:28.528	00:00:00.000	0	SIPTest
7	55551102@12.1.1.3	44441102@12.1.1.3	2020-09-01 01:56:28.380	00:00:00.000	0	SIPTest
8	55553302@12.1.1.3	44443302@12.1.1.3	2020-09-01 01:56:27.831	00:00:00.000	0	SIPTest
9	55551104@12.1.1.3	44441104@12.1.1.3	2020-09-01 01:56:27.303	00:00:00.000	0	SIPTest
10	55551101@12.1.1.3	44441101@12.1.1.3	2020-09-01 01:56:26.628	00:00:00.000	0	SIPTest
11	55552210@12.1.1.3	44442210@12.1.1.3	2020-09-01 01:56:24.753	00:00:00.000	0	SIPTest
12	55551103@12.1.1.3	44441103@12.1.1.3	2020-09-01 01:56:23.304	00:00:00.000	0	SIPTest

Filtered Calls

GL NetSurveyorWeb Refresh Protocol **VOIP (SIP & H323)** Type **CDR**

Data **Reports** **Alarms** **Users** System Status at 2020-09-01 04:24:34 ✓

Config \ Filter View

Profiles

[View Other Profiles](#)

SI No.	Profile Name	
1	New Profile	✗
2	New Profile2	✗

Filters

New Profile Name Save Clear

Basic Expression

[Add Filter](#) [Clear All](#) [Show Expression](#)

Filter1 **AND** ✗

Called Number **EqualTo** **And** Add Condition ✗

Ex: user2@gl.com (or)
9454471117@192.168.10.2;user=phone

Filtered Call View

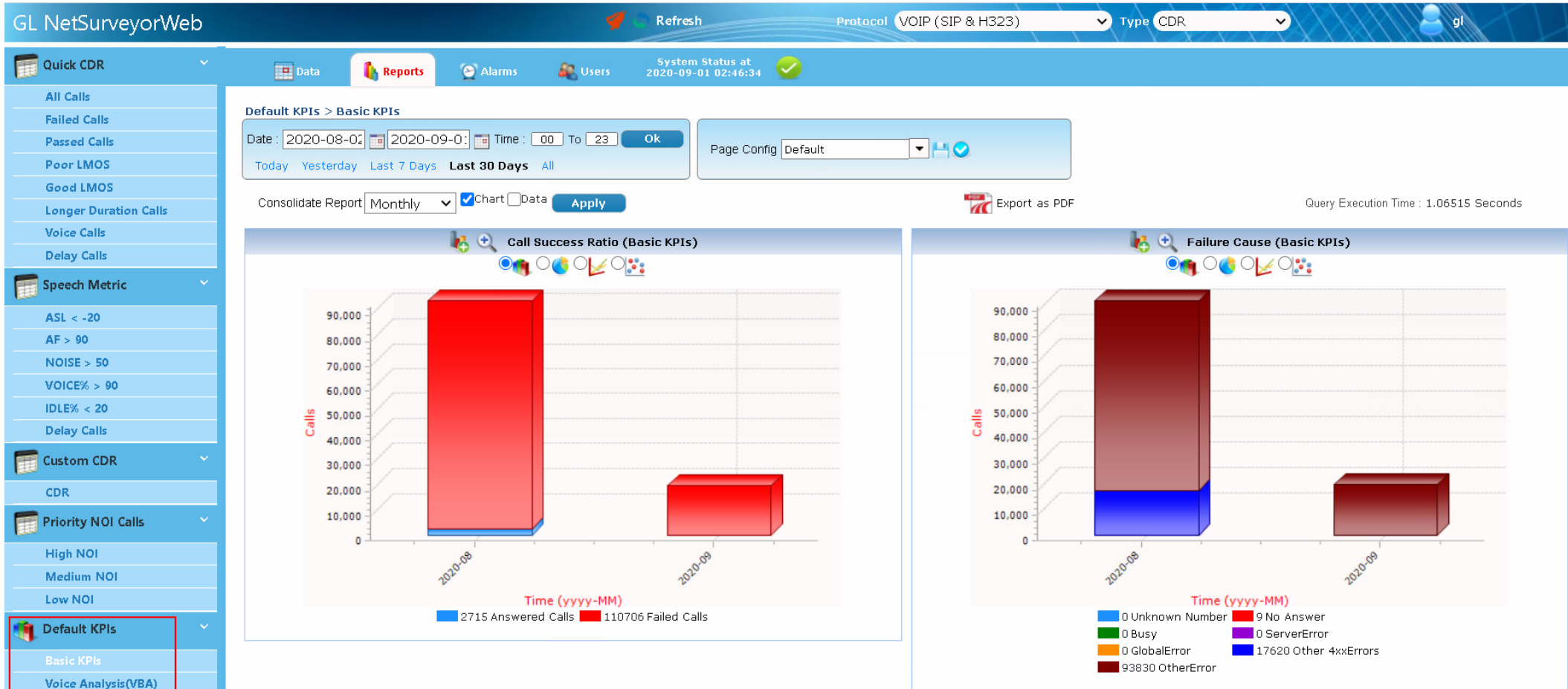
- Select **Custom CDR**→**CDR** on the left pane and select required filter to view the filtered calls. For example, select Call Number filter as shown in the below figure

The screenshot displays the GL NetSurveyorWeb interface. The left sidebar shows the navigation menu with 'Custom CDR' selected and 'CDR' highlighted. The main content area shows the 'Custom CDR \ CDR' view. The date range is set to 2020-09-01, and the time range is 00:00:00 to 23:59:59. The filter dropdown is set to 'All'. The table below shows a list of call records with columns for S/N, Trafficsumid, Starttime, Calling Number, Called Number, and Duration.

S/N	Trafficsumid	Starttime	Calling Number	Called Number	MinDelay_OUT	MaxDelay_OUT	AvgDelay_OUT	MinDelay_IN	MaxDelay_IN	AvgDelay_IN	Payload1	Duration
1	254836	2020-09-01 04:18:40.733	55552205@12.1.1.3	44442205@12.1.1.3								00:00
2	254122	2020-09-01 04:16:29.217	55552205@12.1.1.3	44442205@12.1.1.3								00:00
3	254318	2020-09-01 04:16:17.838	55552205@12.1.1.3	44442205@12.1.1.3								00:00
4	254747	2020-09-01 04:16:06.494	55552205@12.1.1.3	44442205@12.1.1.3								00:00
5	254248	2020-09-01 04:15:56.979	55552205@12.1.1.3	44442205@12.1.1.3								00:00
6	254624	2020-09-01 04:15:45.594	55552205@12.1.1.3	44442205@12.1.1.3								00:00
7	254237	2020-09-01 04:15:35.698	55552205@12.1.1.3	44442205@12.1.1.3								00:00
8	254651	2020-09-01 04:15:25.523	55552205@12.1.1.3	44442205@12.1.1.3								00:00
9	254377	2020-09-01 04:15:13.656	55552205@12.1.1.3	44442205@12.1.1.3								00:00
10	254673	2020-09-01 04:15:01.757	55552205@12.1.1.3	44442205@12.1.1.3								00:00
11	254094	2020-09-01 04:14:51.716	55552205@12.1.1.3	44442205@12.1.1.3								00:00
12	254301	2020-09-01 04:14:40.364	55552205@12.1.1.3	44442205@12.1.1.3								00:00

KPI's

- Select **Default KPIs**→**Basic KPIs** on the left pane to observe the performance of basic KPI's



Solutions and Techniques

- Manual G.168 EC Compliance Testing of ATAs & Gateways with Two-Wire Interfaces
- Manual G.168 EC Compliance Testing of ATAs & Gateways with T1 E1 Interfaces
- Automated G.168 EC Compliance Testing of ATAs & Gateways - All IP Solutions
- Automated G.168 EC Compliance Testing of Gateways - TDM / VoIP Interfaces
- Automated G.168 Compliance Testing of Gateways – Back-to-Back Gateway Solution

Components

The following components are either required or recommended

- **IP**

- Manual G.168 Compliance Test Suite with GLC View Software
- AutoECTest - Automatic G.168 Compliance Test Suite with either Windows Client Server (WCS) software or Tx/Rx File Utility Software

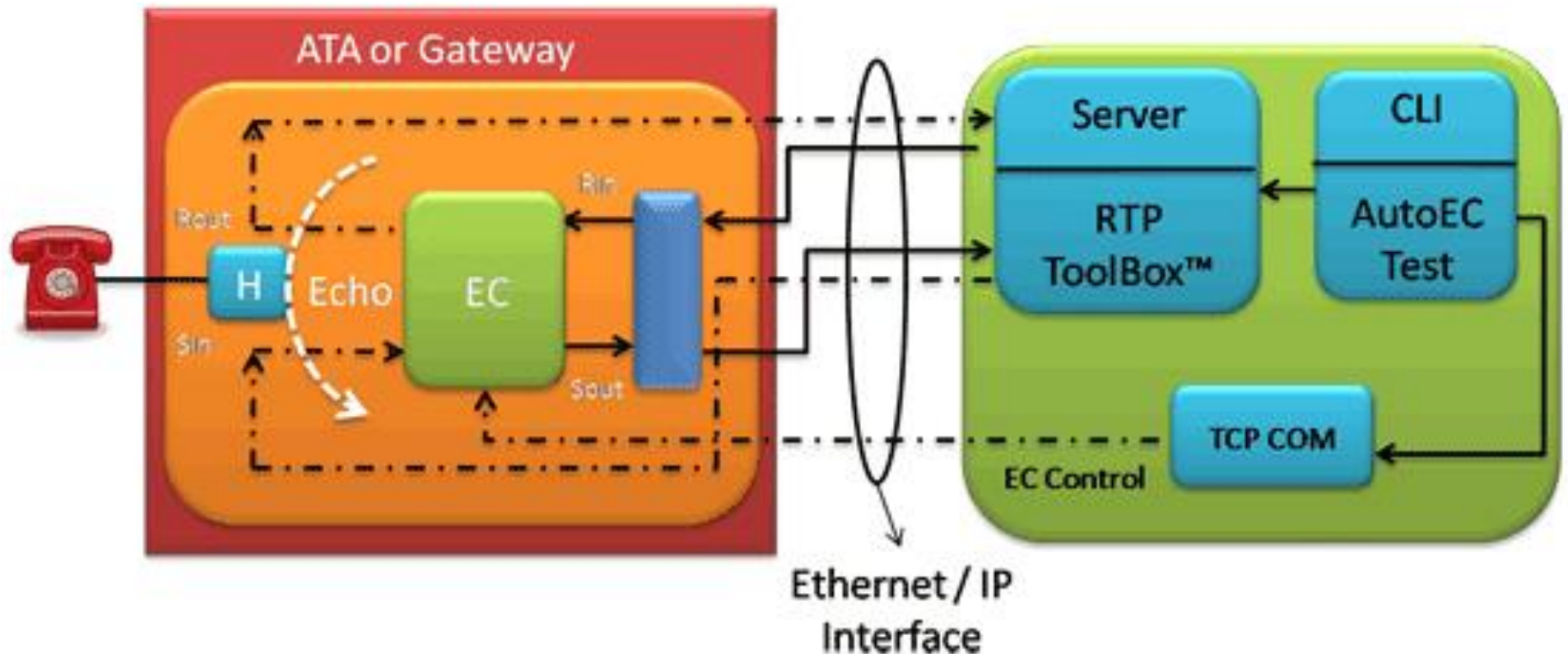
- **TDM**

- Dual T1 or E1 HD Card or USB T1 or E1 Units, Universal T1E1 Cards
- Delay Attenuate, Record / Playback Software
- Digital Echo Canceller Software (xx066)
- Echo Path Measurement Software (xx063)

For more information, please refer to <http://www.gl.com/echocan.html#VoIP>

Automated EC Compliance Testing in all IP

- Back-to-back gateways with testing interface at T1 E1 side
- Full automation is available for all G.168 test cases
- Full manual & Semi-automated testing are also possible
- Quick performance testing is also possible



Thank you