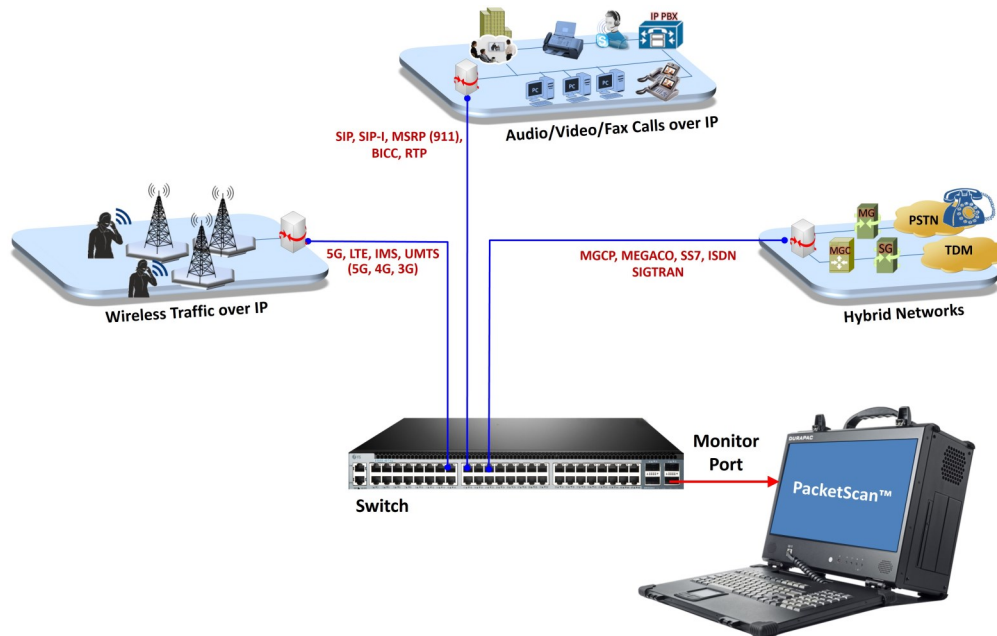


PacketScan™ - All IP Analyzer

(Signaling and Traffic Monitoring)



Overview

GL's **PacketScan™** – a **Network Monitoring** software offers powerful features to capture and monitor live signaling and traffic over IP (version 4 and 6). It captures, segregates, monitors and collects statistics on all IP calls. Almost all VoIP and Wireless protocols over IP transport layer, as listed below, can be captured and decoded for troubleshooting network problems.

- Supports decoding of almost all industry standard signaling protocols – See Protocol List
 - 5G N1N2, N4, N8, N10, N11, N12, and N13 (optional)
 - SIP, SIP-I, SIP-T, MSRP, H.323, MEGACO, MGCP, Diameter, Skinny (SCCP), SCTP
 - LTE (optional)
 - SIGTRAN – SS7, ISDN (optional)
 - GSM A and Abis over IP (optional)
 - GPRS Gb and Gn over IP (optional)
 - UMTS IuCS and IuPS over IP (optional)
 - T.38 Fax and Video calls
 - ED-137 / ED-138
 - All traffic supported – Digits, Tones, Voice, Video, Fax
- SIP ED-137 / ED-138 for Air Traffic Monitoring (Air-to-Ground, Ground-to-Ground Calls and Record interface)
- Capture and monitor live signaling and MSRP traffic over IP interface
- Live monitoring Ipv4 and Ipv6 (version 4 and version 6) networks; users can listen / record a session in real-time and extracts Fax images into TIFF format
- Segregates, captures, and collects statistics on VoIP and Wireless calls
- Provides VoNR call statistics such as caller, callee, MOS scores, discarded packets and voice storage
- Monitors QoS on voice and video calls; perform power, frequency, spectral, tone and digit analysis, and video analysis with ease and precision; get an exact picture of QoS (Quality of Service)
- Includes [Packet Data Analysis](#) (PDA)/Traffic Analyzer (TA) views
- PDA support for IP traffic over Multi-Protocol Label Switching encapsulation

GL's TCP Analytics application is an optional application with PacketScan™ protocol analysis software. It analyzes TCP connections between both internal LAN and external WAN computers including servers and clients. The application helps troubleshoot large bandwidth consumption, failed TCP sessions, packet loss, poor TCP throughput and more. For more details, refer to [TCP Analytics](#) webpage.

For more details, refer to [PacketScan™ Analyzer](#) and [Protocol Analysis for Wireless and IP Networks](#) webpages.



GL Communications Inc.

818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A

(Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com

Main Features

As a Stand-alone tool

- Capture real-time calls over packet network for infinite time
- Enhanced to support Non Access Stratum (NAS), Next Generation Application Protocol (NGAP), Packet Forwarding Control Protocol (PFCP), XnAP protocols
- PDA feature in PacketScan™ provide a complete call flow of a 5G session
- Analyze with rich graphics, ladder diagrams, call trace
- Flexibility to add any protocol field to the summary view, filtering, and search features
- Complex filtering and search capabilities to record all or filtered traffic into a trace file
- Option to create multiple aggregate column groups and prioritize the groups as per the requirement to display the summary results efficiently
- Allows the user to automatically create search/filter criteria from the current screen selection
- Consolidated interface allows access to all the important settings and auto-startup actions
- Permits analysis of adherence to protocol standards for the system under test or observation
- Graphical representation of statistics including ladder diagrams of VoIP calls
- Analyze recorded trace files offline
- Decrypt and analyze Voice over Long-Term Evolution (VoLTE) calls secured over Internet Protocol Security (IPsec) connection
- Decode support for multi-layer tunnelled traffic - GTP, GRE, VXLAN
- Supports BFD protocol decode
- Enhanced to support export frame summary for tunnelled traffic
- Supports decoding of [eCPRI](#) protocol
- Supports Encapsulating Security Payload (ESP) protocol to decrypt ESP packets on both IPv4 and IPv6 by providing ESP SAs value

As a Single Point Packet over IP CDR Analysis System

- PacketScan™ can work with GL's [Voice Band Analyzer \(VBA\)](#) and [Call Data Records \(CDR\)](#) applications to generate Call Detail Records as (*.CSV files) along with voice files for each direction
- The call detail records are used for further analysis using built-in [Excel®](#) tools

As a Probe with Central Monitoring System (NetSurveyorWeb™ / NetSurveyorWeb™ Lite)

- PacketScan™ can send protocol fields, and call detail records, along with traffic summary of captured calls to a central database [NetSurveyorWeb™](#) displays the data from the database in a simple web-based browser, featuring rich graphics, custom search, report and filter configurations
- PacketScan™ can be integrated with [NetSurveyorWeb™ Lite](#) version, which is a simple web-based client and works at the probe level, as an addon tool to enhance the features of protocol analyzers enhancing the capability to handle larger volume of data, filter for specific calls, build custom statistics and KPIs, automate and graphical analysis features to analyze the call detail records (CDRs) in depth
- It is an easy plug-and-play system that collects data, segregates, and provides comprehensive analysis of network health, detailed protocol monitoring with historical data retention up to 9 GB

Supported Codecs

- G.711 (a-Law and μ -Law), G.711 App II (a-Law and μ -Law with VAD)
- G.722, G.722.1 (Wideband)
- G.726, G.726, with VAD
- G.729, G.729B (8kbps)
- GSM, GSM HR and GSM EFR
- SPEEX/SPEEX_WB (Narrow band/Wideband)
- iLBC (20ms and 30ms), SMV
- AMR/AMR_WB (Narrow band/Wideband) (requires additional license)
- EVRC, EVRC0, EVRC-B, EVRC-B0, EVRC-C (requires additional license)
- Opus (Optional codec)

For more information, refer to [Voice Codec](#) webpage.

Supported Protocols

- Almost all industry standard protocols decode supported. For more information, refer to [Supported Protocols](#) webpage

QOS Parameters

- E-model (G.107) based MOS/R-Factor scores
- Media Delivery Index (Delay Factor: Media Loss Rate) for video calls
- H.263, H.264 codec support

Main Features (Contd.)

Traffic Handling

- Segregation of IP traffic, and VoIP calls
- Listen and Record RTP (Audio) streams
- Audio capture/playback - Listen and Record RTP (Audio) streams
- Filters based on Whitelist Calls, Criteria based Voice/Trace Recording

Performance Metrics

- Signaling, audio, and video QoS parameters for each call
- Minimum, maximum, and average round trip delay
- Inband (DTMF and MF) events, Outband events as per RFC 2833 or RFC 4733 events, RTP/RTCP packet count and reports per direction

Triggers and Actions

- Filter the completed calls captures based on different signaling parameters and then specify a series of actions to be taken

Utilities

- Provides **HDL File Conversion** utility to convert ethereal format file (*.PCAP, *.CAP, and *.PCAPNG) to GL's file format (*.HDL) and vice-versa
- Includes Excel® tool to import CDRs into Excel® to analyze using Pivot Table, and Pivot Charts

ATM Network Quality Monitoring Tools per ED-138

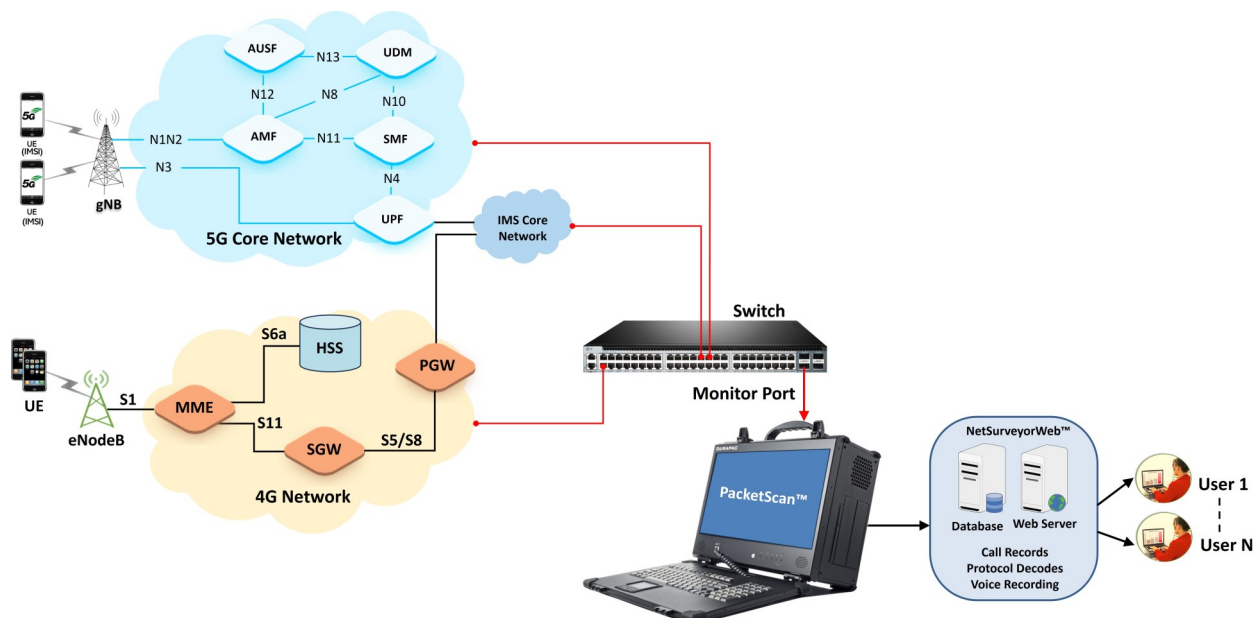
GL's PacketScan™ - an All-IP Network Monitoring software offers powerful features to capture and monitor live signaling and traffic over IP. It captures, decodes, segregates, monitors and collects statistics on all IP calls, as per EUROCAE ED-138. Ease of viewing Ground-to-Ground calls and Air-to-Ground sessions is possible. For more information, refer to [Test-Solutions-for-VoIP-Air-Traffic-Management](#) webpage.

eCPRI Protocol Analysis

PacketScan™ supports decoding of eCPRI protocol. For more details, refer to [eCPRI Protocol Analysis](#) webpage.

5G and LTE Network Monitoring

PacketScan™ [5G Protocol Analyzer](#) supports 5G network monitoring, capturing, segregating, and collecting statistics on calls over N1N2, N4, N8, N10, N11, N12, and N13 interfaces. It is an optional module available with PacketScan™. Additionally, GL's [LTE Protocol Analysis](#) (optional module available with PacketScan™) captures and monitors real-time signaling and traffic on LTE networks, collecting statistics on calls and testing eNodeB or UE over interfaces such as S1, S3, S4, S5 (or S8), S6a, S10, S11, S13, and X2.



Summary, Detail, and Hex Dump Views

The Summary View displays various information such as Frame Number, Time, Length, Message Types, IP source and destination addresses, and so on. Any field from the protocol headers can be added to Summary view, i.e., summary fields are completely user-configurable. User can select a frame in Summary View to analyze and decode each frame in the Detail View. The Hex dump view displays the frame information in HEX and ASCII octet dump.

The screenshot displays the PacketScan 64-bit application window. The top menu bar includes File, View, Capture, Statistics, Database, Call Detail Records, Configure, and Help. Below the menu is a toolbar with various icons for file operations, capture control, and analysis. The main window is divided into three sections:

Summary View: A table listing network frames. The columns are Device, Frame#, TIME (Date), Length (Bytes), Error, Length/Protocol Type, Packet Type, Source IP Address, and Destination IP Address. The first frame (Frame 0) is selected, showing a time of 2012-04-16 13:58:48.358273000 and a length of 82 bytes.

Detail View: Displays the Ethernet Frame Data for the selected frame. It shows the MAC Layer (Destination Address: xFFFFFFF, Source Address: x0016760CFED4) and the IPv4 Layer (Version: 0100, Internet Header Length: 0101, Differentiated Services Field: 000000, Explicit Congestion Notification: 00, IP Hdr No TCP SegmentationOffload: 00). The Total Length is 68 (x0044) and the Identification is 74272 (x5FD0).

Hex Dump of the Frame Data: Shows the raw data in hexadecimal and ASCII. The hex dump starts with FF FF FF FF FF FF 00 16 76 0C FB D4 08 00 45 00. The ASCII dump shows the start of an Ethernet II frame with destination MAC address FF:FF:FF:FF:FF:FF and source MAC address 00:16:76:0C:FB:D4.

SIP Call Log: A table showing SIP call details. The columns are SIP CSeq, SIP Call ID, SIP From, SIP Method, SIP To, and Frame Count (SIP CSeq). The log shows several INVITE and ACK messages between 1620788079-5060-3@192.1.103 and 4000@192.168.1.60.

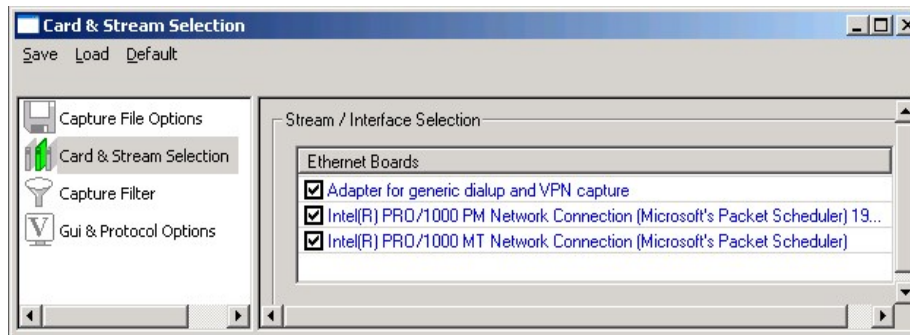
Call Detail View: A table showing call details. The columns are Call ID, Call Status, Protocol, Call Originating (Number / Address), Call Destination (Number / Address), Call Start Date & Time, and Call Duration. The log shows three calls: a terminated call (Call ID 0), a completed call (Call ID 1), and a terminated call (Call ID 2).

The bottom status bar indicates the file path C:\Program Files\GL Communications Inc\F and the total number of frames captured: 19 043 Frames.

Different Views

Real-time and Offline Analysis

Users can capture and analyze packets through real-time analysis or analyze the recorded data in offline mode. All captured or filtered traffic can be recorded into a trace file. The recorded trace file can be used for offline analysis or exported to a comma-delimited file or ASCII file.

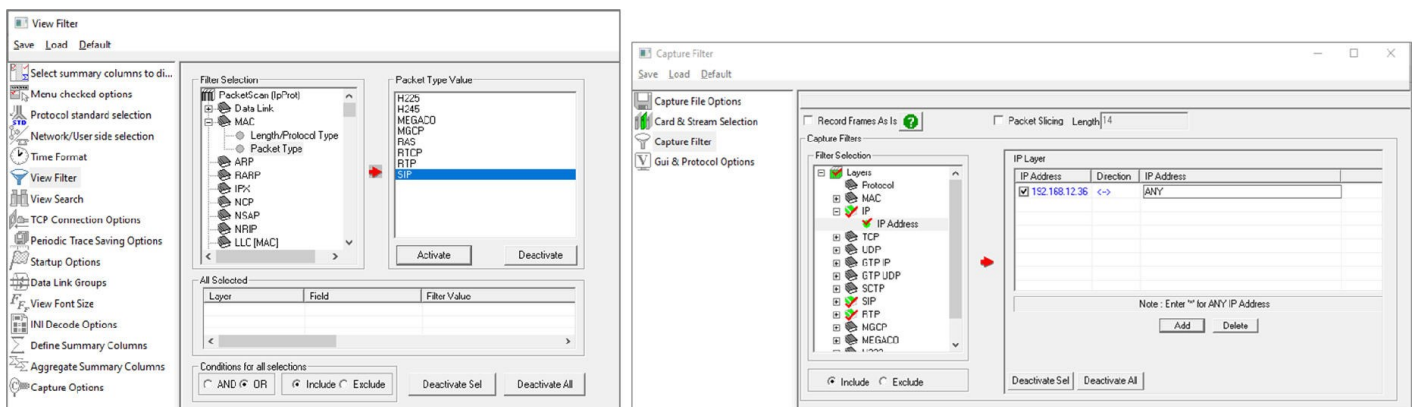


Real-time Capture

Filtering and Search

Filter and search capabilities adds a powerful dimension to the PacketScan™ analyzer. These features isolate required frames from original frames in real-time/offline. Users can record all or filtered traffic into a trace file. To analyze only particular frames of interest, user can select real-time capture filters which also includes protocol filter.

Allows real-time filtering based on parameters set in Data Link layer, MAC layer, IP, TCP/UDP, and more. The offline filter allows filtering based on Frame Number, Time, Length, Message Types, etc. The search capability helps user to filter for a particular frame based on specific search criteria.



Real-time / Offline Filter

5G Analyzer

GL's PacketScan™ 5G protocol analyzer supports monitoring of 5G networks. It captures, segregates, monitors, and collects statistics on all calls over N1/N2, N4, N8, N10, N11, N12, and N13 interfaces of the 5G network. GL's 5G Protocol Analyzer is an optional module available within PacketScan™ on purchase of additional licensing.

The screenshot shows the PacketScan 64-bit interface. The top section displays a list of captured packets with columns for Device, Frame#, TIME (Relative), Length (Bytes), Error, Length/Protocol Type, Packet Type, Source IP Address, and Destination IP Address. Below this, the details of a selected packet (Frame# 54) are shown, including the NGAP Layer decode. The decode shows the following structure:

```

0030 Length = 112 (x0070)
0032 TSN = 448 (x000001C0)
0036 Stream Identifier = 0 (x0000)
0038 Stream Sequence Number = 448 (x01C0)
003A Payload Protocol Identifier = x0000003C NGAP

***** NGAP Layer *****
NGAP-PDU = CHOICE
Extensibility Marker = 0
Choice Index = 0
InitiatingMessage = SEQUENCE
ProcedureCode = INTEGER
Contents = 15 id-InitialUEMessage
procedureCriticality = ENUMERATOR
Contents = 0 reject(0)
Value = Open Type
Length = 92
InitialUEMessage = SEQUENCE
Extensibility Marker = 0
ProtocolIE-Container = SEQUENCE OF
Iteration Count = 6
ProtocolIE-Container = Instance 0
ProtocolIE-Field = SEQUENCE
ProtocolIE-ID = INTEGER
Contents = 85 id-RAN-UE-NGAP-ID
procedureCriticality = ENUMERATOR
Contents = 0 reject(0)
Value = Open Type
Length = 2
RAN-UE-NGAP-ID = INTEGER
Length Determinant = 1
Contents = 36
ProtocolIE-Container = Instance 1
ProtocolIE-Field = SEQUENCE
ProtocolIE-ID = INTEGER
Contents = 38 id-NAS-PDU
procedureCriticality = ENUMERATOR
Contents = 0 reject(0)
Value = Open Type
Length = 44
NAS-PDU = SEQUENCE
NAS-PDU = OCTET STRING
  
```

At the bottom, the status bar indicates a Capture Rate of 0.02 Mbps, the file path C:\Program Files\GL Communications Inc\PacketScan, and that 10,242 frames were captured with 0 missed frames.

NGAP Layer Decode

The screenshot shows the Packet Data Analyzer - Summary View. The top section displays a list of captured calls with columns for Call#, StartTime, EndTime, Duration, S-URI, S-URI, STMSI, IMEISV, gNB, AMF, and RanUeNgapId. Below this, the details of a selected call (Call# 1) are shown, including the NGAP Layer decode. The decode shows the following structure:

```

***** NGAP Layer *****
NGAP-PDU = InitiatingMessage (0)
InitiatingMessage = 15 id-InitialUEMessage
ProcedureCode = 0 reject(0)
Value = Open Type
InitialUEMessage = SEQUENCE
ProtocolIE-Container = 6 Items
Item =
ProtocolIE-Field =
ProtocolIE-ID = 85 id-RAN-UE-NGAP-ID
procedureCriticality = 0 reject(0)
Value =
RAN-UE-NGAP-ID = 2
Item =
ProtocolIE-Field =
ProtocolIE-ID = 38 id-NAS-PDU
procedureCriticality = 0 reject(0)
Value =
NAS-PDU =
NAS PDU Dump = x7E004171000D0100F11000000000
Item =
ProtocolIE-Field =
ProtocolIE-ID = 121 id-UserLocationInformation
procedureCriticality = 0 reject(0)
Value =
UserLocationInformation =
userLocationInformationNR =
nr-CellIdentity =
pCellIdentity = 001
MNC = 01
nCellIdentity = 00000000000000000000000000000000
tai =
pLMIIdentity =
MNC = 001
MNC = 01
tAC = x000001
Item =
ProtocolIE-Field =
ProtocolIE-ID = 90 id-BRCEstablishmentCause
procedureCriticality = 0 reject(0)
  
```

At the bottom, the status bar indicates a Call Rate of 0.02, the file path C:\Program Files\GL Communications Inc\PacketScan, and that 10,242 frames were captured with 0 missed frames.

5G N1N2 Interface Call Graph

Encapsulating Security Payload (ESP) Deciphering

PacketScan™ analyzer supports Encapsulating Security Payload (ESP) to decrypt ESP packets on both IPv4 and IPv6 by providing ESP SAs value.

Protocol Capture Configuration

Save Load Default

Capture File Options

Card & Stream Selection

Capture Filter

Gui & Protocol Options

Capture Filters Hardware Filters

☐ Record Frames As Is ☐ Packet Slicing Length 14

Filter Selection

- Layers
- Protocol
- MAC
- VLAN
- IP (All Levels)
- IP (Outer)
- ESP
- SPI
- TCO

Filters

☒ Filter all ESP data

☒ Decode Encrypted ESP Payload

Extract

☐ Original Encrypted Payload

☒ Deciphered Payload

ESP SAs Edit

ESP SAs

Save Load

IP Protocol	Src IP	Dest IP	SPI	Encryption	Encryption Key	Authentication	Authentication Key
IPv4	192.168.12.86	192.168.12.45	0x05d2ede0	AES-CBC [RFC3602]	0x97D055ABC4E0826C394DC0F2CCBE6CF9	HMAC-MD5-96 [RFC2403]	0x6CC1C7BE902D253286386E7B7C2623E3
IPv4	192.168.12.45	192.168.12.86	0x467113ba	AES-CBC [RFC3602]	0x97D055ABC4E0826C394DC0F2CCBE6CF9	HMAC-MD5-96 [RFC2403]	0x6CC1C7BE902D253286386E7B7C2623E3
IPv4	192.168.12.86	192.168.12.251	0xd02382c2	AES-CBC [RFC3602]	0x97D055ABC4E0826C394DC0F2CCBE6CF9	HMAC-MD5-96 [RFC2403]	0x6CC1C7BE902D253286386E7B7C2623E3
IPv4	192.168.12.251	192.168.12.86	0x129e7b1a	AES-CBC [RFC3602]	0x97D055ABC4E0826C394DC0F2CCBE6CF9	HMAC-MD5-96 [RFC2403]	0x6CC1C7BE902D253286386E7B7C2623E3
IPv4	192.168.12.90	192.168.12.45	0xa5e7259a	AES-CBC [RFC3602]	0x97D055ABC4E0826C394DC0F2CCBE6CF9	HMAC-MD5-96 [RFC2403]	0x6CC1C7BE902D253286386E7B7C2623E3
IPv4	192.168.12.45	192.168.12.90	0x9637a428	AES-CBC [RFC3602]	0x97D055ABC4E0826C394DC0F2CCBE6CF9	HMAC-MD5-96 [RFC2403]	0x6CC1C7BE902D253286386E7B7C2623E3

PacketScan 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

Device	Frame#	TIME (Relative)	Length (Bytes)	Error	Length/Protocol Type	Packet Type	Source IP Address	Destination IP Address	Source Address
✓	0	00:00:00.000000000	822		Internet (IPv4)		192.168.12.86	192.168.12.45	
✓	1	00:00:00.015714000	822		Internet (IPv4)		192.168.12.86	192.168.12.45	
✓	2	00:00:01.537143000	822		Internet (IPv4)		192.168.12.86	192.168.12.45	
✓	3	00:00:03.556945000	822		Internet (IPv4)		192.168.12.86	192.168.12.45	
✓	4	00:00:04.626310000	806		Internet (IPv4)		192.168.12.90	192.168.12.45	
✓	5	00:00:05.143077000	806		Internet (IPv4)		192.168.12.90	192.168.12.45	
✓	6	00:00:06.165570000	806		Internet (IPv4)		192.168.12.90	192.168.12.45	

Device Frame# at 00:00:00.000000000 OK Len=822

Ethernet Frame Data

```

===== MAC Layer =====
0000 Destination Address      = xE0D55ADFEBFD
0006 Source Address          = xFCA1492AB2F
000C Length/Protocol Type    = x0800 Internet IP(IPv4)
===== IPv4 Layer =====
000E Version                  = 0100..... (4)
000E Internet Header Length (In 32 bit words) = .....0101 (5)
000F Differentiated Services Field
000F Explicit Congestion Notification
IP Hdr No TCP SegmentationOffload
0010 Total Length             = 808 (x0328)
0012 Identification          = 31181 (x79CD)
0014 Reserved Bit             = 0..... Not Set
0014 Don't fragment           = 0..... Not Set
0014 More fragments           = 0..... Not Set
0014 Fragment Offset          = 0 (...00000 000000000)
0016 Time To Live              = 128 (x80)
0017 Protocol                 = 00110010 Encap Security Payload
0018 Header Check Sum         = x2403
001A Source IP Address        = 192.168.12.86 (xC0A80C56)
001E Destination IP Address   = 192.168.12.45 (xC0A80C2D)
===== Encapsulating Security Payload (ESP) Layer =====
0022 Security Parameter Index = 97709536 (x05D2EDE0)
0026 Sequence Number          = 1 (x00000001)
ESP Payload Data              = x49F74319A723AF44...BFA3074B9C6D5534 (Length=780)
  
```

*** Right click to SHOW/HIDE layer details or copy ***

Before Deciphering

PacketScan 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

Device	Frame#	TIME (Relative)	Length (Bytes)	Error	Length/Protocol Type	Packet Type	Source IP Address	Destination IP Address	Source Address
✓	0	00:00:00.000000000	769		Internet (IPv4)	SIP	192.168.12.86	192.168.12.45	
✓	1	00:00:00.015721000	769		Internet (IPv4)	SIP	192.168.12.86	192.168.12.45	
✓	2	00:00:01.537143000	769		Internet (IPv4)	SIP	192.168.12.86	192.168.12.45	
✓	3	00:00:03.556945000	769		Internet (IPv4)	SIP	192.168.12.86	192.168.12.45	
✓	4	00:00:04.626310000	769		Internet (IPv4)	SIP	192.168.12.90	192.168.12.45	

0018 Header Check Sum = x2403

001A Source IP Address = 192.168.12.86 (xC0A80C56)

001E Destination IP Address = 192.168.12.45 (xC0A80C2D)

===== UDP Layer =====

0022 Source Port = 5060 (x13C4)

0024 Destination Port = 5060 (x13C4)

0026 Length (Header + Data) = 735 (x02DF)

0028 Checksum = x1FBF

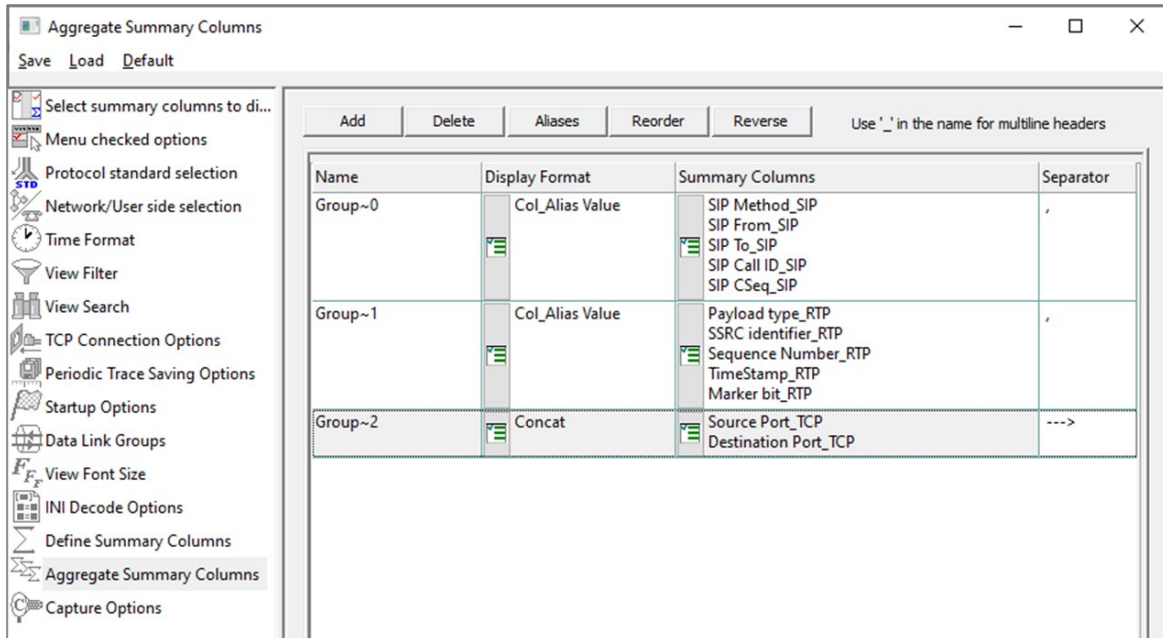
===== SIP Layer =====

HDR

Aggregate Summary Column Group

The enhanced feature of the protocol analyzer is aggregate column groups which are very flexible and comprise aggregate columns from the same or different protocol layers and prioritizes the column groups based on the requirement.

If the user has five different aggregate columns depending on the requirement to prioritize some columns, then the group of aggregate columns is created with the highest priority. Accordingly, the group columns values are displayed. The aggregate columns comprising a group will have the same prefix and suffix index as ~0, ~1 ... ~N.



Aggregate Summary Column Group

The updated results are as shown in the below screenshot. Here the root aggregate **Group~0** summary columns are displayed first and then **Group~1** and **Group~2** as per the assigned priority.

Device2 Frame=3 at 00:00:00.000310480 OK Len=823

Ethernet II Frame Data

```

===== MAC Layer =====
0000 Destination Address      = xFCAA149CBF99
0006 Source Address          = xFCAA149CBF9B
000C Length/Protocol Type    = x0800 Internet IP(IPv4)
===== IP Layer =====
000E Version                  = 0100... (4)
000E Internet Header Length (In 32 bit words) = ...0101 (5)
000F Differentiated Services Field
000F Differentiated Services Codepoint = 000000.. Default
000F Explicit Congestion Notification = .....00 Not-ECT (Not ECN-Capable Transport)
0010 IP Hdr No TCP SegmentationOffload =
0010 Total Length             = 809 (x0329)
0012 Identification           = 28511 (x6F5F)
0014 Reserved Bit              = 0..... Not Set
0014 Don't fragment           = .1..... Set
0014 More fragments            = .0..... Not Set
0014 Fragment Offset           = 0 (...00000 00000000)
0016 Time To Live              = 128 (x80)
0017 Protocol                  = 00000110 TCP
0018 Header Check Sum          = x0000
001A Source IP Address         = 192.168.12.122 (xC0A80C7A)
001E Destination IP Address    = 192.168.12.123 (xC0A80C7B)
===== TCP Layer =====
0022 Source Port               = 57494 (xE096)
0024 Destination Port          = 5060 (x13C4)
0026 Sequence Number           = 3414694555 (xCB801A9B)
002A Acknowledgement Number    = 3548904125 (xD387FABD)
002E Data Offset               = 0101... (5)
002E Reserved                  = .....0000 (0)
  
```

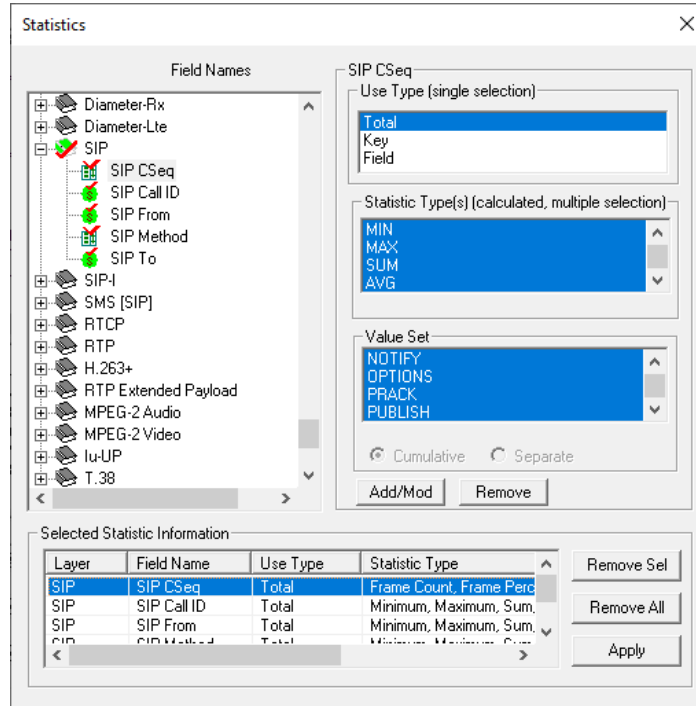
Off-line Viewing. C:\Users\Archana\Desktop\Aggregate Summary Column\11 Frames

Display of Aggregate Summary Column Group in Summary View

Call Detail Records and Statistics View

Important call specific parameters like call status, release cause, parties involved and more are displayed in call trace view. Additionally, users are provided with the option to search a particular call detail record from the captured traces.

Statistics can be obtained for all frames both in real-time as well as offline mode. Various statistics can be obtained to study the performance and trend in the VoIP network, based on protocol fields and different parameters.



Define Statistics View

PacketScan 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

Device Frame# TIME (Date) Length (Bytes) Error Length/Protocol Type Packet Type Source IP Address Destination IP Address

Device	Frame#	TIME (Date)	Length (Bytes)	Error	Length/Protocol Type	Packet Type	Source IP Address	Destination IP Address
2	0	2012-04-16 13:58:48 358273000	82		Internet IPI(Pv4)		192.168.1.70	192.168.1.255
2	1	2012-04-16 13:58:50 200243000	82		Internet IPI(Pv4)		192.168.1.142	255.255.255.255
2	2	2012-04-16 13:58:50 705427000	836		Internet IPI(Pv4)	SIP	192.168.1.200	192.168.1.103
2	3	2012-04-16 13:58:50 706003000	354		Internet IPI(Pv4)	SIP	192.168.1.103	192.168.1.200
2	4	2012-04-16 13:58:50 707648000	355		Internet IPI(Pv4)	SIP	192.168.1.103	192.168.1.200

Device2 Frame#1 at 2012-04-16 13:58:50 200249000 OK Len=82

Ethernet Frame Data

***** MAC Layer *****

0000 Destination Address = xFFFFFFFFF

0006 Source Address = x0013208E22C3

000C Length/Protocol Type = x0800 Internet IP(IPv4)

***** IPv4 Layer *****

000E Version = 0100 (4)

000E Internet Header Length (In 32 bit words) = 0010 (5)

000F Differentiated Services Codepoint = 000000.. Default

000F Explicit Congestion Notification = 000000 Not-ECT (Not ECN-Capable Transport)

IP Hdr No TCP SegmentationOffload = 68 (x0044)

0010 Total Length = 3583 (x0DFF)

0014 Reserved Bit = 0..... Not Set

001E Data Offset = 0..... Not Set

SIP CSeq SIP Call ID SIP From SIP Method SIP To Frame Count(SIP CSeq) Frame % (SIP CSeq)

SIP CSeq	SIP Call ID	SIP From	SIP Method	SIP To	Frame Count(SIP CSeq)	Frame % (SIP CSeq)
INVITE (0)	1620788079-5060-3@192.1...	4000@192.168.1.60	INVITE (0)	1000@192.168.1...	2	100
total INVITE (0)	total 1620788079-5060-3@192.1...	total 4000@192.168.1...	total INVITE (0)	total 1000@192.1...	2	100
INVITE (0)	211ea0268e7e463d@dGV...	test3@192.168.10.14	INVITE (0)	test4@192.168.1...	1	100
total INVITE (0)	total 211ea0268e7e463d@dGV...	total test3@192.168.1...	total INVITE (0)	total test4@192.1...	1	100
INVITE (0)	211ea0268e7e463d@dGV...	test4@192.168.10.45	INVITE (0)	test3@192.168.1...	1	100
total INVITE (0)	total 211ea0268e7e463d@dGV...	total test4@192.168.1...	total INVITE (0)	total test3@192.1...	1	100
INVITE (0)	GLPG-483633760331	0001@192.168.1.200	INVITE (0)	0001@192.168.1...	1	100
total INVITE (0)	total GLPG-483633760331	total 0001@192.168.1...	total INVITE (0)	total 0001@192.1...	1	100
ACK (1)	1620788079-5060-3@192.1...	4000@192.168.1.60	ACK (1)	1000@192.168.1...	2	100
total ACK (1)	total 1620788079-5060-3@192.1...	total 4000@192.168.1...	total ACK (1)	total 1000@192.1...	2	100
ACK (1)	211ea0268e7e463d@dGV...	test3@192.168.10.14	ACK (1)	test4@192.168.1...	1	100
total ACK (1)	total 211ea0268e7e463d@dGV...	total test3@192.168.1...	total ACK (1)	total test4@192.1...	1	100

Call ID Call Status Protocol Call Originating (Number / Address) Call Destination (Number / Address) Call Start Date & Time Call Duration Protocol Specific Info

Call ID	Call Status	Protocol	Call Originating (Number / Address)	Call Destination (Number / Address)	Call Start Date & Time	Call Duration	Protocol Specific Info
0	Terminated	SIP	0001@192.168.1.200	0001@192.168.1.103	45232-57359-00 00:00:00.5...	00:50:13.479600	<SIPCallID> GLPG-48363...
1	Completed	MEGACO	ash/2	rtg/30000	45232-57359-00 24608:184...	00:29:13.080600	<ContextID> 0 <Release...
2	Terminated	SIP	4000@192.168.1.60	1000@192.168.1.60	45232-57359-00 02:00:00.7...	04:32:05.191900	<SIPCallID> 1620788079-5...
3	Terminated	SIP	test4@192.168.10.45	test3@192.168.10.14	45232-57359-00 03:00:00.5...	00:47:15.034300	<SIPCallID> 211ea0268e7...

C:\Program Files\GL Communications Inc\Packet\19 043 Frames

Call Detail Records and Statistics View

Packet Data Analysis (PDA) – Summary View

Features

- Call Quality Of Service (QoS) for all calls with E-Model based (G.107) Mean Opinion Score [MOS (ITU-T, G.107, E-model)] and R-factor with individual and summary statistics presented in graphical and tabular formats
- Provision for H.263+ and H.264 video capture and video conference monitoring capability
- Calculates minimum, maximum, and average round trip delay values for SIP calls
- Supports decoding of **AMR** and **AMR_WB** codec with **IuUP** Header
- Save calls in **HDL**, **PCAP**, or **PCAPNG** file format for further analysis
- Ability to copy the cell value to clipboard (Notepad)
- The PDA Summary View can also export all terminated call details as a text file (CSV format) during the live capture. This feature requires activating the Export Terminated Calls option from PDA prior to live capturing
- This structured text file can be imported into Excel® using a custom add-in (**Excel-Dashboard-Tool-IP.xlsm**) to generate different chart types such as call volumes, call duration, call failure causes, CMOS, LMOS, packet loss and more
- Individual and summary statistics presented in graphical and tabular formats
- Graphs are provided for key statistics for network monitoring and troubleshooting. Graphs available include – Active Calls, Average Jitter, E-Model MOS/R-Factor/Packets Discarded, RTP Packets Summary, ladder diagram for T.38 based fax calls and call signaling, Gap, Jitter, Gap/Jitter Distribution, Wave and Spectral Display for media stream analysis, VoIP calls and more
- Displays a summary of signaling, audio, and video parameters such as Source/Destination Video Channels, Media Type, SSRC, Average Delay/Gap, Packet Counts, Media Delivery Index and Frame Rate for all video calls
- Calls and sessions are classified as active, completed, or failed giving the user an idea about the calls and its status in the network
- Filter CDRs (Call Detail Records) based on parameters such as caller, time, message count, etc.
- Generates VoIP Key Performance Indicators (KPI) Reports: Call Success Ratio, Calls Per Second, Post Dial Delay, Error Code Distribution, Answer Seizure Ratio, and Call Duration
- Creates SIP Registration KPI Reports: Register messages per sessions ,Registrar(s) distribution, Registration(s) vs Deregistration(s) Over Time, Error code distribution
- Export KPI Report in PDF Format
- Generates alert summary when particular vital parameters go beyond a specified value

Summary View

TA Summary view displays summary of data transmission in each direction including calling number, called number, call id, start time, duration, missing packets, max/min RTD, average RTD and so on. It includes separate statistical counts on total packets, calls, failed calls, and more for SIP, H.323, MEGACO, BICC, CAMEL, ISUP, LTE, RTP, GSM, IuCS, SCCP, and ED-137 based calls. The user can get the statistics of active calls, purged calls, and so on.

Call Summary – Signaling, Audio, and Video QoS Statistics

The Call Summary displays the signaling, audio, and video parameters of each call for SIP, RTP, MEGACO, H.323, LTE, BICC, ISUP, CAMEL, GSM, IuCS, SCCP, and ED-137 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.

Call #	Caller	Callee	Start Time	Duration	Voice Quality	Conversational MOS
1	0001@192.168.1.100	0001@192.168.1.103	2012-04-16 13:30:20	00:00:20.121	Good	4.20
2	0001@192.168.1.60	0001@192.168.1.60	2012-04-16 14:02:03	00:02:39.469	Good	4.20
3	test4@192.168.10.45	test3@192.168.10.14	2012-04-16 14:05:52	00:00:28.242	Good	4.16

Signaling Parameters	Value	Audio Parameters	Value	Video Parameters	Value
Caller	0001@192.168.1.100	Src RTP Channel	192.168.1.200.10...	Src Video Channel	
Callee	0001@192.168.1.103	Src Media Type	PCMU/8000	Src Media Type	
Call ID	GLPG-403633760...	Src SSRC	338954537	Src SSRC	
Call Status	Terminated	Src Packets Count	1273	Src Packets Count	
Call Initiated Time	2012-04-16 13:30:20	Src Missing Packets / (%)	0 / 0.00	Src Missing Packets / (%)	
Call Established Time	2012-04-16 13:30:20	Src Duplicate Packets / (%)	0 / 0.00	Src Duplicate Packets / (%)	
Call Stop Time	2012-04-16 13:30:20	Src Out of Sequence Packets / (%)	0 / 0.00	Src Out of Sequence Packets / (%)	
Call Duration	00:00:20.121	Src Conversational MOS/R-Factor	4.20 / 93	Src Video Frame count	
Call Failure Reason	Caller	Src Listening MOS/R-Factor	4.20 / 93	Src Frame Rate/Frames/sec	
Session Request Delay (msec)	2.221	Src Good MOS/FacMOS/PostMOS (Seconds)	25 / 0 / 0	Src Avg Delay	
Session Disconnect Delay (msec)	10.469	Src Voice Quality	Good	Src Avg Gap	
Post PickUP Delay (msec)	4605.469	Src Discarded Packets / (%)	0 / 0.00	Src MDI (DF-MLR)	
Total Signaling Frames	7	Src Average Inter Arrival Jitter (RTCP)	0	Src Avg MDI (DF-MLR)	
Call Type		Src Average Jitter	0.58	Dest Video Channel	
SubCallType		Src Average Delay	0.80	Dest Media Type	
PTT Count	0	Src Average Gap	20.17	Dest SSRC	
SquareCount	0	Dest RTP Channel	192.168.1.103.10...	Dest Packets Count	
PTTMCCount	0	Dest Media Type	PCMU/8000	Dest Missing Packets / (%)	
PTTSCCount	0	Dest SSRC	338954537	Dest Duplicate Packets / (%)	
PPSCTCount	0	Dest Packets Count	1269	Dest Out of Sequence Packets / (%)	
CPSCCTCount	0	Dest Missing Packets / (%)	0 / 0.00	Dest Video Frame count	
		Dest Duplicate Packets / (%)	0 / 0.00	Dest Frame Rate/Frames/sec	
		Dest Out of Sequence Packets / (%)	0 / 0.00	Dest Avg Delay	
		Dest Conversational MOS/R-Factor	4.20 / 93	Dest Avg Gap	
		Dest Listening MOS/R-Factor	4.20 / 93	Dest MDI (DF-MLR)	
		Dest Good MOS/FacMOS/PostMOS (Seconds)	25 / 0 / 0	Dest Avg MDI (DF-MLR)	
		Dest Voice Quality	Good		
		Dest Discarded Packets / (%)	0 / 0.00		
		Dest Average Inter Arrival Jitter (RTCP)	0		
		Dest Average Jitter	0.54		

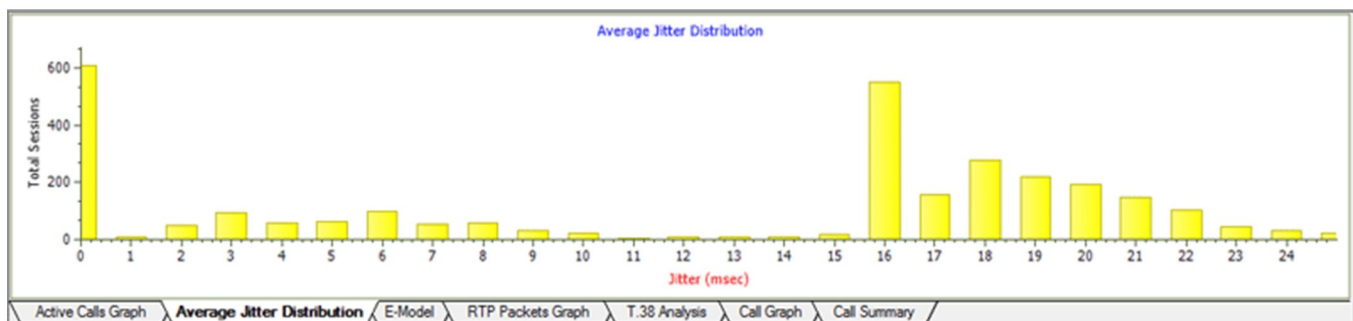
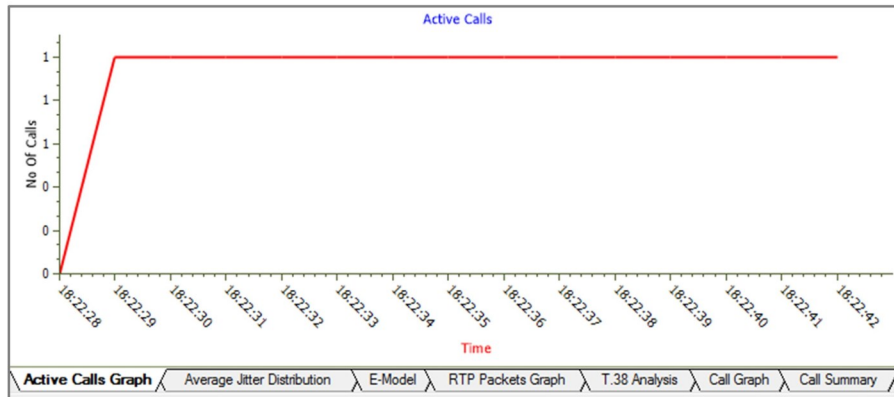
Call Summary, Audio and Video Statistics

Packet Data Analysis (PDA) – Summary View (Contd.)

Graphs in PDA – Summary View

Active Calls – A line graph, depicting the Number Of Calls Vs Time.

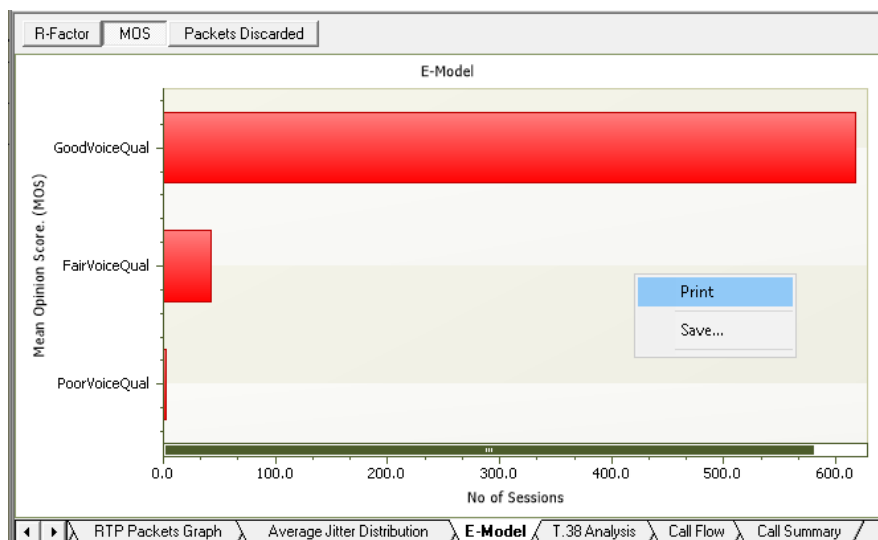
Average Jitter Distribution – Distribution of the Average Jitter values across the Total Sessions.



Active Calls and Average Distribution Graphs

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



E-Model Graph

Packet Data Analysis (PDA) – Summary View (Contd.)

T.38 Analysis - Fax (T.38 data) over VoIP monitoring and decoding capability.

Call Graph - Displays the message sequence of SIP, SIP ED137, MEGACO, and H.323 captured VoIP calls.

PDA Packet Data Analyzer - Summary View

File View Call Summary Protocol Configurations GUI Configurations Help

Call Summary SIP Registration Summary Alert Summary

Call Count: 1

Call #	Caller	Callee	StartTime	Duration	VoiceQuality_L	VoiceQuality_R	Payload_L	Payload_R
1	444@67.120.213.197	666@122.166.105.193	2010-07-27 01:28:23.671	00:02:43.962	Good		PCMU/8000	PCMU/8000

Column Width Absolute Timing Show Latest

Time	Frame#	67.120.213.197	122.166.105.193
00.00.000	0	5060	INVITE
00.00.497	1	5060	INVITE
00.00.498	2	5060	SIP/2.0 101 Dialog Establishment
00.03.429	3	5060	SIP/2.0 180 Ringing
00.07.326	4	5060	SIP/2.0 200 OK
00.08.252	5	5060	ACK
00.08.313	6	6002	RTP (PCMU/8000)
00.09.520	47	5060	INVITE
00.09.847	58	5060	SIP/2.0 200 OK
00.09.881	59	5060	ACK
02.51.889	3227	5060	BYE
02.51.889	3228	5060	SIP/2.0 200 OK

Find Complete Stack

```

===== MAC Layer =====
Destination Address      = x00501AA0F4BC
Source Address          = x0019D19CB799
Length/Protocol Type    = x0800 Internet IP(IPv4)
===== IPv4 Layer =====
Version                 = 0100.... (4)
Internet Header Length (In 32 bit words) = ....0101 (5)
Differentiated Services Field = 0000000.. Default
Explicit Congestion Notification = .....00 Not-ECT (Not ECN-Capab.
IP Hdr No TCP SegmentationOffload =
Total Length            = 387 (x0193)
Identification          = 38496 (x9624)
Reserved Bit            = 0..... Not Set
Don't fragment          = .0..... Not Set
More fragments          = .0..... Not Set
Fragment Offset         = 0 (...00000 000000000)
Time To Live            = 128 (x80)
Protocol                = 00010001 UDP
Header Check Sum        = xA5A0
Source IP Address       = 122.166.105.193 (x7AA669C1)
Destination IP Address  = 67.120.213.197 (x4378D5C5)
===== UDP Layer =====
Source Port             = 5060 (x13C4)
Destination Port        = 5060 (x13C4)
Length (Header + Data)  = 367 (x016F)
Checksum               = x7F7A
===== SIP Layer =====
SIP/2.0 101 Dialog Establishment
Via: SIP/2.0/UDP 67.120.213.197:5060;branch=z9hG4bK-5014a4e
  
```

Average Jitter Distribution E-Model T.38 Analysis Call Flow Call Summary

PDA Packet Data Analyzer - Summary View

File View Call Summary Protocol Configurations GUI Configurations Help

Call Summary SIP Registration Summary Alert Summary

Call Count: 824

Call #	Caller	Callee	StartTime	Duration	VoiceQuality_L	VoiceQuality_R	Payload_L	Payload_R	Result	ErrorCode
1	0001@192.168.12.92	0001@192.168.12.94	2023-06-01 15:01:34.419	00:01:00.023			PCMU/8000	PCMU/8000	Pass	0
2	0002@192.168.12.92	0002@192.168.12.94	2023-06-01 15:01:34.482	00:01:00.033			MuLaw_2/8000	MuLaw_2/8000	Pass	0
3	0003@192.168.12.92	0003@192.168.12.94	2023-06-01 15:01:34.533	00:01:00.045			PCMA/8000	PCMA/8000	Pass	0
4	0004@192.168.12.92	0004@192.168.12.94	2023-06-01 15:01:34.583	00:01:00.037			ALAW_2/8000	ALAW_2/8000	Pass	0
5	0005@192.168.12.92	0005@192.168.12.94	2023-06-01 15:01:34.623	00:01:00.049			G729/8000	G729/8000	Pass	0
6	0006@192.168.12.92	0006@192.168.12.94	2023-06-01 15:01:34.684	00:01:00.041			G729B/8000	G729B/8000	Pass	0
7	0007@192.168.12.92	0007@192.168.12.94	2023-06-01 15:01:34.715	00:01:00.043			GSM/8000	GSM/8000	Pass	0

Column Width Absolute Timing Show Latest

Time	Frame#	192.168.12.92	192.168.12.94
00.00.000	0	5060	INVITE
00.00.020	1	5060	SIP/2.0 100 Trying
00.00.029	2	5060	SIP/2.0 180 Ringing
00.00.153	9	5060	SIP/2.0 200 OK
00.00.163	11	5060	ACK
01.00.177	3984	5060	BYE
01.00.187	3985	5060	SIP/2.0 200 OK

Find Complete Stack

```

===== MAC Layer =====
Destination Address      = xC6C26D3EEB30
Source Address          = x54BEF737BC75
Length/Protocol Type    = x0800 Internet IP(IPv4)
===== IPv4 Layer =====
Version                 = 0100.... (4)
Internet Header Length (In 32 bit words) = ....0101 (5)
Differentiated Services Field = 0000000.. Default
Explicit Congestion Notification = .....00 Not-ECT (Not ECN-Capab.
IP Hdr No TCP SegmentationOffload =
Total Length            = 761 (x02F9)
Identification          = 15592 (x3CE8)
Reserved Bit            = 0..... Not Set
Don't fragment          = .0..... Not Set
More fragments          = .0..... Not Set
Fragment Offset         = 0 (...00000 000000000)
Time To Live            = 128 (x80)
Protocol                = 00010001 UDP
Header Check Sum        = x0000
Source IP Address       = 192.168.12.92 (xC0A80C5C)
Destination IP Address  = 192.168.12.94 (xC0A80C5E)
  
```

Displays decoded information of the selected SIP message

Average Jitter Distribution E-Model T.38 Analysis Call Flow Call Summary

SIP, MEGACO, H.323, T.38, GSMA luCS, SCCP Call Graph

Packet Data Analysis (PDA) – Detail View

Features

- Provides further detail statistics on the two (or one) RTP sessions that are part of a single call
- RTP sessions include the graphical representation of R-Factor statistics which includes Quality Metrics with R-Factor and MOS Factors graphs, Jitter Buffer Statistics, Degradation Factor, Burst Metrics, and Delay Metrics
- R factors/MOS is supported for audio codecs such as μ -Law, a-Law, G726 (40, 32, 24, 16 kbps), G726 (40, 32, 24, 16 kbps) with VAD, GSM610, G729, G729B, AMR, ILBC (20, 30 msec), SPEEX, EVRC, EVRCB, SMV, G711, G722, and G722.1 application.

Packet Data Analysis (PDA) - 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.

Packet Data Analyzer - Detail View													
Show All Sessions													
Packet #	Seq...	RTP...	Payload Type	Payload...	Packet Sequ...	Gap(ms)	Gap...	Delay	Jitter	Packet #	Seq...	RTP...	Payload Type
5	41763	4325	PCMU/8000	160	Session In P...	0.00	0.00	0	0.00	9	47038	3301	PCMU/8000
6	41764	4325	PCMU/8000	160	Session In P...	20.06	20.00	0	0.00	11	47039	3301	PCMU/8000
7	41765	4325	PCMU/8000	160	In Sequence	19.53	20.00	0	0.03	13	47040	3301	PCMU/8000
8	41766	4325	PCMU/8000	160	In Sequence	19.52	20.00	0	0.06	15	47041	3301	PCMU/8000
10	41767	4325	PCMU/8000	160	In Sequence	21.50	20.00	1	0.14	17	47042	3301	PCMU/8000
12	41768	4325	PCMU/8000	160	In Sequence	19.53	20.00	0	0.17	19	47043	3301	PCMU/8000
14	41769	4325	PCMU/8000	160	In Sequence	19.53	20.00	0	0.19	21	47044	3301	PCMU/8000
16	41770	4325	PCMU/8000	160	In Sequence	20.49	20.00	0	0.20	23	47045	3301	PCMU/8000
18	41771	4325	PCMU/8000	160	In Sequence	19.57	20.00	0	0.22	25	47046	3301	PCMU/8000
20	41772	4325	PCMU/8000	160	In Sequence	20.51	20.00	0	0.23	27	47047	3301	PCMU/8000
22	41773	4325	PCMU/8000	160	In Sequence	19.52	20.00	0	0.25	29	47048	3301	PCMU/8000
24	41774	4325	PCMU/8000	160	In Sequence	20.75	20.00	0	0.28	31	47049	3301	PCMU/8000
26	41775	4325	PCMU/8000	160	In Sequence	19.31	20.00	0	0.31	33	47050	3301	PCMU/8000
28	41776	4325	PCMU/8000	160	In Sequence	19.50	20.00	0	0.32	35	47051	3301	PCMU/8000

Heading	Value	Heading	Value
SSRC	3306458417	SSRC	3306458537
Source IP Address	192.168.1.200	Source IP Address	192.168.1.103
Destination IP Address	192.168.1.103	Destination IP Address	192.168.1.200
Source Port	1024	Source Port	1024
Destination Port	1024	Destination Port	1024
RTP Packets Count	1271	RTP Packets Count	1268
RTCP Packets Count	2	RTCP Packets Count	1
Packets With Marker Bit	1	Packets With Marker Bit	1
Total Audio Bytes	203201	Total Audio Bytes	202721
RTCP Sender's Reports	2	RTCP Sender's Reports	1
RTCP Receiver's Reports	0	RTCP Receiver's Reports	0
Out Of Sequence Packets %	0 \ 0.00	Out Of Sequence Packets %	0 \ 0.00
Missing Packets %	0 \ 0.00	Missing Packets %	0 \ 0.00
Duplicate Packets %	0 \ 0.00	Duplicate Packets %	0 \ 0.00
MOS CB \ Conversational R	4.20 \ 93	MOS CB \ Conversational R	4.20 \ 93
MOS LQ \ Listening R	4.20 \ 93	MOS LQ \ Listening R	4.20 \ 93
G.107 R	92	G.107 R	92
Nominal MOS \ Nominal R	4.20 \ 93	Nominal MOS \ Nominal R	4.20 \ 93

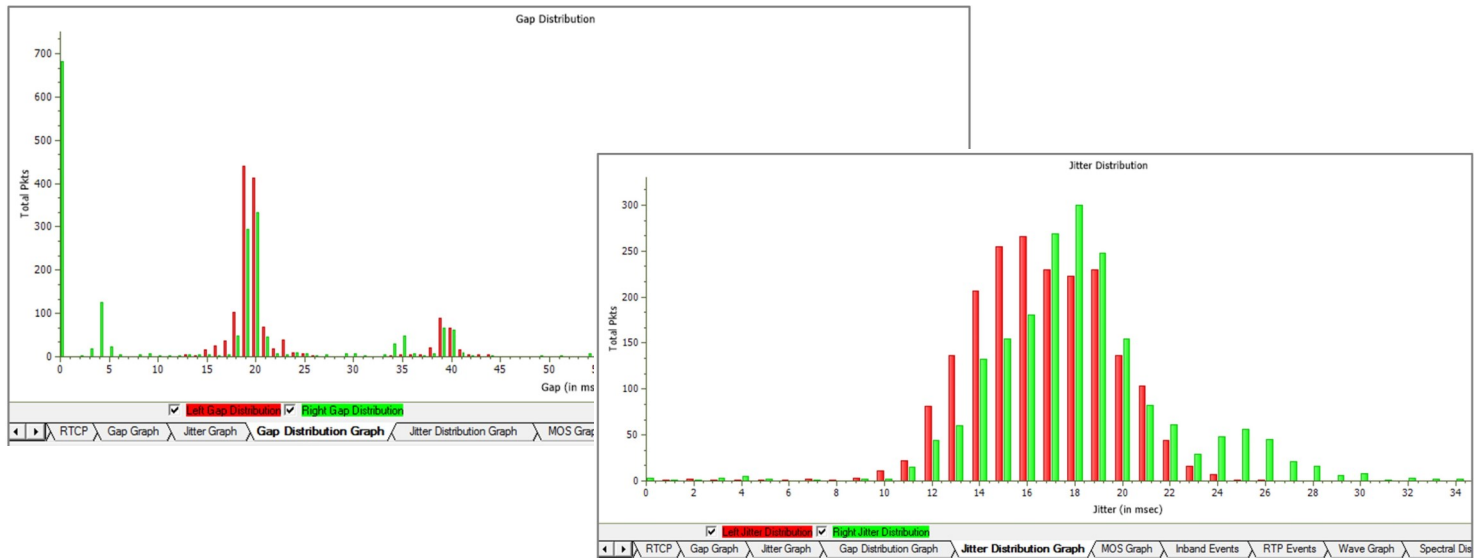
Traffic Analyzer Detail View

Graphs in PDA – 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



Gap/Jitter Distribution Graph

Packet Data Analysis (PDA) – Detail View (Contd.)

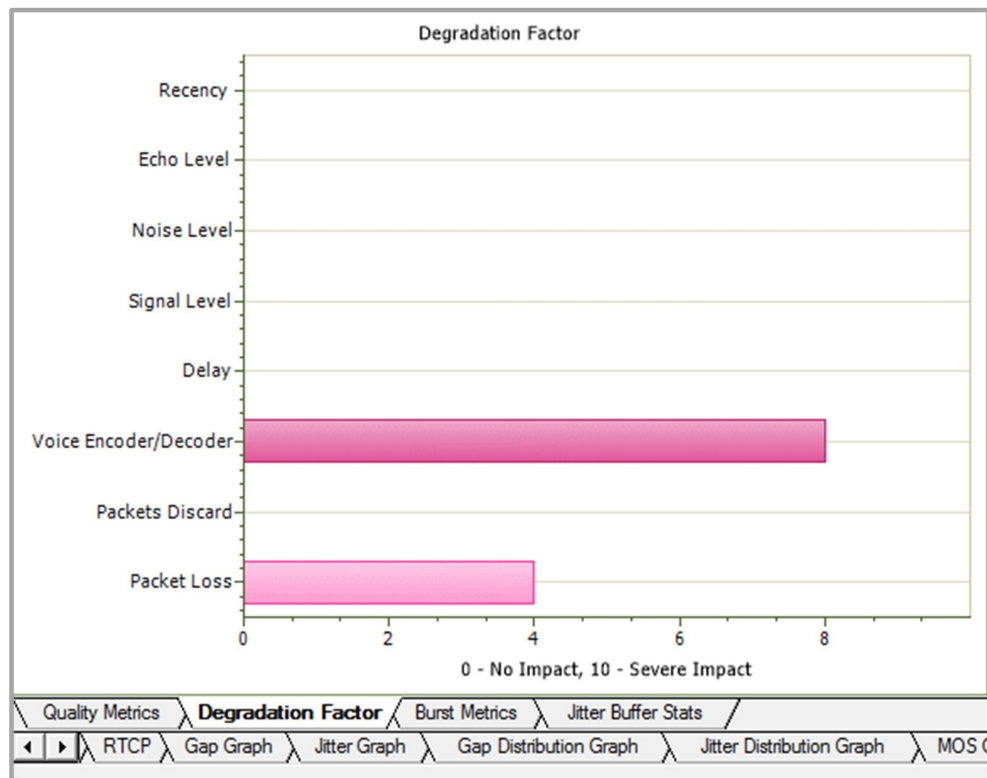
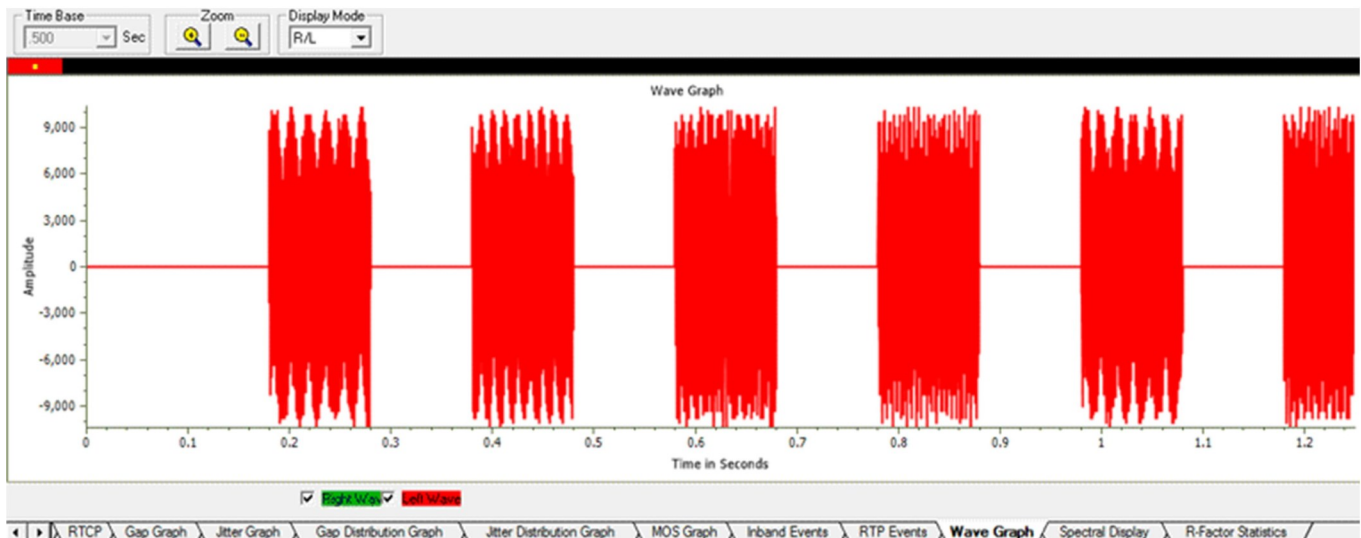
Graphs in PDA – Detail View

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.



Wave Graph and Degradation Factors

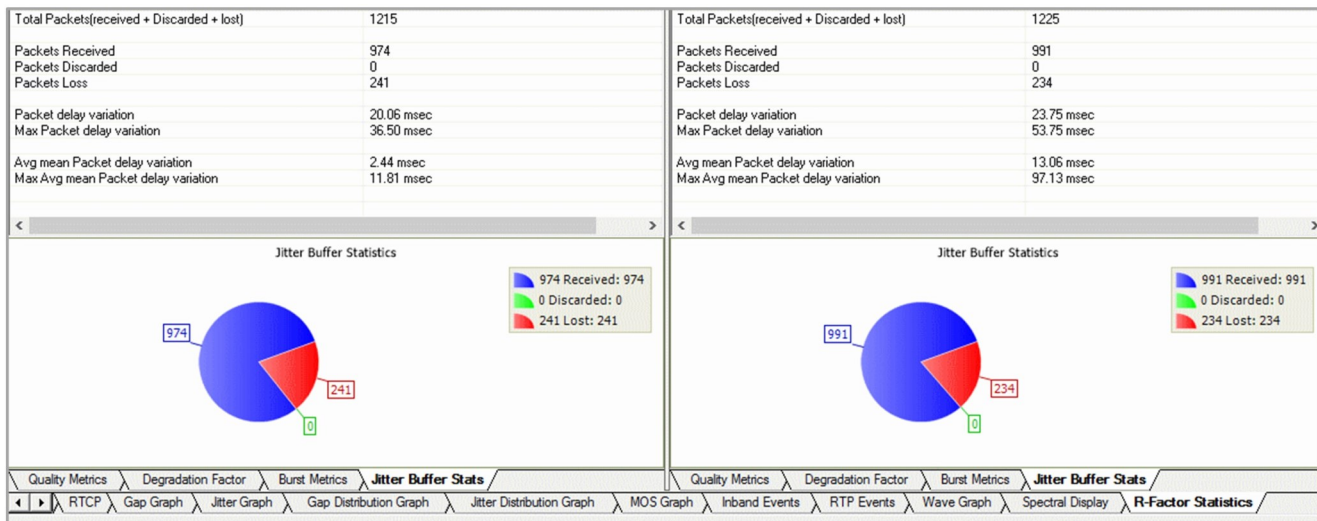
Packet Data Analysis (PDA) – Detail View (Contd.)

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.



Jitter Buffer Statistics

Other Features in PDA

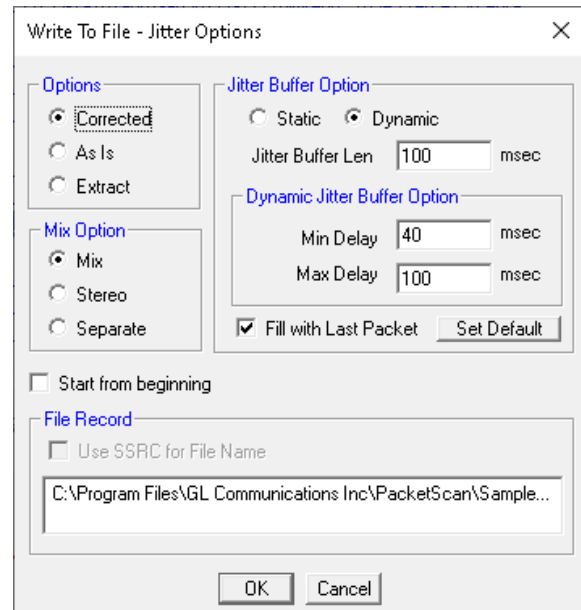
Play Audio and Write to File

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.



Play Audio

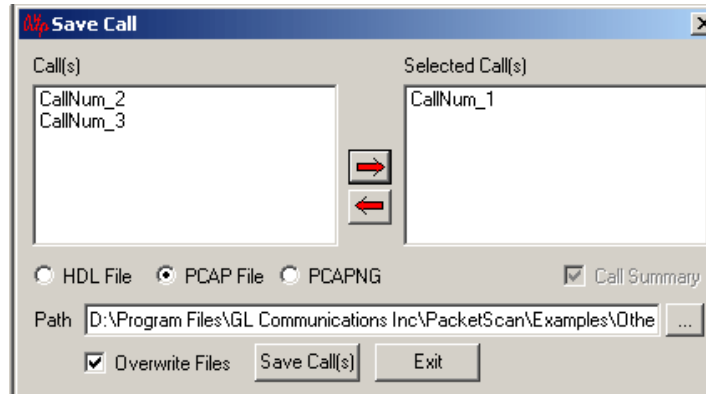


Write To File

Other Features in PDA (Contd.)

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.



Save Call

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.

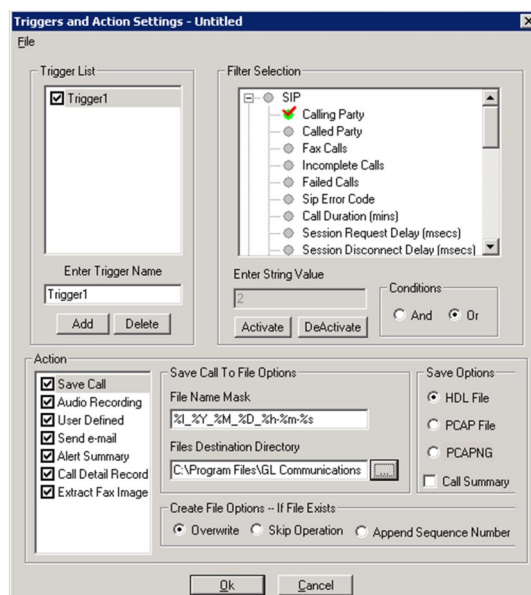
Inband Events display Inband DTMF and MF digits as they are received with details such as Timestamp, Type, Event, On-Time, Power, and Frequency. Outband Events display RTP events as per RFC 2833 or 4733 with details such as Timestamp, Event, Power, and Duration.

Triggers and Action Settings

Triggers and Action Settings allow the user to filter calls based on certain SIP, RTP, MEGACO, H.323, GSMA, and luCS 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**.



Trigger and Action Settings

Other Features in PDA (Contd.)

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.

Call#	Protocol	Message	Type	Threshold	Value	Caller	Callee	Callid
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

Alert Summary View

Packet Data Analysis (PDA) – Registration Summary

- Provides the registration summary of each SIP registration including the user agent, registrar, status, registered time, expiry time, time to live, remaining time, registration request delay (RRD), and Re-registration Attempts
- Provides graphical view of the active registrations and registration trace of each registration

Call#	Method	RegisterRequestTime	UserAgent	Registrar	Result	Status	ErrorCode	CallID	RegisteredTime	Requests	Resp
4	DeRegister	2023-10-04 23:47:3...	4056501944	stas-alt1-007-cts2.k...	Passed	De-Registered	0	gr2oY4i6BtpYwXR...		2	2
5	DeRegister	2023-10-04 23:47:3...	310280110542293	one.alt.net	Passed	De-Registered	0	yZuICH4n9YlM3z...		2	2
6	Register	2023-10-04 23:47:3...	310410342947386	scaf-alt1.msrgroup0...	Failed	Failed	480	9ganningCPYvp3loT...		1	1
7	Register	2023-10-04 23:47:3...	310150750381449	smile.cricketwireless...	Passed	Registered	0	vUbJ40_j75zA94Zs...	2023-10-04 23:47:3...	2	2
8	Register	2023-10-04 23:47:3...	310280068104377	one.alt.net	Passed	Registered	0	9f7d5e775c645ad4...	2023-10-04 23:47:3...	2	2
9	Register	2023-10-04 23:47:3...	310280068991809	one.alt.net	Failed	TimeOut	0	1735520760_28600...		2	2
10	Register	2023-10-04 23:47:3...	310170866282501	scaf-alt1.msrgroup0...	Passed	Registered	0	1794145595_11689...	2023-10-04 23:47:3...	2	2
11	Register	2023-10-04 23:47:3...	310150750381449	scaf-alt1.msrgroup0...	Failed	TimeOut	0	1794145595_11689...		1	1

Column Width | Absolute Timing | Show Latest

Time | Frame# | 2001:1890:fc:1176::1:1 | 2001:1890:fc:103f::1:17

00:00:00.000 | 460 | 5060 | REGISTER | 5060

00:00:00.000 | 467 | | | |

00:00:00.108 | 1203 | | | |

00:00:00.177 | 1751 | 5060 | SIP/2.0 200 OK | 5060

Find | Complete Stack

SIP Layer

```
REGISTER sip:smile.cricketwireless.net SIP/2.0
Via: SIP/2.0/UDP [2001:1890:fc:1176::1:1]:5060;branch=z9hG4bK409c824096c71385
Via: SIP/2.0/UDP 127.0.0.1;branch=z9hG4bK_0001_1491448011-140006986143404;1ss
Via: SIP/2.0/TCP [2600:381:a768:7blb:0:10:28a3:9c01]:8100;received=2600:381:a
Max-Forwards: 69
Require: Path
Contact: <sip:310150750381449@[2600:381:a768:7blb:0:10:28a3:9c01]:8100>;+sip.
To: <sip:310150750381449@smile.cricketwireless.net>
From: <sip:310150750381449@smile.cricketwireless.net>;tag=9828401
Call-ID: vUbJ40_j75zA94ZsGFSComg..@2600:381:a768:7blb:0:10:28a3:9c01
CSeq: 2 REGISTER
Expires: 600000
Allow: INVITE,ACK,OPTIONS,CANCEL,BYE,UPDATE,INFO,REFER,NOTIFY,MESSAGE,PRACK
Supported: path
User-Agent: SM-A136U-A136USQU6DWH5 Samsung IMS 6.0
Authorization: Digest realm="smile.cricketwireless.net" username="310150750381449"
```

Registration Graph | Registration Trace

Registration Summary

Filtered Calls using Filter Expressions

The PacketScan™ analyzer offers the option to filter call detail records based on parameters such as caller, time, and message count. The expression supports the following mathematical operators: ==, <=, >=, !=, <, >, &&, ||. For example, the filter expression "ErrorCode==400 || ErrorCode>600" will display calls with ErrorCode equal to 400 and calls with ErrorCode greater than 600 as shown in the below screenshot.

Packet Data Analyzer - Summary View

File View Call Summary Protocol Configurations GUI Configurations Help

SIP Show Filtered Calls Call Count: 6

ErrorCode==400 || ErrorCode>600

Call Summary SIP Registration Summary Alert Summary

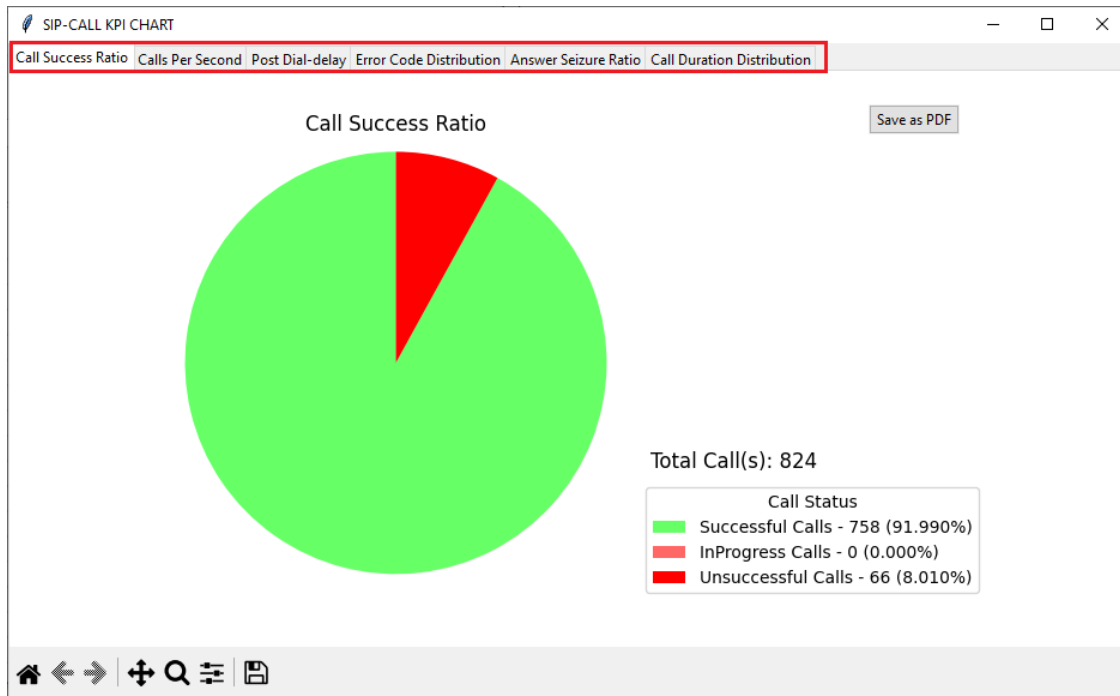
Payload_R	ErrorCode	FailureCause	CallID	EndTime	PostDialDelay	SessionDisconnectDe
	400	5	GL-MAPS-2654-766727097-26124-3688@192.168.12.92	2023-06-01 15:02:12.275	9	0
	603	4	GL-MAPS-2679-766728649-26314-14696@192.168.12.92	2023-06-01 15:02:13.828	9	0
	604	4	GL-MAPS-2677-766728698-26320-13540@192.168.12.92	2023-06-01 15:02:13.879	19	0
	606	4	GL-MAPS-2677-766728748-26326-14572@192.168.12.92	2023-06-01 15:02:13.919	9	0
	400	5	GL-MAPS-2685-766728798-26332-6156@fe80::3f20:7953:f2df:f26a	2023-06-01 15:02:13.973	18	0
	606	4	GL-MAPS-2709-766730449-26530-14696@fe80::3f20:7953:f2df:f26a	2023-06-01 15:02:15.632	9	0

Displaying Filtered Calls using Expressions

KPI Report for SIP Calls

The SIP Call Summary KPI Report includes KPIs for the following:

- **Call Success Ratio:** Displays graph for "Successful" and "Unsuccessful Calls", including counts and percentages (%)
- **Calls Per Second:** Shows graph "Total", "Passed", and "Failed Calls per second."
- **Post Dial Delay:** Shows delay counts in milliseconds (0-250ms, 251-500ms, etc.)
- **Error Code Distribution:** Lists Top 10 Call Failure Causes with counts and percentages (%)
- **Answer Seizure Ratio:** Shows "Answered" and "Unanswered Calls", with counts and percentages (%)
- **Call Duration Distribution:** Provides call counts for different durations (0-1 sec, 1-10 sec, etc.)

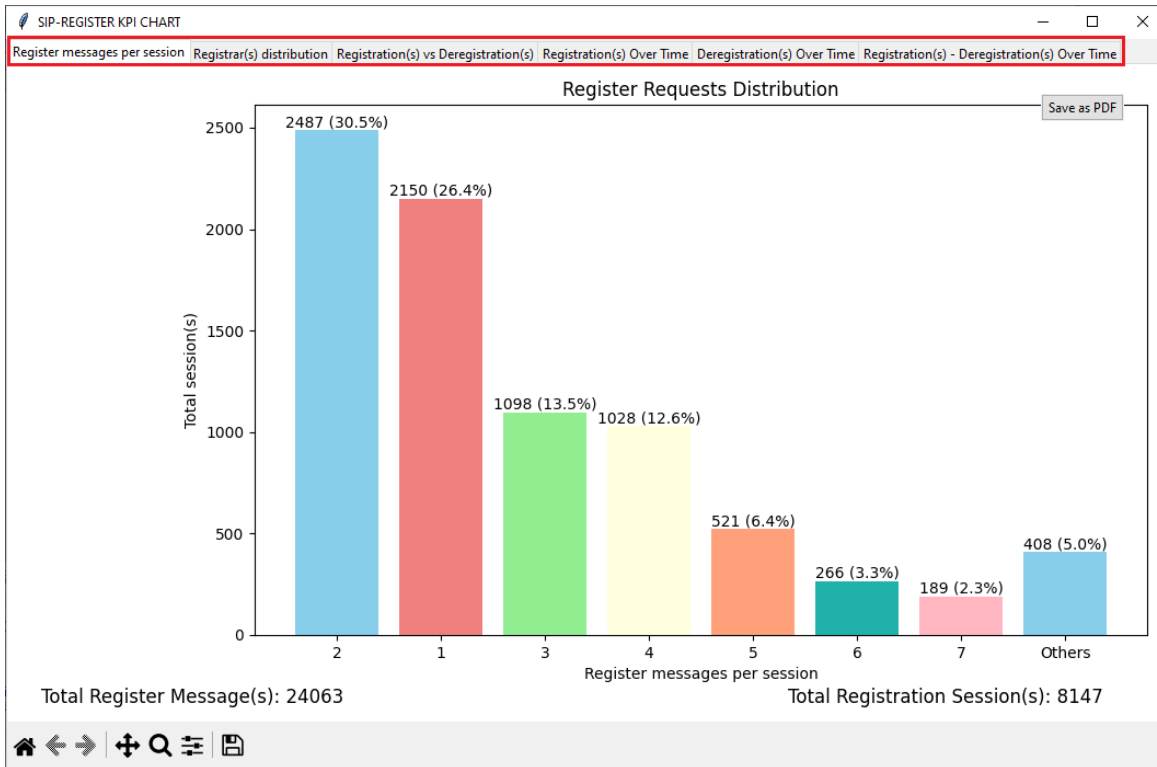


SIP-Call KPI Chart

KPI Report for SIP Registration

The **SIP Registration Summary KPI Report** includes KPIs for the following:

- **Register Messages per Session:** Shows a graph for the distribution of Register Requests
- **Registrar(s) Distribution:** Displays a graph for the number of Registration sessions per Registrar
- **Registration(s) vs Deregistration(s):** Illustrates a graph comparing the distribution of Register and Deregister counts with percentages (%)
- **Registration(s) Over Time:** Show the graphs for "Successful", "Failed", and "Total Attempts" per second
- **Deregistration(s) Over Time:** Displays a graph for "Successful" and "Total Attempts" per second
- **Registration(s) - Deregistration(s) Over Time:** Shows a graph for overall "Register & Deregister attempts", "Register & Deregister passed", and "Register & Deregister failed" attempts per second Register messages per session



SIP-Registration KPI Chart

Supported Protocol Standards

The supported protocol standards in PacketScan™ are 5G N1N2, N4, N8, N12, N13, SIP-3261, MSRP, MEGACO 3525, MEGACO 3015, H.323, SS7 SIGTRAN, ISDN-SIGTRAN, GSMA over IP, GPRS over IP, UMTS over IP, and LTE.

Supported Protocols	
SIP, MSRP, MEGACO, MGCP, RTP	MAC
	IP / TCP / UDP
	ICMP
	SIP, SIP Extensions
	MSRP
	RTSP
	RTCP
	RTP
	MEGACO
	MGCP
	H245
	RAS
	ISDN H225
	STUN
	DNS
	DHCP
	SMTP
	POP3
	HTTP
	FTP
	SNMP
	T38
	RFC 2833
	H263
	STP
	IPv6
	PPPoE
	ISUP ITU
	Skinny

Supported Protocols	
5G	N1N2, N4
	N8, N10, N11, N12, N13
SS7 SIGTRAN	ISUP ITU
	ISUP ETSI
	ISUP ANSI
ISDN-SIGTRAN	Q.931
	DASS2
	DPNSS
GSMA over IP	BSSAP+
	BSSAP-LE (BSSMAP-LE/DTAP-LE)
	CC, MM, RR
GPRS over IP	SMG
	SNDPCP
UMTS over IP	RANAP
	RNSAP
LTE	S1AP
	X2AP
Diameter	S6a, S6d, S13
	Rx
	Cx/Dx
	Gx
	Zn/Zh
	Wx
	Gx
	Gy
	Gq
	Sh/Dh
	Rf/RO
	Wg/Wm/Wa/Wd/Pr

For more information, refer to [Protocol Supported in PacketScan™](#) webpage

Buyer's Guide

Item No	Product Description
PKV100	PacketScan™ (Real-time and Offline)
PKV101	PacketScan™ - Offline

Item No	Related Software
PCD103	AMR Narrowband Codec for PacketScan™
PCD107	Optional Codec – AMR Wideband
PCD104	EVRC Codec for PacketScan™
PCD105	EVRC-B Codec for PacketScan™
PCD106	EVRC-C Codec for PacketScan™
For more information on Codecs refer to Voice Codecs	
PKV400	TCP Analytics
PKV105	SIGTRAN Analysis
PKV103	IP Based GSM and UMTS Analysis
PKV110	IMS Protocol Decodes (Optional with PacketScan™)
PKV107	LTE (Long Term Evolution) Analyzer (Optional with PacketScan™)
PKV112	5G Analyzer (Optional with PacketScan™)
PKV113	Offline 5G Analyzer (Optional with PacketScan™ and NetSurveyorWeb™)
PKV104	FaxScan™ – Decodes T.38 Fax images in TIFF format from captured PCAP files
PKV170	NetSurveyorWeb™
PKV171	Network Surveillance Agent Toolkit
PKV172	Network Surveillance for GSM – GPRS Systems
PKV169	NetSurveyorWeb™ Lite



GL Communications Inc.

818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A
 (Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com

Buyer's Guide (Contd.)

Item No	Related Software
PKS118	MAPS™ ED137 Radio (Includes PKS102 and PKS107)
PKS119	MAPS™ ED137 Telephone (Includes PKS102)
PKS117	MAPS™ ED137 Recorder (Includes PKS102)
PKS107	RTP EUROCAE ED137
PKV169	NetSurveyorWeb™ Lite

Item No	Related Hardware
PKV120	PacketScan™ HD – High Density IP Traffic Analyzer w/ 4x1GigE - includes PKV100 – Online (not Offline) for temporary audio codec support
PKV122	PacketScan™ HD – High Density IP Traffic Analyzer w/ 2x10GigE - includes PKV100 – Online (not Offline) for temporary audio codec support
PKV123	FastRecorder™ and PacketExtractor™ (Optional with PacketScan™ HD)
PKV301	LAN Switch w/ Mirror Port

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

For more information, refer to [PacketScan™ - Analyzer](#) webpage.



GL Communications Inc.

818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A
 (Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com