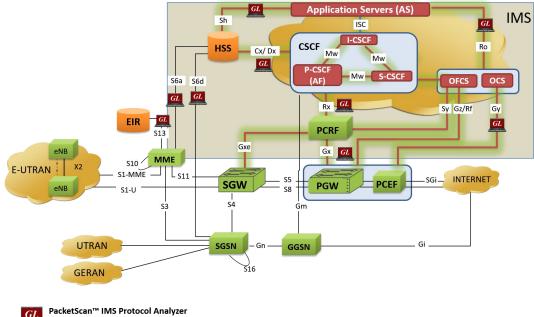
PacketScan[™] IP Multimedia Subsystem (IMS) Protocol Analyzer for Wireless & IP Networks



(S6a, S6d, S13, Cx/Dx, Gx, Rx, Sh, and Gy/Ro)

Overview

Internet Protocol (IP) Multimedia Subsystem, popularly known as "IMS", is built on Session Initiation Protocol (SIP) as the base to further support packaging of voice, video, data, fixed, and mobile services on a single platform to end users. It provides a unique convergence platform for different types of networks – whether it is mobile, satellite, broadband, cable, and fixed networks, with a goal of building an efficient interoperating networks.

GL's IMS Protocol Analysis option (PKV110) is available with additional licensing with <u>PacketScan™ Analyzer</u> (PKV100) or <u>PacketScan™</u> <u>HD Analyzer</u> (PKV120/PKV122).

With the **IMS Protocol Analysis** option, PacketScan[™] can capture, decode and analyze all SIP packets used to setup sessions as well as the Diameter signaling used for accessing subscriber data and charging data on IMS networks. PacketScan[™] permits continuous monitoring of communication over IMS network over S6a, S6d, S13, Sh, Cx/Dx, Gx, Gq, Gy, Rx, Rf, Ro, Zn, Zh, Dh, Wa, Wd, Wg, Wx, Wm, and Pr interfaces. PacketScan[™] also supports wide range of voice code for SIP-MS calls such as AMR, AMR WB, EVS, OPUS, and many more . Visit <u>Voice Codec</u> webpage for more details.

GL's PacketScan[™] an All-IP monitoring and analysis probe, along with <u>NetSurveyorWeb[™]</u> allows centralized monitoring of entire LTE-IMS network.

For more details, visit IMS Network Protocol Analyzer webpage.

Main Features

- Real-time and Offline Analysis
- Capture and Decode all SIP and Diameter Interfaces with Traffic Voice, Fax, Video, & more
- Includes Protocol Analysis & Traffic Analysis Views
- Support for Filter and Search Features
- Support for variety of Voice and Video Codec Options
- Use as Stand alone or Network Probe with Central Monitoring System NetSurveyorWeb™

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Protocol Stack and Standards

		Audio Codec	Video Codec		н	.323 Contr	ol	Diam	eter
MEGACO	SIP	RT	ГР	H.225		H.245	T.120	SCTP	TCP
				(RAS)	(Q.931)			IP)
		U	OP	ID	ТСР			MA	AC
	IP MAC							Diameter	Protocol
			c	SIP					

Protocols	Standard / Specification Used
SIP	RFC 3261
SIP	RFC 3262 - Reliability of Provisional Responses in the SIP RFC 3311 - The Session Initiation Protocol (SIP) UPDATE Method
Extensions	RFC 3455 - Private Header (P-Header) Extensions to the Session Initiation Protocol (SIP) for the 3rd- Generation Partnership Project (3GPP) RFC 3515 - Session Initiation Protocol (SIP) Refer Method RFC 3310 - HTTP/SIP Digest Authentication Using Authentication and Key Agreement (AKA)
	RFC 3263 - Locating SIP Servers
RTP, RTCP	RFC 3550
MEGACO	RFC 3525, RFC 3015
S6 , S13	3GPP TS 29.272 V12.6.0 (2014-09)
Sh	3GPP TS 29.329 V12.4.0 (2014-09)
Сх	3GPP TS 29.229 V12.3.0 (2014-09)
Dx	3GPP TS 29.229 V10.1.0
Gx	3GPP TS 29.212 V12.6.0 (2014-09)
Gq	3GPP TS 29.209 V6.7.0 (2007-06)
Gy	3GGP TS 32.225, 3GPP TS 32.299 & IETFRFC 4006), 3GPP TS 29.061 V10.3.0
Rx	3GPP TS 29.214 V14.1.0 (2016-09)
Rf	3GGP TS 32.225 , 3GPP TS 32.299 and IETFRFC 4006),3GPP TS 29.061 V10.3.0
Ro	3GGP TS 32.225 , 3GPP TS 32.299 and IETFRFC 4006),3GPP TS 29.061 V10.3.0
Zn	3GPP TS 29.109 V10.0.0 (2011-03) and 3GPP TS 33.220 V10.0.0 (2010-10)
Zh	3GPP TS 29.109 V10.0.0 (2011-03) and 3GPP TS 33.220 V10.0.0 (2010-10)
Dh	3GPP TS 29.329 V11.0.0
Wa	3GPP TS 29.234 V10.1.0 (2011-06)
Wd	3GPP TS 29.234 V10.1.0 (2011-06)
Wg	3GPP TS 29.234 V10.1.0 (2011-06)
Wm	3GPP TS 29.234 V10.1.0 (2011-06)
Wx	3GPP TS 29.234 V10.1.0 (2011-06)
Pr	3GPP TS 29.234 V10.1.0 (2011-06)

For more details on supported protocols, visit <u>Protocols Supported in PacketScan™</u> webpage.

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Summary and Detail Views

Displays Summary, Detail, Hex dump, Statistics, and Call Detail Views. Any protocol field can be added to the summary view, providing users more flexibility to monitor required protocol fields. User can select a frame in Summary View to analyze and decode each frame in the Detail View.

Hex dump View displays the frame information in HEX and ASCII format, the contents of this view can also be copied to clipboard.

Statistics View displays statistics based on frame count, byte count, frames/sec, bytes/sec etc. for the entire capture data.

The detail decode view of SIP-IMS call displays the following

- MAC layer
- IPV6 (or IPv4) layer
- GTP IP and UDP Layer
- SIP 3261

Packet Data Analyzer - Summary View								-		×
File View Call Summary Protocol Confi	gurations GUI Config	gurations Help								
🚰 🔎 🎴 兄 🦻 🕨 🖉	a 🛪 📽 🛙	📲 SIP 🔄	Show All Sessio	ns	-					
Call Summary Registraton Summary Alert Sum	mary									
Call # SSRC Payload Packe (Rec)	Conversati Listening Pa 40S/R· M0S/R· D	ackets Missing Duplicate Out Of iscard Packets Packets Seguen.		Average Jitter	Average Cumulativ Inter Arri Packet	Max/Min Gap	Max/M Delay Ji		Max/Mi RTDela	
Cal#000001 Caller:0001@192.168.1.200 Call	e:0001@192.168.1.103	Calld:GLPG-483633760331 Call StartTim	e:2011-02-10 16:58:57.7	99 Call Dur	ation: 00:00:25.489					
	4.20/93 4.20/93 0	/0.00 0/0.00 0/0.00 0/0.00	20.01 0.00	0.00	0 0	21.65 / 18.97	1/-1 0	0.68 / 0.00	0.000 /	/ 0.00
21 3380545537 PCMU/8000 1269	4.20/93 4.20/93 0	/0.00 0/0.00 0/0.00 0/0.00	20.01 0.00	0.00	0 0	21.61 / 18.81	1/.1 0	0.68 / 0.00	0.130/	0.11
<										
							_			_
Signalling Parameters	Value	Audio Parameters	Value	^	Video Parameters			Value		1
Caller	0001@192.168	Sic BTP Channel	192,168,1,2	200	Stc Video Channel					-
Calee	0001@192.168	Src Media Type	PCMU/800	0	Stc Media Type					
Calld	GLPG-4836337	Stc SSRC	336546841	7	Sic SSic					
Call Status	Terminated	Stc Packets Count	1273		Stc Packets Count					
		Src Missing Packets / (%)	0/0.00		Stc Missing Packets					
Call Initiated Time	2011-02-10 16:	Src Duplicate Packets / (%)	0 / 0.00		Src Duplicate Packe					
Call Established Time	2011-02-10 16:	Src Out of Sequence Packets / (%)	0 / 0.00		Src Out of Sequence					
Call Stop Time	2011-02-10 16:	Src Conversational MOS/R-Factor	4.20 / 93		Stc Video Frame con					
Call Duration	00:00:25.489	Src Listening MOS/R-Factor	4.20 / 93		Stc Frame Rate(Fran	nes/sec)				
Call Terminator	Caller	Src Discarded Packets / (%)	0 / 0.00		Src AvgDelay					
Call Failure Reason		Src Average Inter Arrival Jitter (RTCP)	0		Stc AvgGap					
		Src Average Jitter	0.00		Stc MDI (DF:MLR)					
Session Request Delay (msec)	1.669	Stc Average Delay	0.00		Stc AvgMDI(DF:ML)	R)				
Session Disconnect Delay (msec)	0.905	Stc Average Gap	20.01							
Post PickUP Delay (msec)	128.905				Dest Video Channel					
		Dest RTP Channel	192.168.1.1		Dest Media Type					
Total Signaling Frames	7	Dest Media Type	PCMU/800		Dest SSrc					
		Dest SSRC	338054553	57	Dest Packets Count					
		Dest Packets Count	1269		Dest Missing Packel					
		Dest Missing Packets / (%)	0/0.00		Dest Duplicate Pack Dest Out of Sequen					
		Dest Duplicate Packets / (%) Dest Out of Sequence Packets / (%)	0/0.00		Dest Dut of Sequen Dest Video Frame of					-1
					Dest video Frame ci	bunt				
					Dark France Data/Fra					
		Dest Out or Sequence Packets 7 (%) Dest Conversational MOS/R-Factor Dest Listening MOS/R-Factor	4.20/93		Dest Frame Rate(Fra Dest AvgDelay	ames/sec)				

Figure: Detail View of SIP

PacketScan (All-in-One)							
File View Capture Statistics Database Call Detail Records Co	onfigure Help						
** ** ** ** · · · · · · · · · · · · · ·	J W S	GoTo					
Device Frame# TIME (Relative) sright (Byte Error Source IP	Address Destination IP Address	Application Identifiers Diameter-Lie	Command Code (S6a)	AUTN Deta Diameter-Lte	MCC Digits Diameter-Lie	MNC Digits Diameter-Lie	Result Code Diameter-Lte
	IP	Diameter-Lie	Diameter-Ge	Liverseter-Lie	Diameter-Lie	Diameter-coe	Diameter-De
0 2 00:00 04 899319 346 192 168 1	2.5 192.168.12.6 Application-ID	of the S6a/S6d interface application	Authentication-Information Request/Answer		001	01e	
0 3 00:00:05:005942 398 192:168.1	2.6 192.168.12.5 Application-ID	of the S6a/S6d interface application	Authentication-Information Request/Answer	x83529469CFE78000580994355E5388CE			DIAMETER_SUCCESS
0 4 00:00:08.044491 406 192.168.1		of the S6a/S6d interface application	Update-Location Request/Answer		001	01e	
0 5 00.00.08.123201 278 192.168.1		of the S6a/S6d interface application	Delete-Subscriber-Data Request/Answer				
0 6 00:00:08 165620 210 192,168.1		of the S6a/S6d interface application	Delete-Subscriber-Data Request/Answer				DIAMETER SUCCESS
0 7 00.00.08.223691 858 192.168.1		of the SSa/SSd interface application	Update-Location Request/Answer				DIAMETER SUCCESS
0 8 00.0010.829596 302 192.168.1		of the SSa/SSd interface application	Puge UE Reguest/Answer				Dame ren_soucess
0 9 00.0010.825556 302 152.166.1		of the SSa/SSd interface application	Puge UE Request/Answer				DIAMETER SUCCESS
 3 00:00 10:070636 2:30 1:32,166.1. 	2.6 132.160.12.5 Application D	or the Soak Sod Intenace application	Purge OE Neguest/Antwer				DIAMETER SOULESS
Diameter-Lte Layer							
003E Version 003F Length	= 00000001 Diameter Version = 284 (x00011C)	1					
Cossand Flags:	= 284 (x00011C)						
0042 Request (R)	= 1 Message is Reque						
0042 Proxiable (P)	= .1 Message Proxied.	Relayed or Redirected					
0042 Error (E)	=	Contain Protocol Error					
0042 Fotentially Retransmitted Message (T)	=0Reserved						
0043 Command Code (S6a) 0046 Application Identifiers	= x00013E Authentication-In	formation Request/Answe	r				
0046 Application Identifiers 004A Hop By Hop Identifier	= x01000023 Application-ID (= 740737416 (x2C26C188)	of the Sta/Std interfac	e application				
004E End To End Identifier	= 539346962 (x2025C812)						
Session-Id	- SSISTONE (ALOLSCOIL)						
AVP Code	= x00000107 Session-Id						
AVP Flags							
Vendor Specific Bit (V)	= 0 Vendor ID Field	Not Present					
Mandatory Bit (M) Encryption For End To End Security (P)	= .1 Support Of AVP R = .0 Not Needed	equired					
Reserved (r)	=00000						
AVP Length	= 61 (x00003D)						
Session-ID Data (S6a)	= x4D4D453140676C2E636F6D3B	3933343638333330343B323	B474C2D4D4150535F335F3934303	034353938342D393230302D34393	3834		
Padding Octet	- 00000000 (0)						
Padding Octet	- 00000000 (0)						
Padding Octet	- 00000000 (0)						
Vendor-Specific-Application-Id AVP Code	- x00000104 Vendor-Specific	too to an a factor and					
AVP Flags	- x00000104 vendor-specific	-application-id					
Vendor Specific Bit (V)	= 0 Vendor ID Field	Not Present					
Handatory Bit (M)	= .1 Support Of AVP B						
Encryption For End To End Security (P)	= Not Needed						
Reserved (r)	00000						
AVP Length AVP Data	= 32 (x000020)						
Vendor-Id							
009A AVP Code	= x0000010A Vendor-Id						
009E Vendor Specific Bit (V)	= 0 Vendor ID Field	Not Present					
009E Mandatory Bit (M)	= .1 Support Of AVP R	equired					
	0 Not Needed						
009F AVP Length	- x00000C						
00A2 AVP Data: Vendor ID Auth-Application-Id	= 10415 (x000028AF)						
AUTh-Application-id AVP Code	= x00000102 Auth-Application	b-Td					
AVP Flags	a a a a a a a a a a a a a a a a a a a						
Vendor Specific Bit (V)	= 0 Vendor ID Field	Not Present					
Mandatory Bit (M)	1 Support Of AVP R	equired					
Encryption For End To End Security (P)	= Not Needed						
Reserved (r) AVP Length	=00000 = 12 (x00000C)						
AVP Length	- 15 (R00000C)						
Hex Duap of the Frame Data							
00 07 E9 5B EE 4A 4C 72 B9 31 18 82 08 00 45 00	éfiJLr'1 E						
01 4C 56 19 00 00 80 84 00 00 C0 48 0C 05 C0 48	LV CI A A						
An AL AD 10 AD 10 50 54 00 70 BC 00 05 00 AA AD	prite						
Off-line Viewing		C:\Users\mallappa\Desktop	o\s6a.hdl	10 Frames			

Figure: Detail View of Diameter S6a Interface

The detail view of Diameter interface displays the following:

- MAC Layer
- IP Layer
- SCTP Layer
- Diameter Layer

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Search and Filters

Similarly any protocol field can be added to the Advanced filtering and search features to drill down to specific frames for detail troubleshooting. Filter and search capabilities adds a powerful dimension to the IMS analyzer. These features isolate required frames from original frames in real-time/offline. Users can record all or filtered traffic into a trace file.

Filter Selection	Ethernet Encoded TPID Value	Capture Filters			
111 SIP-2543	V LAN (802.10)	Filter Selection	IP Layer		
⊕-®e Data Link ⊡-®e MAC		- W Layers	IP Address	Direction	IP Address
VIAN ID VIAN ID Ethernet Encoded TPIE Higher Layer Protocol ARP NetWare Internet Packet E Logical Link Control Internet Datagram Protocol DECnet Routing Protocol	Activate Deactivate	H → MAC → IP Address H → ICP H → UDP H → SCTP H → SCTP H → STP H → MEGAC0 H → MEGAC0 H → MEGAC0 H → MEGAC0		<>	IPAddress
All Selected					siete
Layer Field	Filter Value	Include C Exclude	Deactivate Sel De	eactivate All	
•	Þ				
Conditions for all selections	Deactivate Sel Deactivate All				

Figure: Filters and Search View

Consolidated Configurations

- Provides a consolidated interface for all the important settings required in the analyzer. All the configuration settings done in any of these options can be saved to a file, loaded from a configuration file
- Allows the captured frames to be saved to a trace file using different conventions such as user-defined prefixes, date-time prefixes, total number of files, file size, frame count, or time limit
- Allows user to decode required interfaces and to enter the custom values for each protocol as per network setup

IMS		
Diameter Application ID for Cx interface:	0 16777216	
Diameter Application ID for Dx interface:	0 16777218	
Diameter Application ID for Zn interface:	0 16777220	
Diameter Application ID for Zh interface:	0 16777221	
Diameter Application ID for Wx interface:	0 16777219	
Diameter Application ID for Gq interface:	0 16777222	
Diameter Application ID for Gy interface:	0 16777225	
Diameter Application ID for Sh interface:	0 16777217	
Diameter Application ID for Dh interface:	0 16777223	
Diameter Application ID for Gx interface:	0 16777224	
Diameter Application ID for Rf interface:	3 3	
Diameter Application ID for Ro interface:	44	
Diameter Application ID for Wg interface:	5 5	
Diameter Application ID for Wm interface:	6 6	
Diameter Application ID for Pr interface:	0 16777230	
Diameter Application ID for Wa interface:	77	
Diameter Application ID for Wd interface:	88	
Diameter Application ID for S6/S13 interface:	16777251 16777252	

Figure: IMS Configuration Settings

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Traffic Analyzer—Summary View

Call Summary, Signaling, Audio, & Video QoS Statistics

The Call Summary displays the signaling, audio, and video parameters of each call for SIP, RTP, MEGACO, H.323, GSMA, IuCS, and SCCP protocols. Video QoS parameters such as Codec Info, Frame Rate, Missing Packets, Delay, Gap, Video Frame Count, Out Of Sequence count, Duplicate Packets count, Media Delivery Index (MDI), etc are displayed for all video calls with H.263 and H.264 codecs.

Packet Data Analyzer - Summary View					- 0
ile View Call Summary Protocol Config	gurations GUI Confi	gurations Help			
🕼 🔎 🎦 🔛 🖓 🕨 🗉 🦉	1 21 🔐 👫	SIP 🔹	Show All Sessions	•	
Call Summary Registraton Summary Alert Summ	nary				
Call # SSRC Pavload Packe C	onversati Listening P	ackets Missing Duplicate Out Of	Average Average Average	Average Cumulativy Max/Min Gap Max/V	Max/Min Max/Min
		iscard Packets Packets Sequen	Gap(ms) Delay Jitter	Inter Arri Packet Delav	Jitter RTDelav(r
Cal#000001 Caler:0001@192.168.1.200 Caler		Calld:GLPG-483633760331 Call StartTime:2	2011-02-10 16:58:57.799 Call D	Juration: 00:00:25.489	
1 3365468417 PCMU/8000 1273 4 1 3380545537 PCMU/8000 1269 4	.20/93 4.20/93 0	/0.00 0/0.00 0/0.00 0/0.00	20.01 0.00 0.00	0 0 21.65 / 18.97 1 / -1	0.68 / 0.00 0.000 / 0.
1 3380545537 PCMU/8000 1269 4	20/93 4.20/93 0	/0.00 0/0.00 0/0.00 0/0.00	20.01 0.00 0.00	0 0 21.61 / 18.81 1 / -1	0.68/0.00 0.130/0.
<					
Signalling Parameters	Value	Audio Parameters	Value	 Video Parameters 	Value
Caller	0001@192.168	Stc RTP Channel	192.168.1.200	Stc Video Channel	
Callee	0001@192.168	Src Media Type	PCMU/8000	Src Media Type	
Calld	GLPG-4836337	Stc SSRC	3365468417	Stc SStc	
Call Status	Terminated	Stc Packets Count	1273	Stc Packets Count	
		Stc Missing Packets / [%]	0/0.00	Stc Missing Packets / [%]	
Call Initiated Time	2011-02-10 16:	Src Duplicate Packets / (%)	0/0.00	Stc Duplicate Packets / (%)	
Call Established Time	2011-02-10 16:	Src Out of Sequence Packets / (%)	0/0.00	Src Out of Sequence Packets / (%)	
Call Stop Time	2011-02-10 16:	Src Conversational MOS/R-Factor	4.20/93	Stc Video Frame count	
Call Duration	00.00.25.489	Src Listening MOS/R-Factor	4.20 / 93	Stc Frame Rate(Frames/sec)	
Call Terminator	Caller	Src Discarded Packets / (%)	0/0.00	Src AvgDelay	
Call Failure Reason		Stc Average Inter Arrival Jitter (RTCP)	0	Stc AvgGap	
		Src Average Jitter	0.00	Stc MDI (DF:MLR)	
Session Request Delay (msec)	1.669	Stc Average Delay	0.00	Stc AvgMDI(DF:MLR)	
Session Disconnect Delay (msec)	0.905	Stc Average Gap	20.01		
Post PickUP Delay (msec)	128.905			Dest Video Channel	
		Dest RTP Channel	192.168.1.103	Dest Media Type	
Total Signaling Frames	7	Dest Media Type	PCMU/8000	Dest SSrc	
		Dest SSRC	3380545537	Dest Packets Count	
		Dest Packets Count	1269	Dest Missing Packets / (%)	
		Dest Missing Packets / (%)	0/0.00	Dest Duplicate Packets / (%)	
		Dest Duplicate Packets / (%)	0/0.00	Dest Out of Sequence Packets / (%)	
		Dest Out of Sequence Packets / (%)	0 / 0.00	Dest Video Frame count	
		Dest Out of Sequence Packets / (%) Dest Conversational MOS/R-Factor Dest Listening MOS/R-Factor	0 / 0.00 4.20 / 93 4.20 / 93	Dest Video Frame count Dest Frame Rate(Frames/sec) Dest AvgDelay	

Figure: Traffic Analyzer—Call Summary, Audio/Video Statistics

Graphs Traffic Analyzer—Summary View

- Active Calls A line graph, depicting the Number Of Calls Vs Time
- Average Jitter Distribution Distribution of the Average Jitter values across the Total Sessions
- E-model This graph provides R-factor, MOS and packets discarded against number of sessions- all these three graphs show statistics of terminated calls
- R-Factor A bar Graph that plots R-Factor across No of Sessions
- MOS A bar Graph that plots Mean Opinion Score values across No. of Sessions
- Packets Discarded A bar Graph that plots Packets Discarded across No. of Sessions
- RTP Packets Graph Plots and compares out of ordered packets, missing packets and duplicate packets against Total Audio Packets
- T.38 Analysis Fax (T.38 data) over VoIP monitoring and decoding capability
- **Call Graph** Displays the message sequence of captured VoIP calls

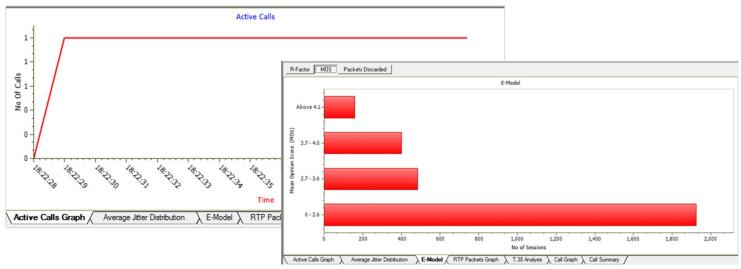


Figure: Active Calls and E-Model Graph

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Traffic Analyzer - Detail View

This display assists in any comparisons that are to be made between the two RTP sessions of a call. Each frame of the selected session is dissected and its contents are displayed in a tabular form for easier viewing and comparisons. Vital aspects from the RTP frame needed for close analysis are included in the table.

PA Packet D	ata Analyzer Detail View		iew I Configuration	CIII C	onfigurations H	-la									-		×
					W III SIP	ыр			- Show	All Sessio	ns	•					
Call Summary	Registraton	Summary	Alert Summary														_
Packet #	Sequenc	RTP T	Payload Type	Payloa	Packet Seque	Gap(ms)	Gap	^	Packet #	Sequenc	RTP T	Payload Type	Payloa	Packet Seque	Gap(ms)	Gap	
M 5	41763	43256	PCMU/8000	160	Session In Pro	0.00	0.00		M 9	47038	33015	PCMU/8000	160	Session In Pro	0.00	0.00	
6	41764	43256	PCMU/8000	160	Session In Pro	20.06	20.00		11	47039	33015	PCMU/8000	160	Session In Pro	18.81	20.00	
7	41765	43256	PCMU/8000	160	In Sequence	19.53	20.00		13	47040	33015	PCMU/8000	160	In Sequence	20.50	20.00	
8	41766	43256	PCMU/8000	160	In Sequence	19.52	20.00		15	47041	33015	PCMU/8000	160	In Sequence	19.53	20.00	
10	41767	43256	PCMU/8000	160	In Sequence	21.50	20.00		17	47042	33015	PCMU/8000	160	In Sequence	21.49	20.00	
12	41768	43256	PCMU/8000	160	In Sequence	19.53	20.00		19	47043	33015	PCMU/8000	160	In Sequence	19.52	20.00	
14	41769	43256	PCMU/8000	160	In Sequence	19.53	20.00		21	47044	33015	PCMU/8000	160	In Sequence	19.59	20.00	
16	41770	43256	PCMU/8000	160	In Sequence	20.49	20.00		23	47045	33015	PCMU/8000	160	In Sequence	19.47	20.00	
18	41771	43256	PCMU/8000	160	In Sequence	19.57	20.00		25	47046	33015	PCMU/8000	160	In Sequence	20.51	20.00	
20	41772	43256	PCMU/8000	160	In Sequence	20.51	20.00		27	47047	33015	PCMU/8000	160	In Sequence	19.53	20.00	
22	41773	43256	PCMU/8000	160	In Sequence	19.52	20.00		29	47048	33015	PCMU/8000	160	In Sequence	20.55	20.00	
24	41774	43256	PCMU/8000	160	In Sequence	20.75	20.00		31	47049	33015	PCMU/8000	160	In Sequence	19.48	20.00	
26	41775	43256	PCMU/8000	160	In Sequence	19.31	20.00	~	33	47050	33015	PCMU/8000	160	In Sequence	20.51	20.00	
<							>		<								>
Heading			Value					^	Heading			Value					
SSRC			33654						SSRC			33805					
Source IP Ad				8.1.200					Source IP A				58.1.103				
Destination IF Source Port	Address		192.16	8.1.103					Destination Source Port			192.16	58.1.200				
Destination P	e di		1024						Destination			1024					
BIP Packets			1271						BTP Packe			1268					
BTCP Packet			2						BICP Pack			1					
Packets With	Marker Bit		1						Packets Wi	th Marker Bit		1					
Total Audio B			20320	1					Total Audio			20272	1				
RTCP Sende			2						RTCP Send			1					
RTCP Receiv			0					~		siver's Reports		0					
Rut Of Serue	ince Packets	1%	0/00	n				*	I Rut Df Seni	ence Packet	\$\%	0\00	10				

Figure: Traffic Analyzer—Detail View

Graphs in Detail View

Gap/Jitter graphs - Plots the Gap (in milliseconds)/Jitter versus the packet number

Gap Distribution Graph - Number of packets with a particular value of gap is plotted against the (gap) value.

Jitter Distribution Graph - Number of packets with a particular value of jitter is plotted against the jitter value

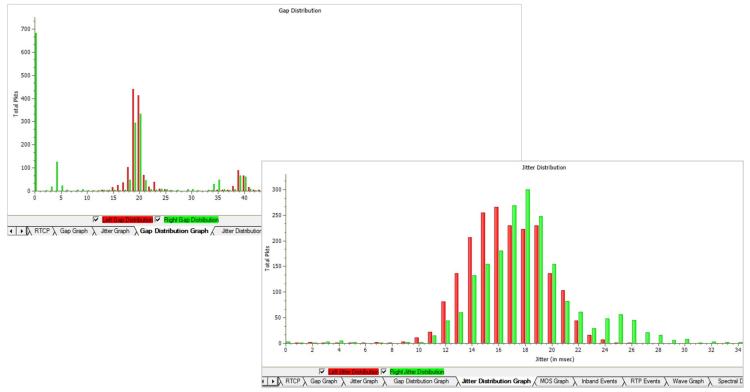


Figure: Gap/Jitter Distribution Graph

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Graphs in Detail View (Contd.)

MOS Graph – Plots Mean Opinion Score values throughout the duration of the call.

Wave graph – Displays the amplitude of the incoming signal in a selected call as a function of time.

Spectral Display – Displays the power of incoming signal while the capturing is going on as a function of frequency.

Degradation Factor – A pie chart plots and compares different statistics such as Good Quality, Packets discarded, Echo level, Packet loss, and Regency against total Packets for each individual sessions.

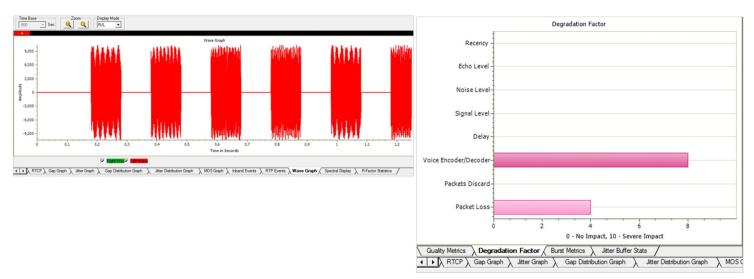


Figure: Wave Graph and Degradation Factors

R-Factor Statistics

Quality Metrics based on E-model includes R-Factor and MOS Factor. R-Factor bar graph will display statistics such as R Listening, R Conversational, R-G107, and R-Nominal values.

MOS Factor bar graph will display statistics such as MOS CQ, MOS PQ, and MOS Nominal values during a call.

Jitter Buffer Statistics – A pie chart plots and compares packets received, packets discarded and packets lost against total Packets for each individual sessions. Also provides a tabular data on average.

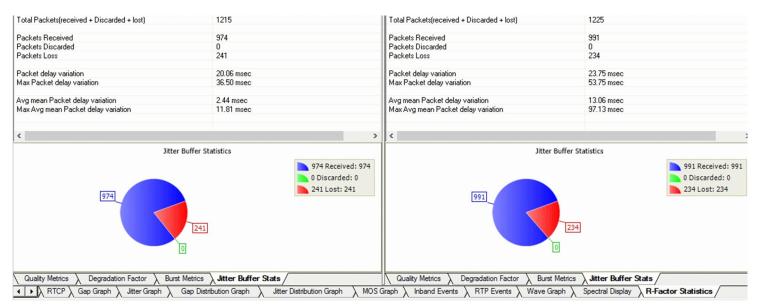


Figure: Jitter Buffer Statistics

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Play Audio and Write to File

The Play Audio plays the selected call to the PC speaker. Write to File is similar to the Play Audio option. The basic difference being that the output is written to a file instead of playing to the speaker.

PDA can monitor video calls and display both audio and video RTP streams in summary view. Users can record video calls to a file in QuickTime format, which can be viewed by VLC player.

Record Video

Record Video option is available for both auto detected RTP calls and SIP calls. Supported video codecs are: H263++ CIF 190 kbps, H263++ CIF 350 kbps, H263++ CIF 512 kbps, H263++ QCIF 128 kbps, H263++ QCIF 64 kbps, H263++ QCIF 80 kbps.

	-	1			🗐 🚮	17 1	ISIP			- Sho	w Video	Session	is Only	•					
Call Sun	nmary Reg	istraton Sur	nmary Ale	rt Summary															
Call #	SSRC	Payload	Packet Received	Conversat MOS/R		Packets Discard		Duplicate Packets		Average Gap(ms)	Average Delay	Average Jitter	Average Inter Arri	Cumulative Packet	Max/Min Gap	Max/Min Delay	Max/Min Jitter	Max/Min RTDela	
V Call#0	000001 Calk	er.test4@19	32.168.10.4	5 Callee:test	3@192.16	3.10.14 Cal	ld:211ea02	68e7e463d	@dGVzdD(Q. Call Start	Time:2002-'	10-05 14:30	23.303 Ca	Duration: 0	0.00.27.77	8			
1	20617	PCMU	1391	3.53 /	3.53 /	147 /	0/0.00	6/0.43	0/0.00	19.89	0.00	3.00	5	0	86.26	66 / -20	12.44	0.000	0.000
21	19892	PCMU	1355	3.25 /	3.25 /	184 /	0/0.00	3/0.22	0/0.00	19.96	0.00	2.00	15	0	105.93	57 / -20	11.73	0.000	0.000
01	22391	h263-2		n/a	n/a	n/a	0/0.00	0/0.00	0/0.00	100.10	-1.00	6.00	n/a	0	178.49			n/a	n/a
C1	18161	h263-2	417	n/a	n/a	n/a	0/0.00	0/0.00	0/0.00	99.87	0.00	6.00	n/a	0	132.10	33 / -30	33.26	n/a	n/a
Record	d Video				×														
Left F	File Name	VPack	etScan\Vid	leo\Left.qt	-1														
Right	File Name	Packe	≀Scan\Vide	o\Right.q;															
Right	File Name	Packe	(Scan\Vide	o\Right.q;															

Save Call

The Save Call feature enables the user to save a particular call either in GL's proprietary *.HDL file format or in Ethereal *.PCAP file format or *.PCAPNG file format. Call Summary details could also be saved for a particular call as a *.rtf file. This is especially useful to get data from real-time traffic locations to the lab for detail analysis of a flawed call.

Mp Save Call	X
Call(s)	Selected Call(s)
CallNum_2 CallNum_3	CallNum_1
O HDL File 💿 PCAP File O PCAPNI	G Call Summary
Path D:\Program Files\GL Communication	ns Inc\PacketScan\Examples\Othe
✓ Overwrite Files Save Call(s)	Exit

RTP/RTCP Statistics, Inband Events, Outband Events

The user can get the complete details of a single selected call such as total packets count, SSRC, RTP packet count, RTCP packet count, total Audio bytes, and more.

Inband Events display Inband DTMF and MF digits as they are received with details such as Timestamp, Type, Event, On-Time, Power, & Frequency. Outband Events display RTP events as per RFC 2833 or 4733 with details such as Timestamp, Event, Power, & Duration.



Triggers and Action Settings

Triggers and Action Settings allow the user to filter calls based on certain SIP, RTP, MEGACO, H.323, GSMA, and IuCS parameters followed by a set of actions for the completed calls. The filtered file can be saved in either GL's proprietary HDL file, Ethereal PCAP, or PCAPNG file format. It extracts fax image for the selected fax calls. Additionally, a summary of call signaling and audio parameters can be saved as *.rtf file, or generate Call Detail Records in CSV file format along with voice files for each direction. The CSV files can be used for further analysis and retrieval of **calls of interest**.

Alert Summary

PacketScan[™] PDA generates alerts when particular vital parameters go beyond a specified value and display in Alert Summary table. The user can specify the criteria based on which the alerts are to be generated. The tab provides an active list of the alerts that have occurred during the test session in tabular columns.

PDA Par	cket Data An	alyzer - Summary View						-	>
File V	iew Help								
	ien Teb								
1									
	lo	straton Summary Alert Summary							_
Call#	Protocol	Message	Type	Threshold	Value	Caller	Callee	Calld	
1	SIP	mos value between 3 to 4	Warning	2.00-4.00	3.57	0005@192.168.1.236	0005@192.168.1.234	GLPG143457205760	
2	SIP	mos value between 3 to 4	Warning	2.00-4.00	3.39	0006@192.168.1.236	0006@192.168.1.234	GLPG143617205763	
3	SIP	mos value between 3 to 4	Warning	2.00-4.00	2.77	0008@192.168.1.236	0008@192.168.1.234	GLPG143617205769	
3	SIP	mos value between 1 to 2.5	Critical	1.00-2.50	2.36	0008@192.168.1.236	0008@192.168.1.234	GLPG143617205769	
4	SIP	mos value between 3 to 4	Warning	2.00-4.00	3.48	0009@192.168.1.236	0009@192.168.1.234	GLPG143617205772	
5	SIP	mos value between 3 to 4	Warning	2.00-4.00	3.30	0011@192.168.1.236	0011@192.168.1.234	GLPG143777205778	
6	SIP	mos value between 3 to 4	Warning	2.00-4.00	2.77	0012@192.168.1.236	0012@192.168.1.234	GLPG143927205781	
6	SIP	mos value between 1 to 2.5	Critical	1.00-2.50	2.31	0012@192.168.1.236	0012@192.168.1.234	GLPG143927205781	
7	SIP	mos value between 3 to 4	Warning	2.00-4.00	2.27	0001@192.168.1.231	0001@192.168.1.237	GLPG13407127763982	
7	SIP	mos value between 1 to 2.5	Critical	1.00-2.50	2.27	0001@192.168.1.231	0001@192.168.1.237	GLPG13407127763982	
8	SIP	mos value between 1 to 2.5	Critical	1.00-2.50	1.47	0002@192.168.1.231	0002@192.168.1.237	GLPG13417127763987	
9	SIP	mos value between 1 to 2.5	Critical	1.00-2.50	1.04	0003@192.168.1.231	0003@192.168.1.237	GLPG13425567763992	

Buyer's Guide

Item No	Product Description
<u>PKV110</u>	IMS Protocol Decodes (Optional with PacketScan™)
<u>PKV100</u>	PacketScan™ (Real-time and Offline)
<u>PKV101</u>	PacketScan™ - Offline
<u>PKV120</u>	PacketScan™ HD – High Density IP Traffic Analyzer w/ 4x1GigE - includes PKV100 – Online (not Offline) for tempo- rary audio codec support
<u>PKV122</u>	PacketScan™ HD – High Density IP Traffic Analyzer w/ 2x10GigE - includes PKV100 – Online (not Offline) for tem- porary audio codec support
Item No	Related Software
PCD103	AMR Codec for PacketScan™
PCD104	EVRC Codec for PacketScan™

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<u>PC</u>	<u>D105</u>	EVRC-B Codec for PacketScan™
<u>PC</u>	<u>D106</u>	EVRC-C Codec for PacketScan™
<u>PK</u>	<u>V170</u>	NetSurveyorWeb™ (Network Surveillance Software) for IP Network

For more details, visit IMS Network Protocol Analyzer webpage.



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