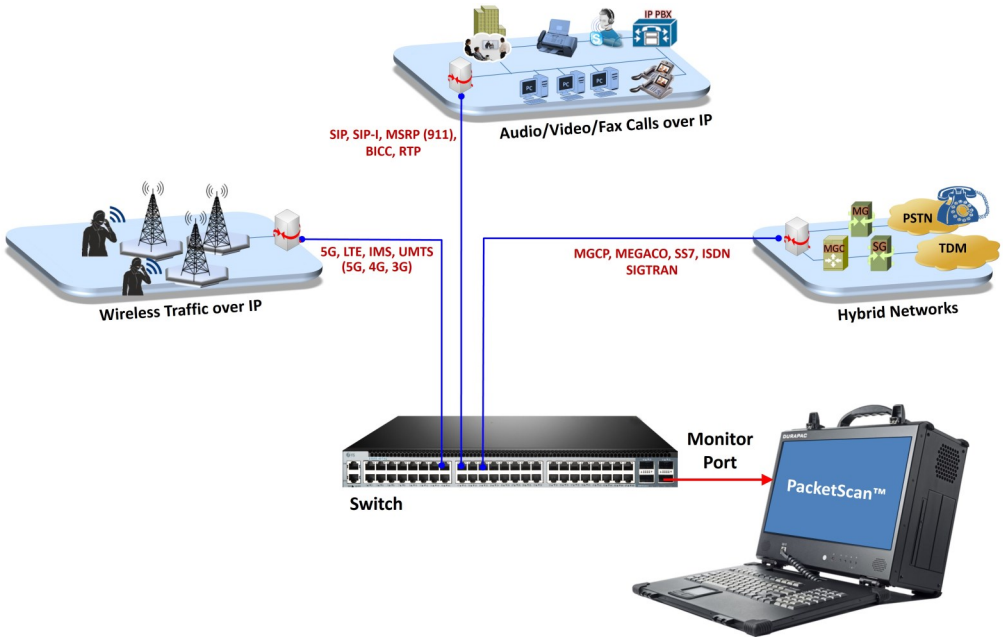
PacketScan™ - All IP Analyzer

(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
- G729, G729B (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

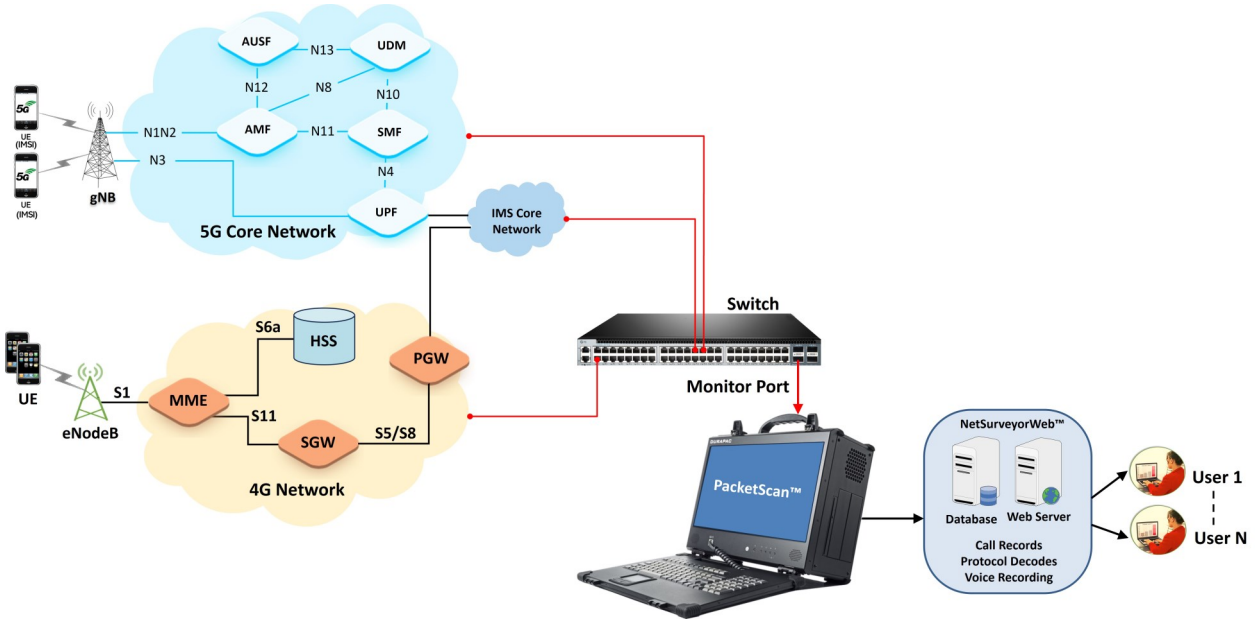
GL's PacketScan™ - an All-IP Network Monitoring software offers powerful features to capture and monitor live signaling and traffic over IP. It captures, decodes, segregates, monitors and collects statistics on all IP calls, as per EUROCAE ED-138. Ease of viewing Ground-to-Ground calls and Air-to-Ground 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.

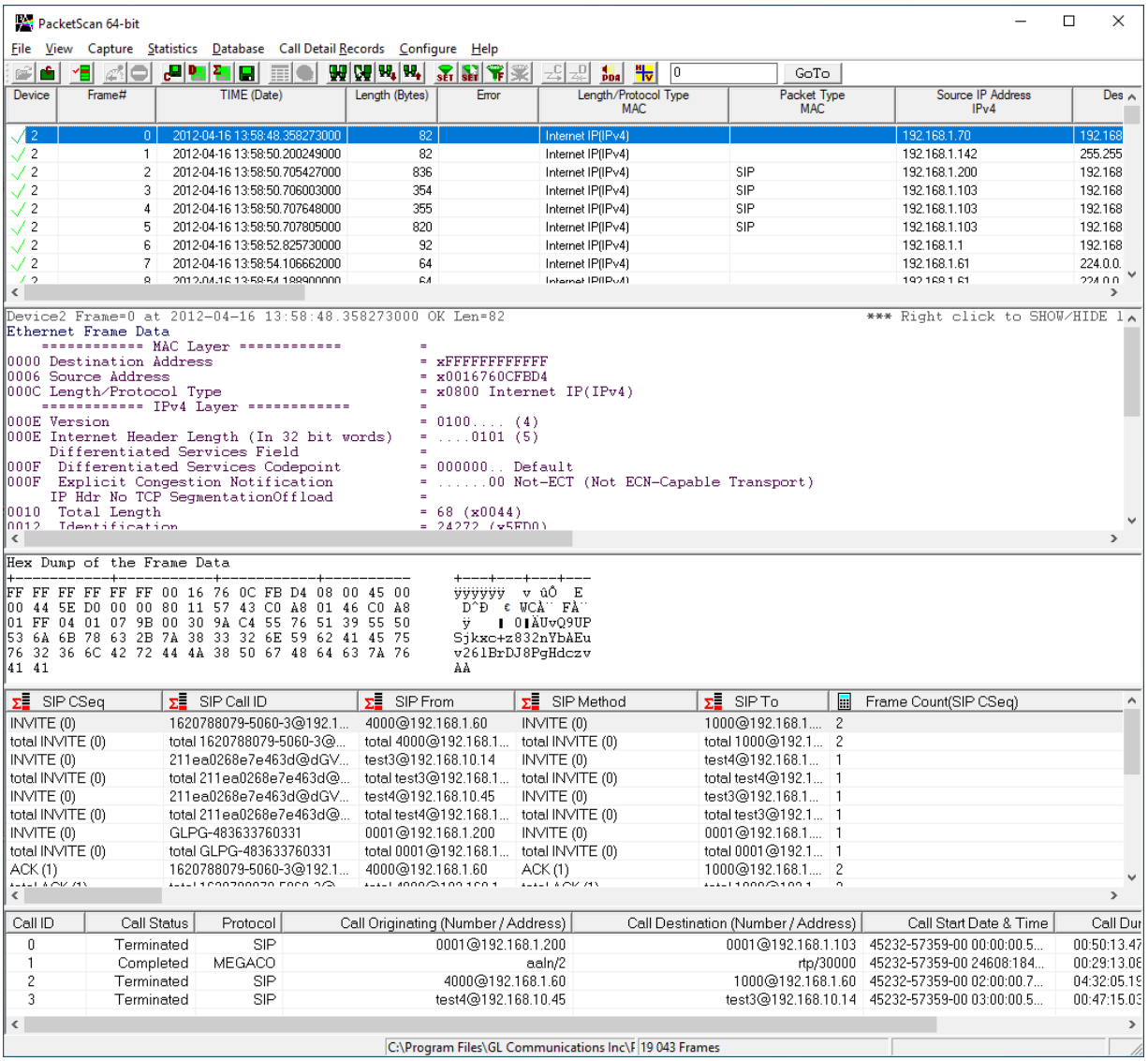
5G and LTE Network Monitoring

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

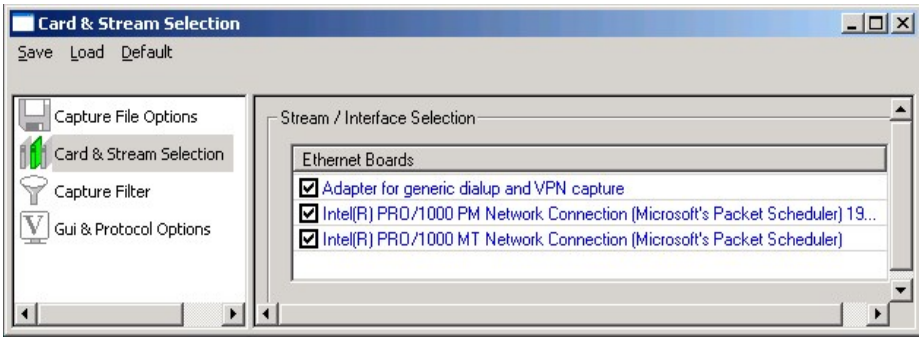
The Summary View displays various information such as Frame Number, Time, Length, Message Types, IP source and destination addresses, and so on. Any field from the protocol headers can be added to Summary view, i.e., summary fields are completely user-configurable. User can select a frame in Summary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



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.

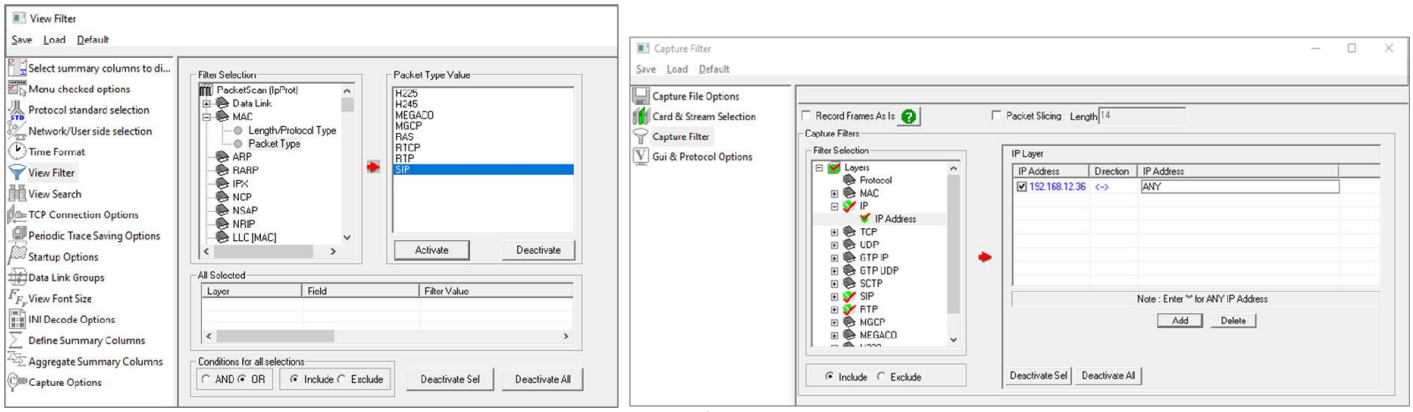


Real-time Capture

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.

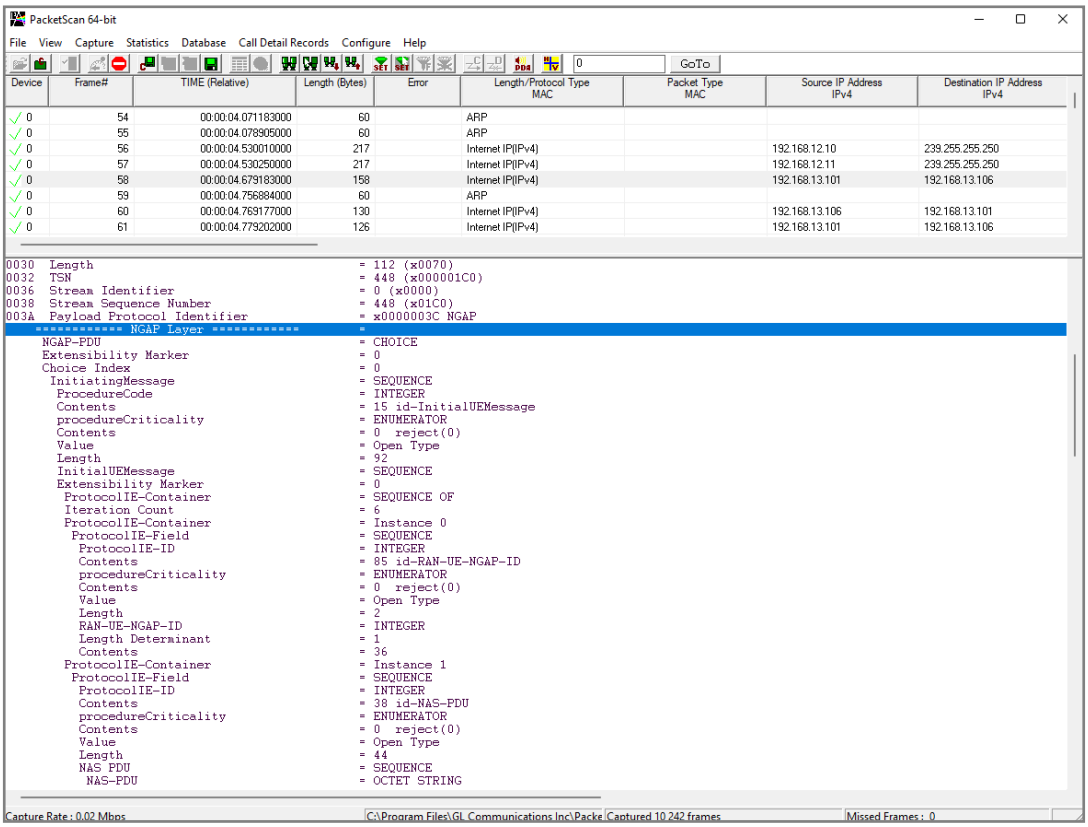
Allows real-time filtering based on parameters set in Data Link layer, MAC layer, IP, TCP/UDP, and more. The offline filter allows filtering based on Frame Number, Time, Length, Message Types, etc. The search capability helps user to filter for a particular frame based on specific search criteria.



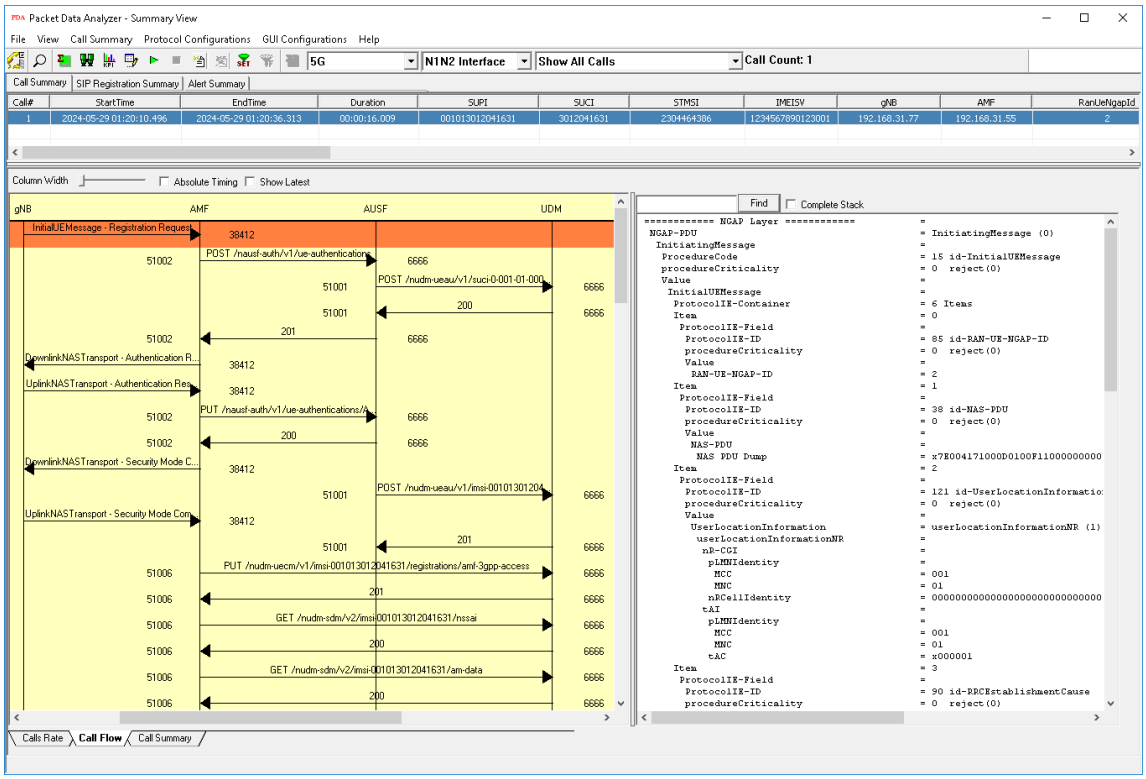
Real-time / Offline Filter

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.



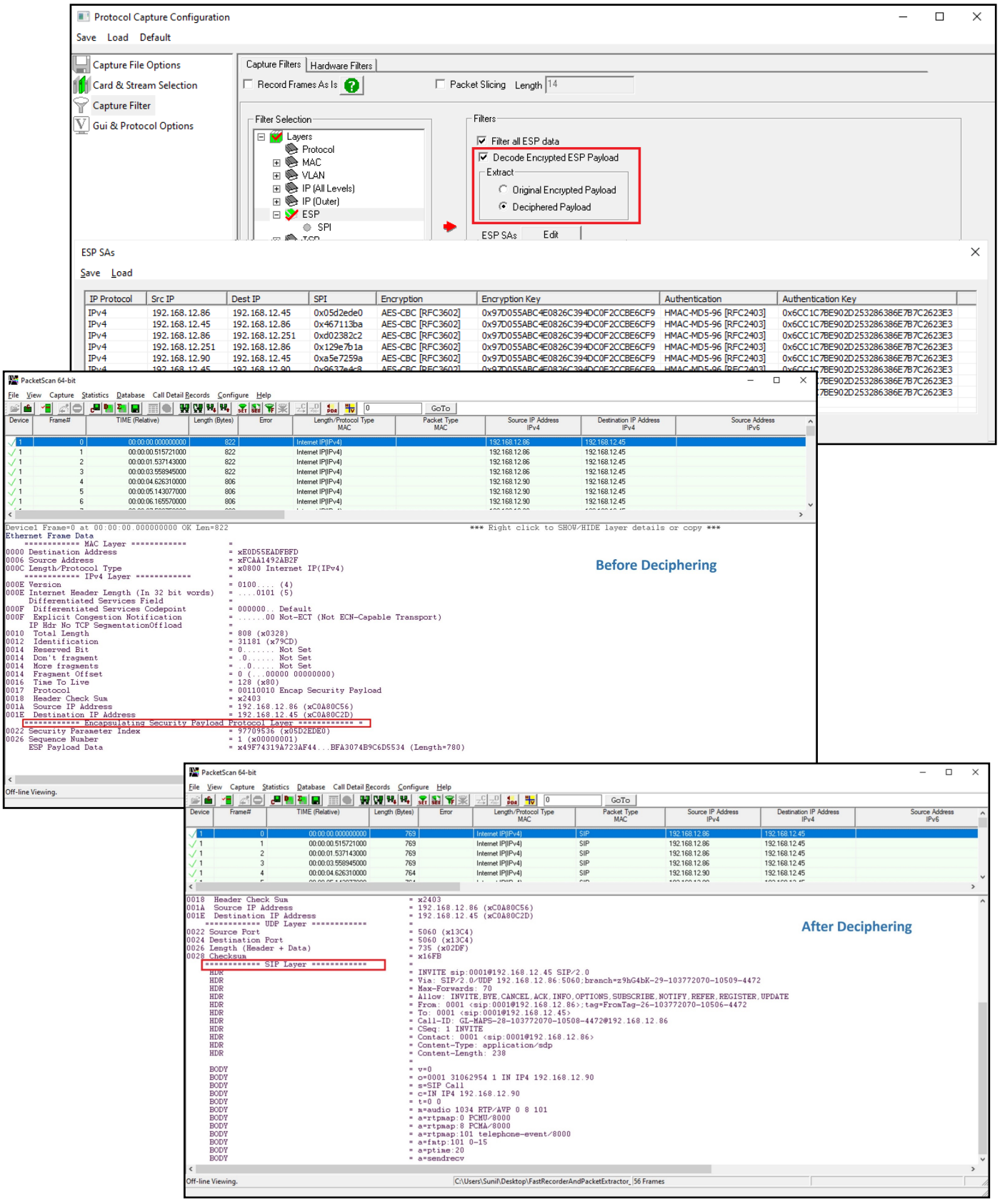
NGAP Layer Decode



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.

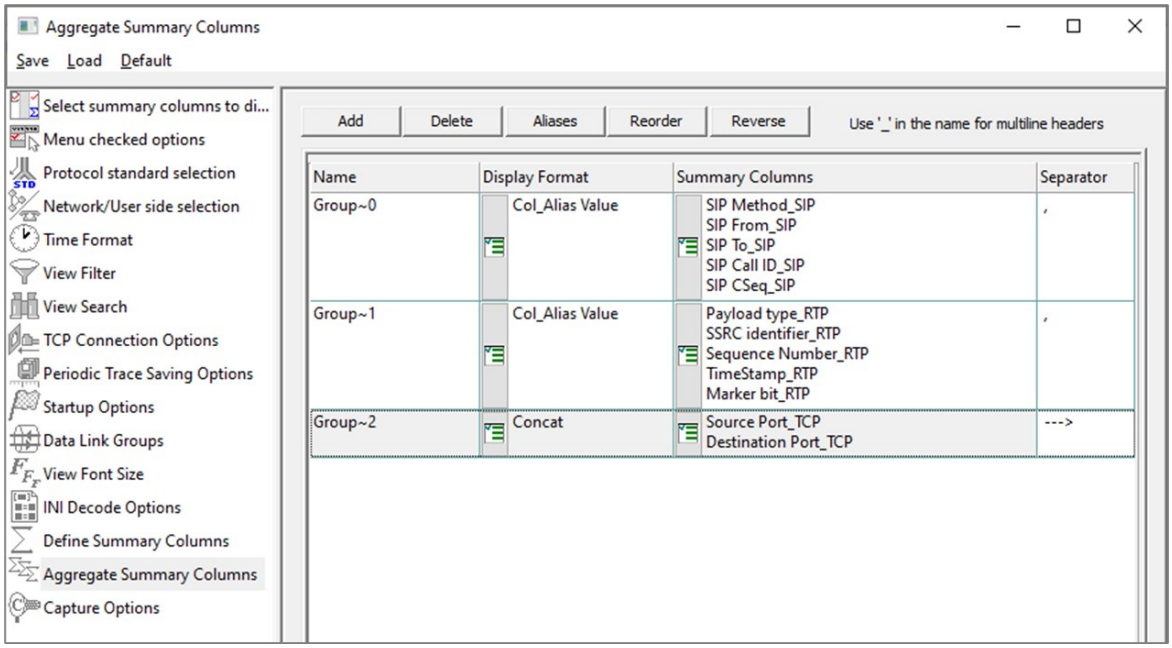


ESP Deciphering

Aggregate Summary Column Group

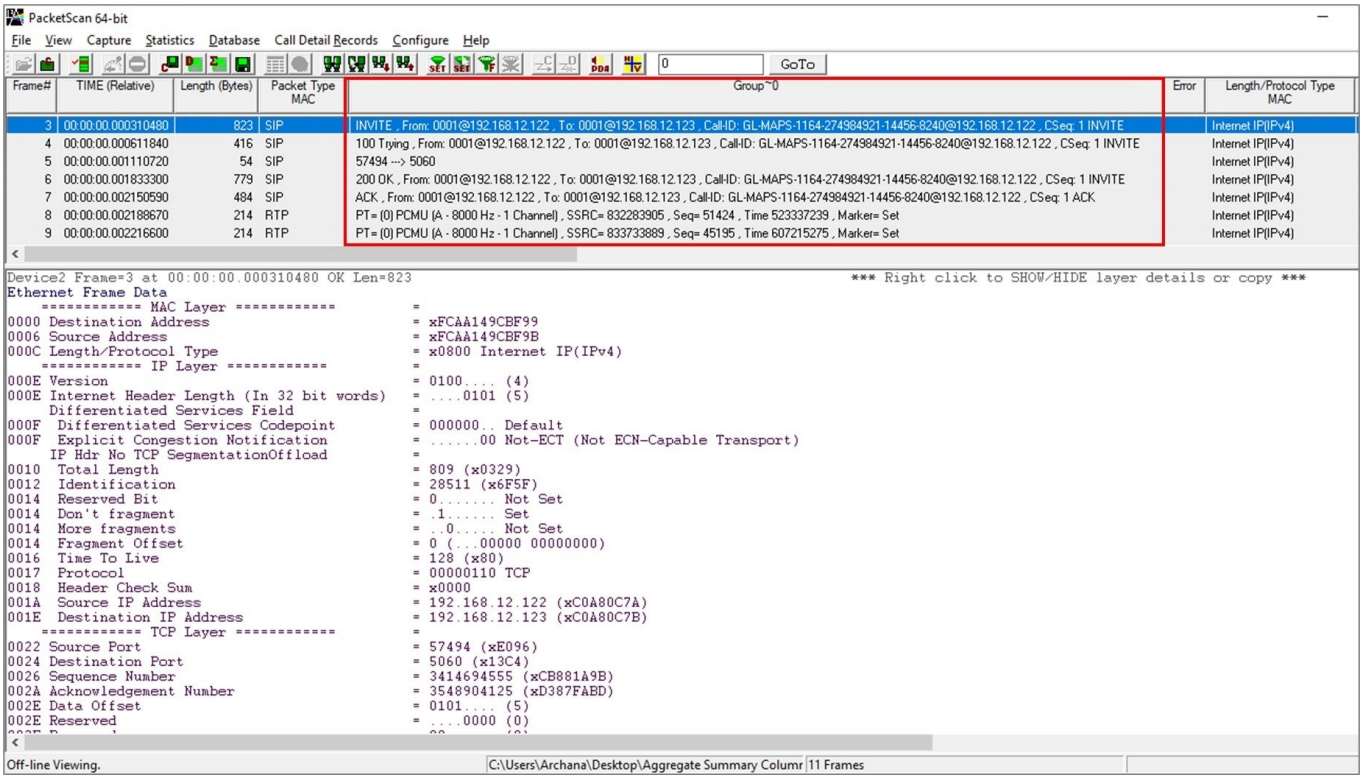
The enhanced feature of the protocol analyzer is aggregate column groups which are very flexible and comprise aggregate columns from the same or different protocol layers and prioritizes the column groups based on the requirement.

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.

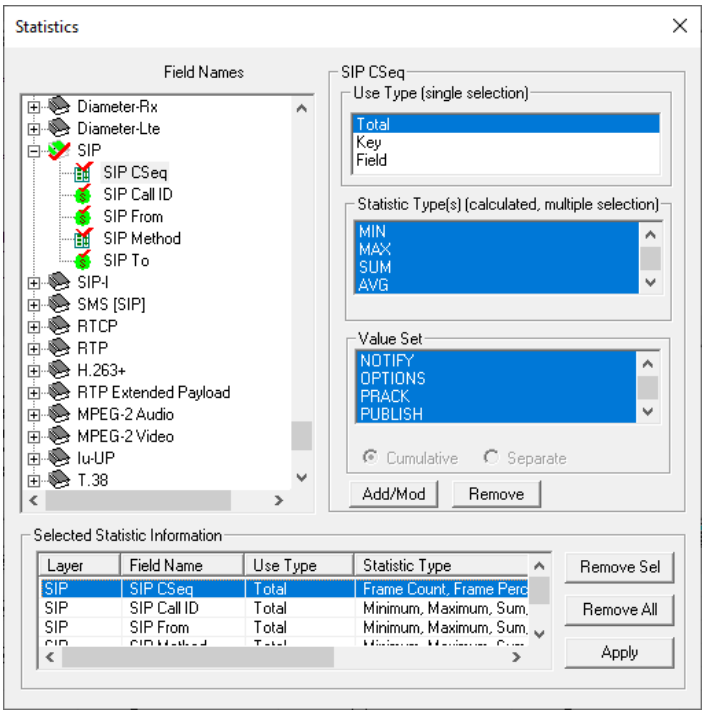


Display of Aggregate Summary Column Group in Summary View

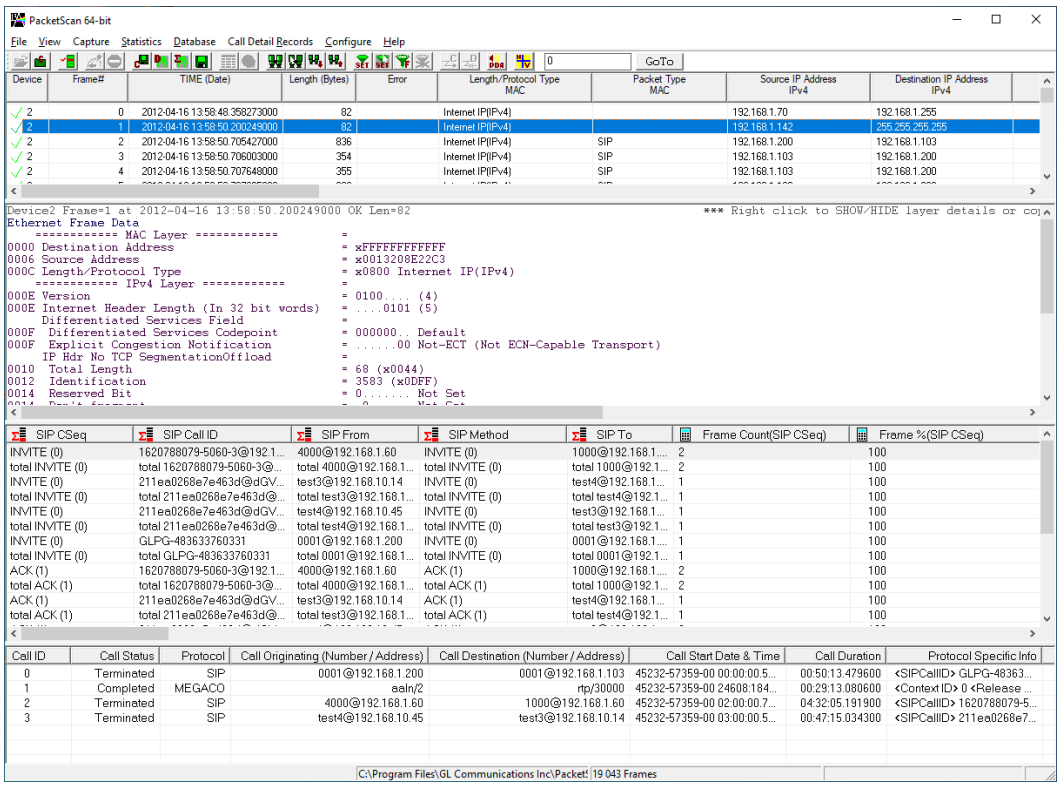
Call Detail Records and Statistics View

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



Call Detail Records and Statistics View

Packet Data Analysis (PDA) – Summary View

Features

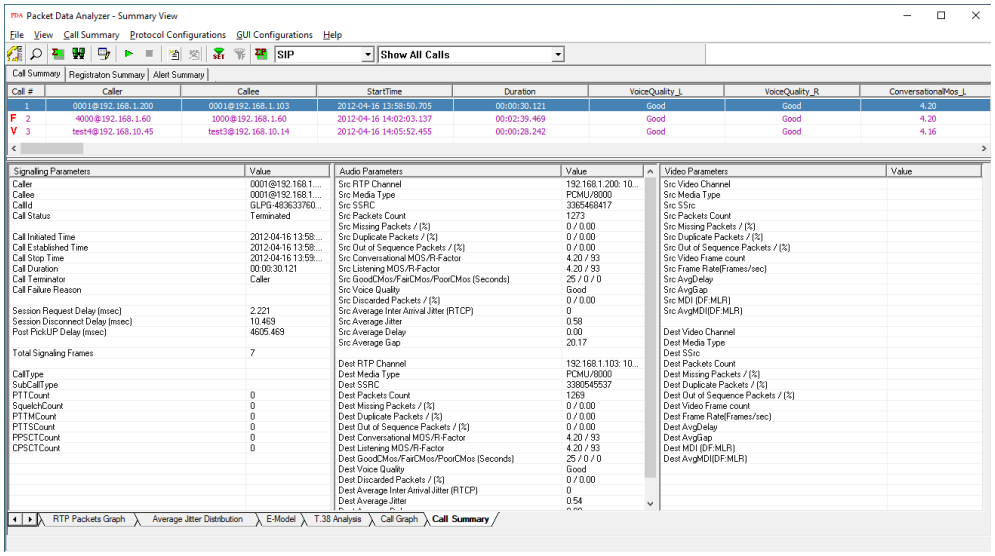
- Call Quality Of Service (QoS) for all calls with E-Model based (G.107) Mean Opinion Score [MOS (ITU-T, G.107, E-model)] and R-factor with individual and summary statistics presented in graphical and tabular formats
- Provision for H.263+ and H.264 video capture and video conference monitoring capability
- 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, GSMA, 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, GSMA, 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.



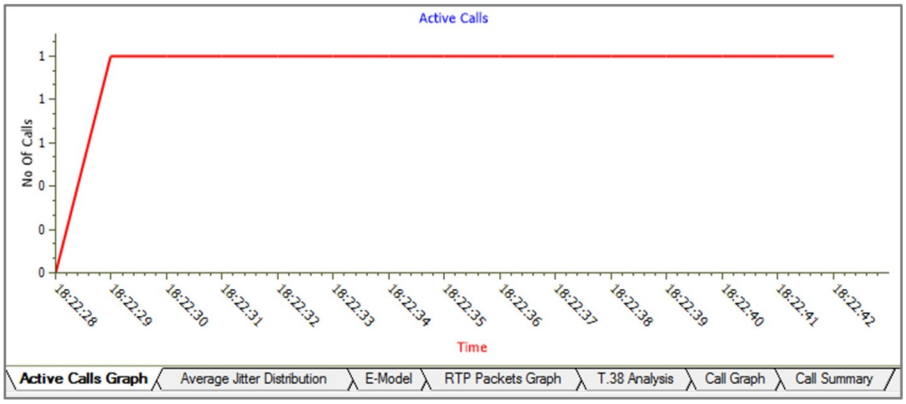
Call Summary, Audio and Video Statistics

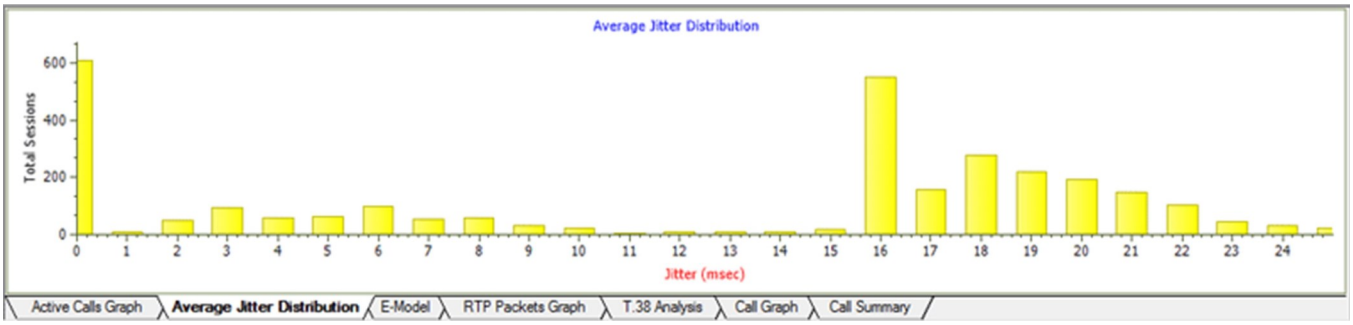
Packet Data Analysis (PDA) – Summary View (*Contd.*)

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.

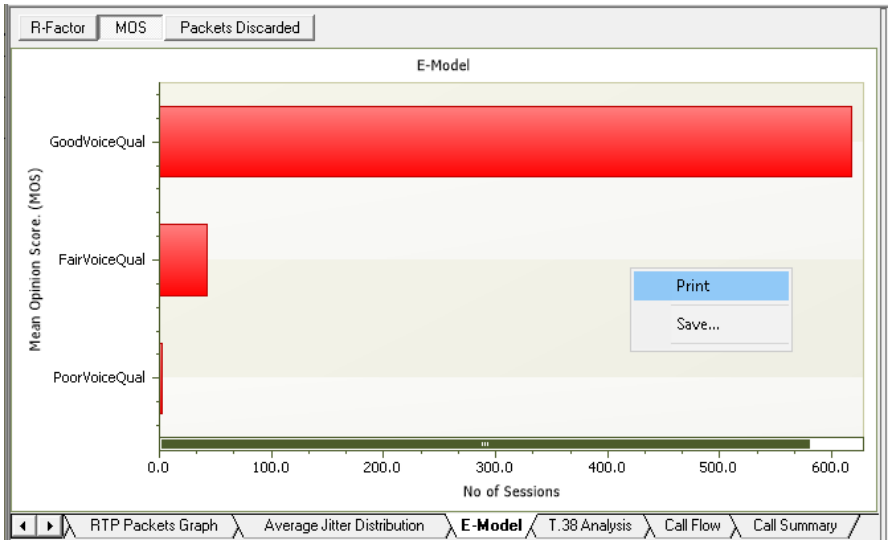




Active Calls and Average Distribution Graphs

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

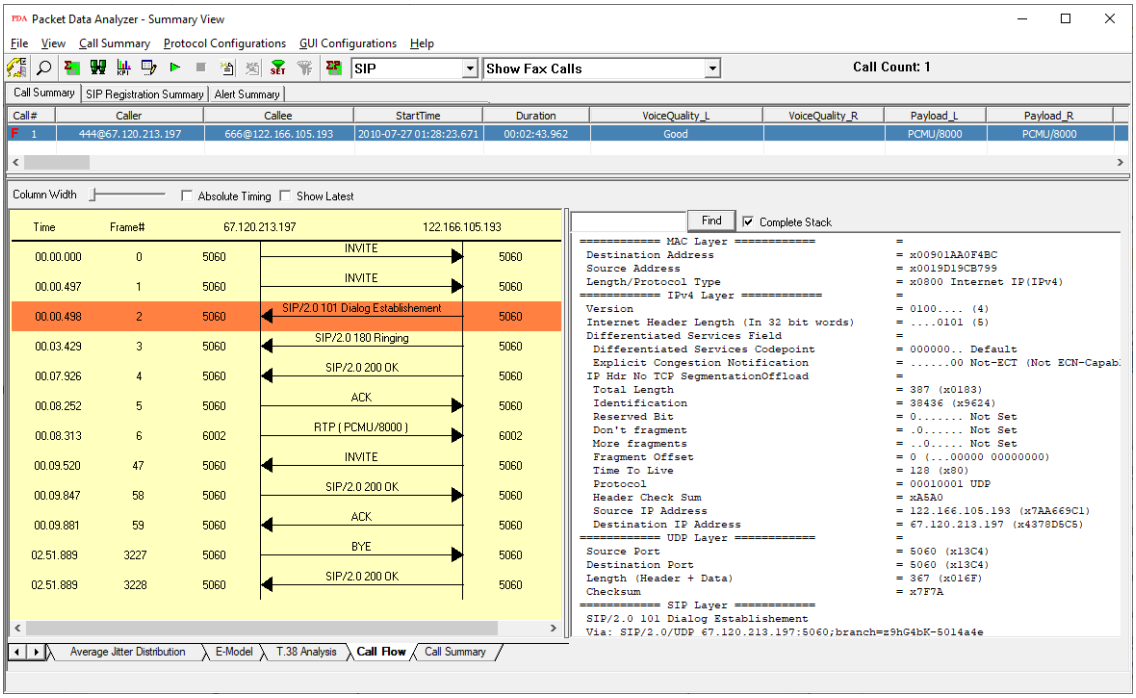


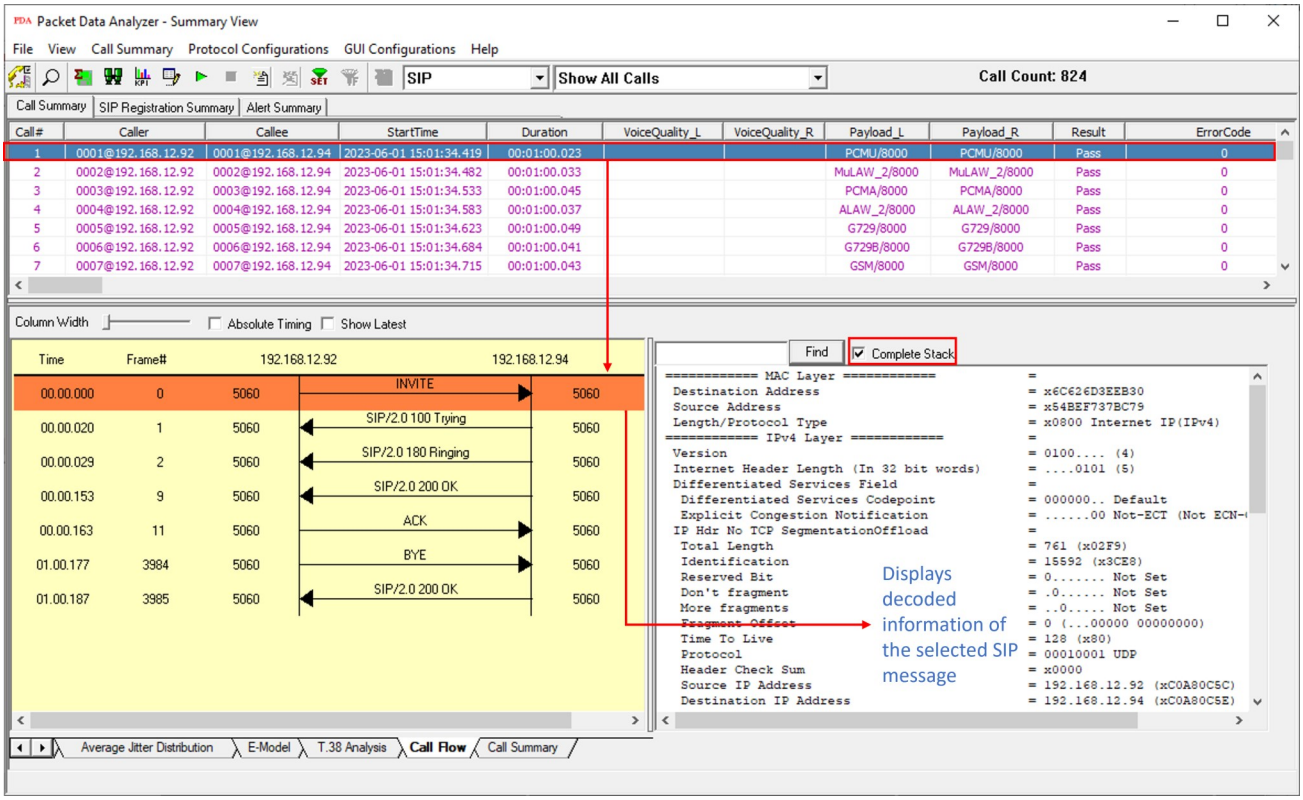
E-Model Graph

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.





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

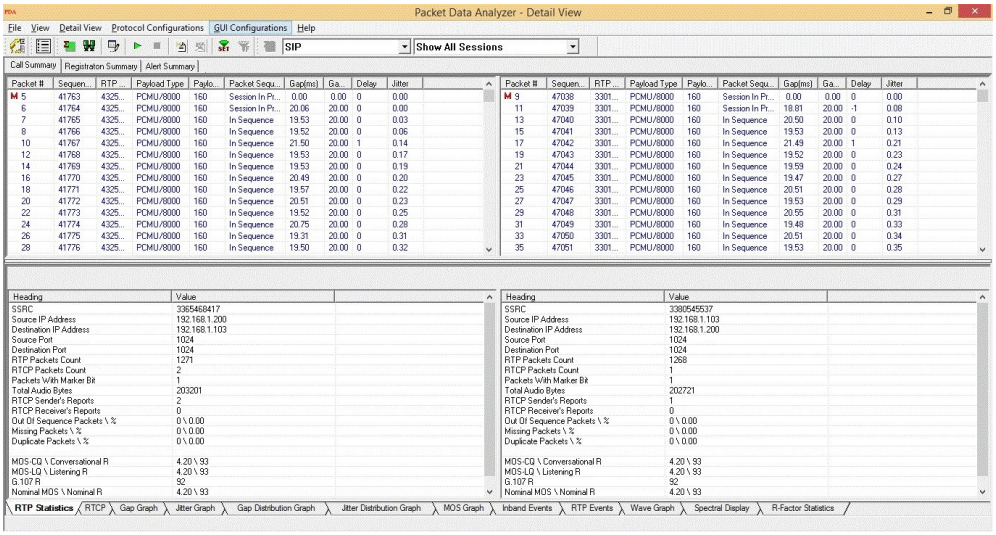
Packet Data Analysis (PDA) – Detail View

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.



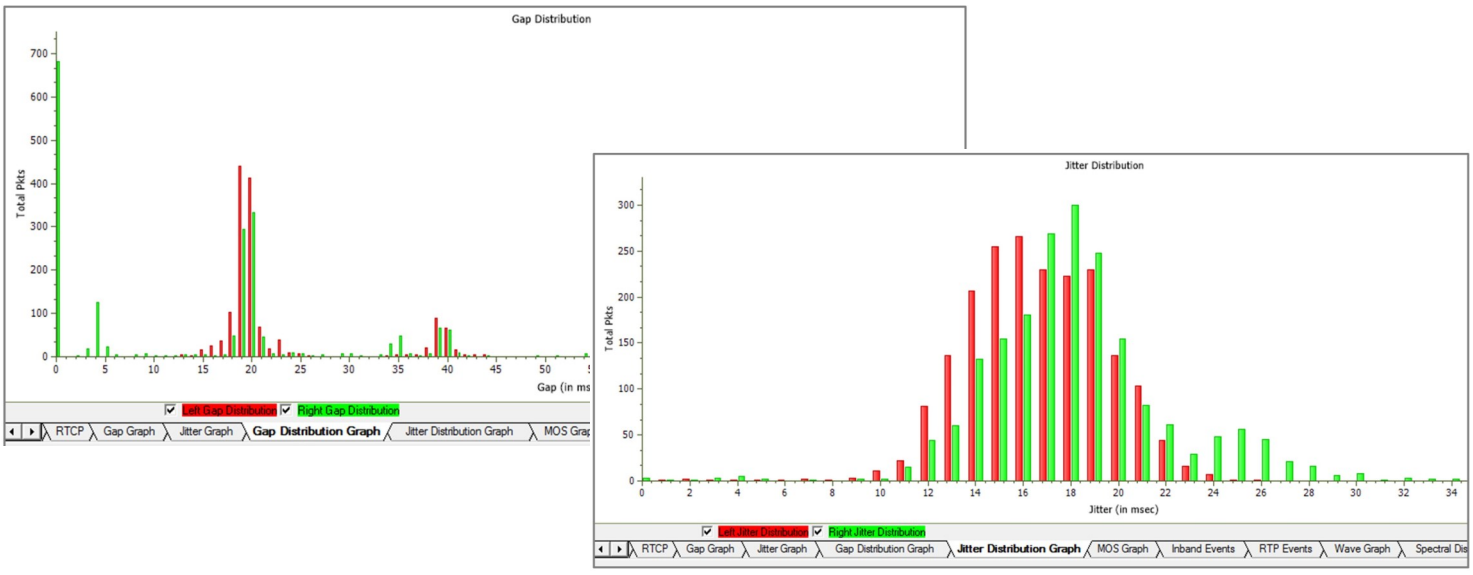
Traffic Analyzer Detail View

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.*)

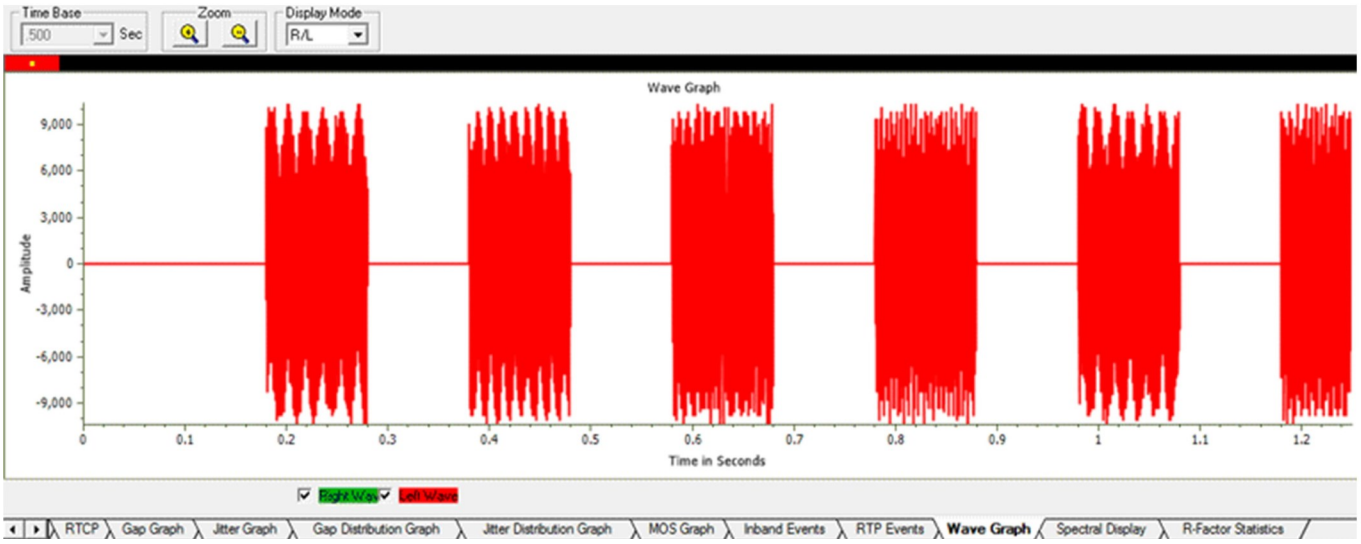
Graphs in PDA – Detail View

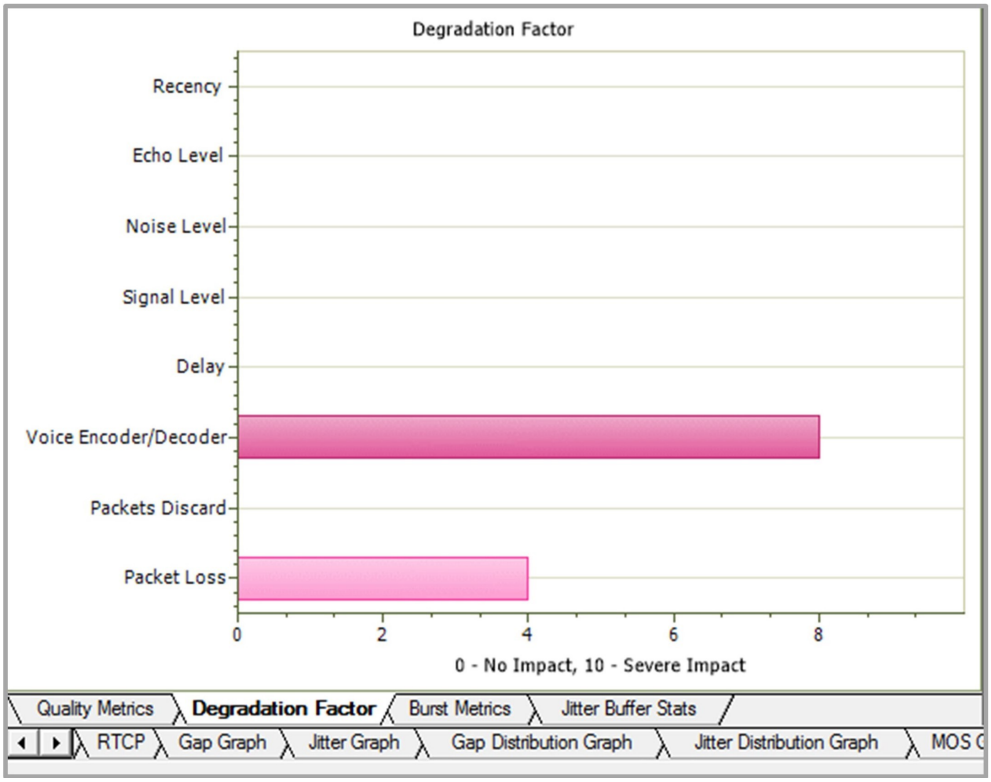
MOS Graph – Plots Mean Opinion Score values throughout the duration of the call.

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

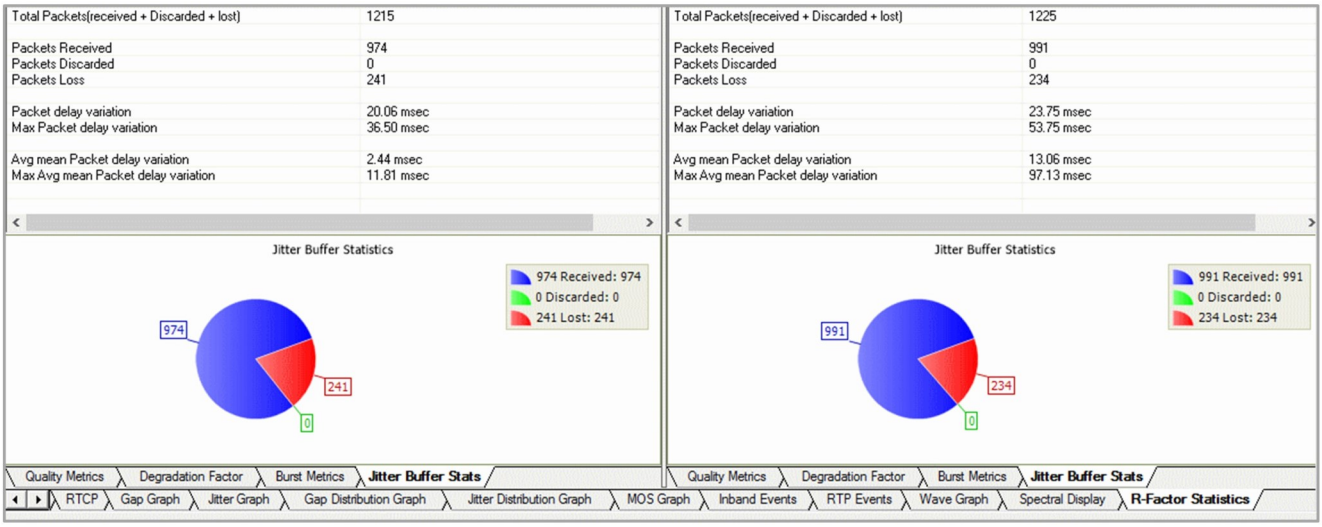
Packet Data Analysis (PDA) – Detail View (*Contd.*)

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.



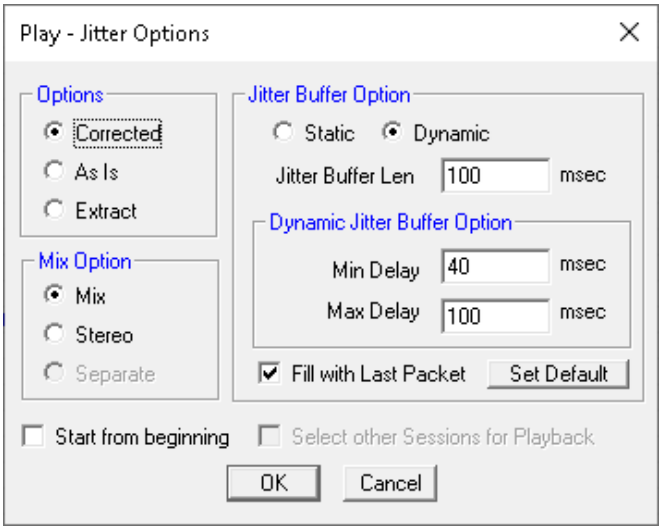
Jitter Buffer Statistics

Other Features in PDA

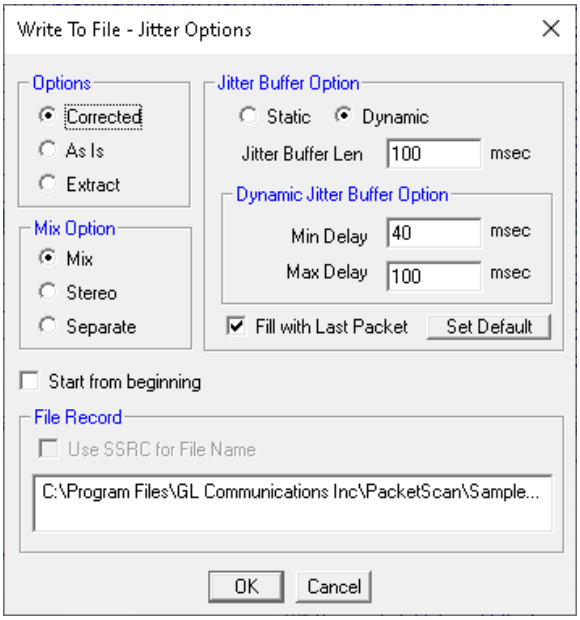
Play Audio and Write to File

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

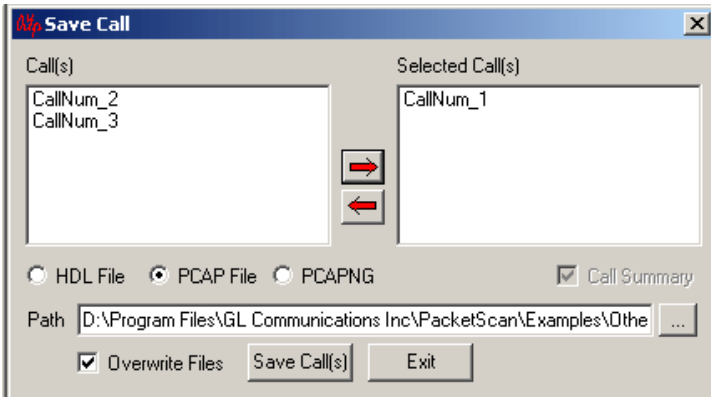


Write To File

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.

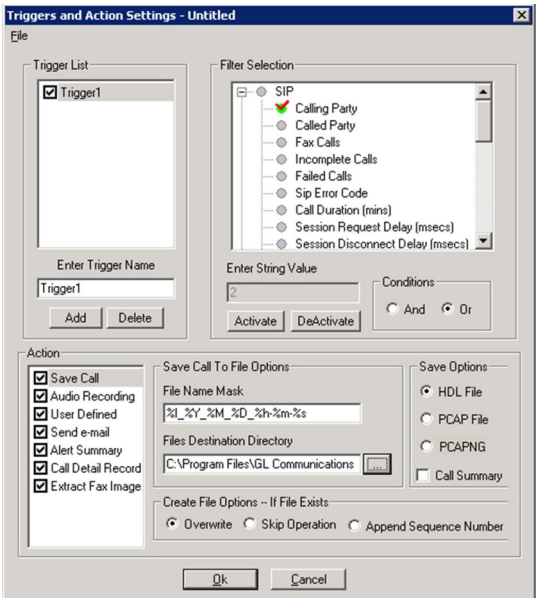
Inband Events display Inband DTMF and MF digits as they are received with details such as Timestamp, Type, Event, On-Time, Power, and Frequency. Outband Events display RTP events as per RFC 2833 or 4733 with details such as Timestamp, Event, Power, and Duration.

Triggers and Action Settings

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

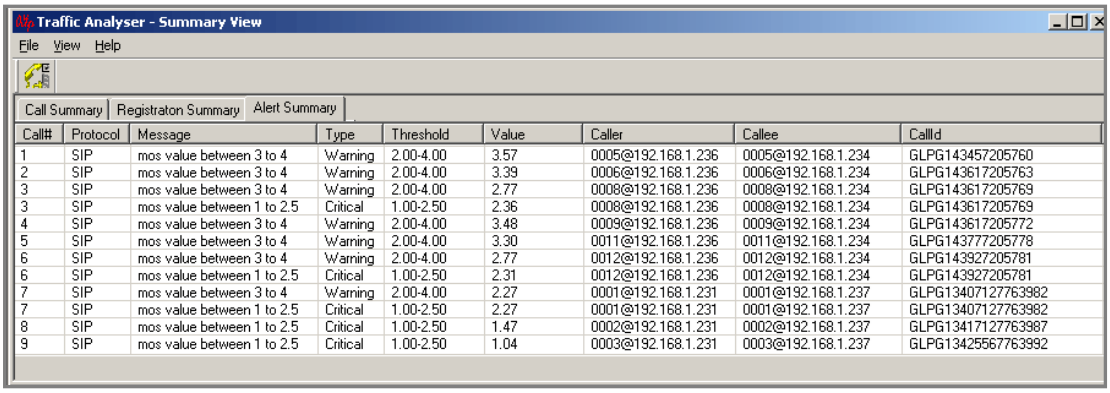


Trigger and Action Settings

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.

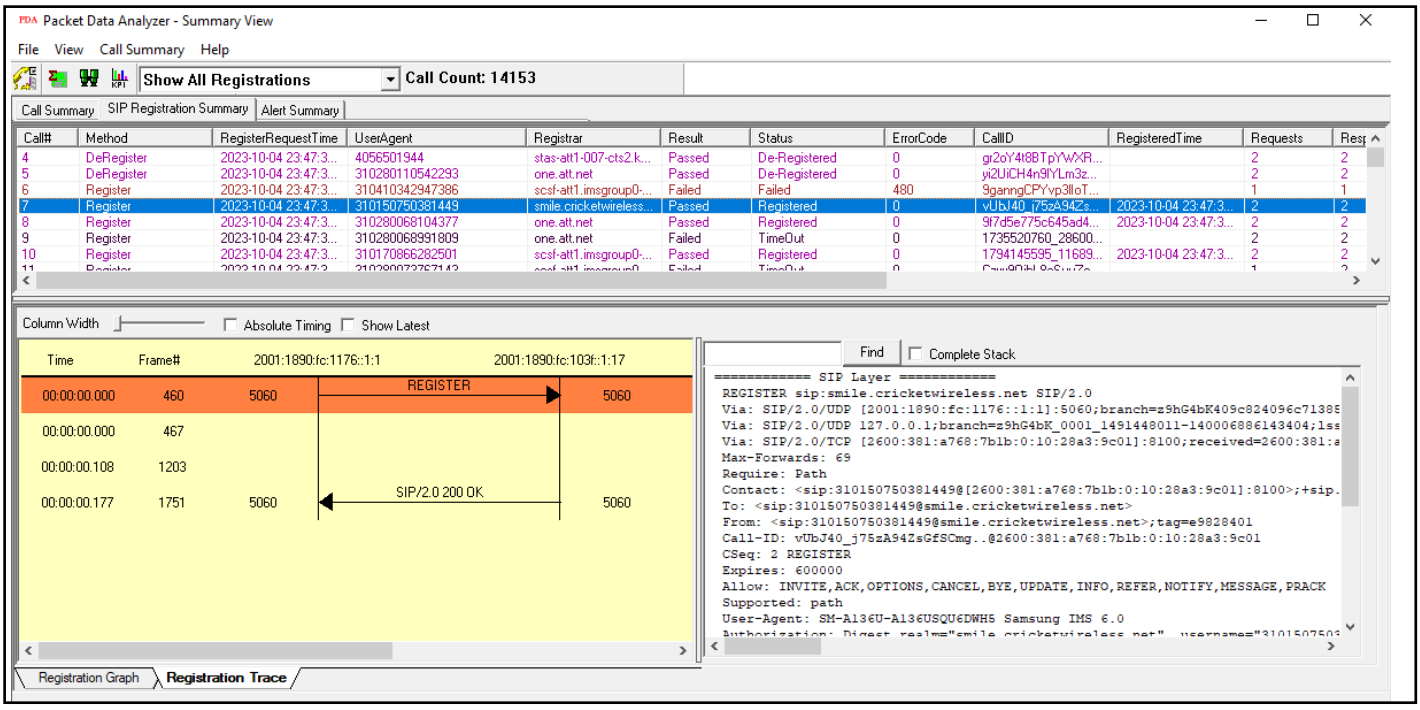


Call#	Protocol	Message	Type	Threshold	Value	Caller	Callee	CallId
1	SIP	mos value between 3 to 4	Warning	2.00-4.00	3.57	0005@192.168.1.236	0005@192.168.1.234	GLPG143457205760
2	SIP	mos value between 3 to 4	Warning	2.00-4.00	3.39	0006@192.168.1.236	0006@192.168.1.234	GLPG143617205763
3	SIP	mos value between 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-att1-007-cts2.k...	Passed	De-Registered	0	gr2oY4t8BTpYWXR...		2	2
5	DeRegister	2023-10-04 23:47:3...	310280110542293	one.att.net	Passed	De-Registered	0	yi2UiCH4n9fYLm3z...		2	2
6	Register	2023-10-04 23:47:3...	310410342947386	scsf-att1.imsgroup0-...	Failed	Failed	480	9ganngCPYvp3lloT...		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.att.net	Passed	Registered	0	9f7d5e775c645ad4...	2023-10-04 23:47:3...	2	2
9	Register	2023-10-04 23:47:3...	310280068991809	one.att.net	Failed	TimeOut	0	1735520760_28600...		2	2
10	Register	2023-10-04 23:47:3...	310170866282501	scsf-att1.imsgroup0-...	Passed	Registered	0	1794145595_11689...	2023-10-04 23:47:3...	2	2

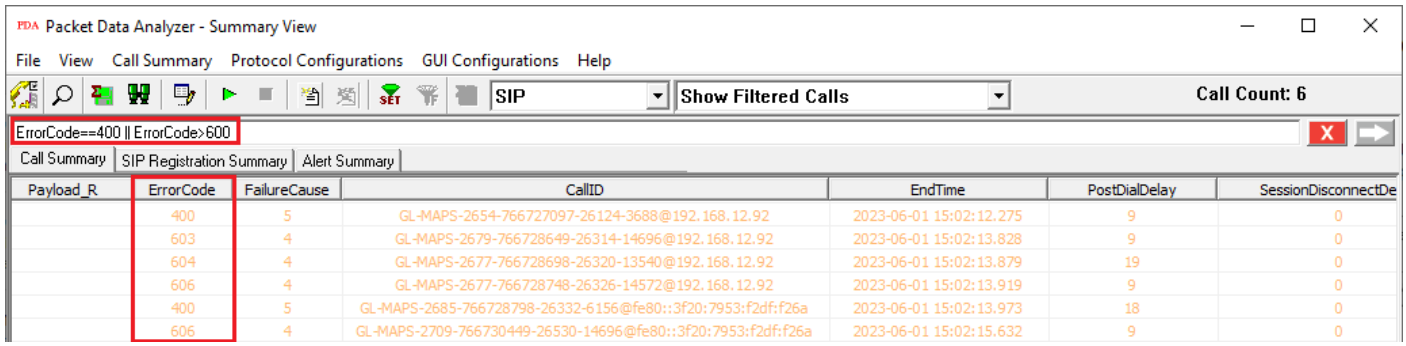
Time	Frame#			
00:00:00.000	460	5060	REGISTER	5060
00:00:00.000	467			
00:00:00.108	1203			
00:00:00.177	1751	5060	SIP/2.0 200 OK	5060

```
============ 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_1491448011-140006886143404;lss
Via: SIP/2.0/TCP [2600:381:a768:7b1b:0:10:28a3:9c01]:8100;received=2600:381:a
Max-Forwards: 69
Require: Path
Contact: <sip:310150750381449@[2600:381:a768:7b1b:0:10:28a3:9c01]:8100>;+sip.
To: <sip:310150750381449@smile.cricketwireless.net>
From: <sip:310150750381449@smile.cricketwireless.net>;tag=e9828401
Call-ID: vUbJ40_j75zA94ZsGfSCmg..@2600:381:a768:7b1b: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
```

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.

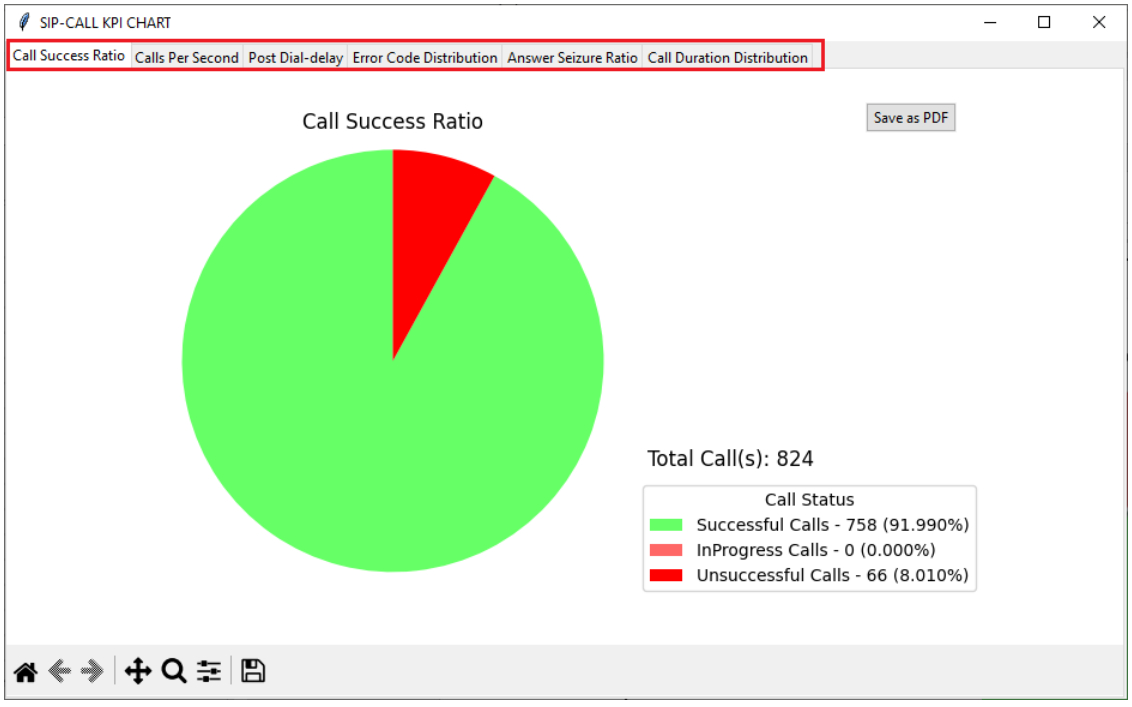


Displaying Filtered Calls using Expressions

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.)

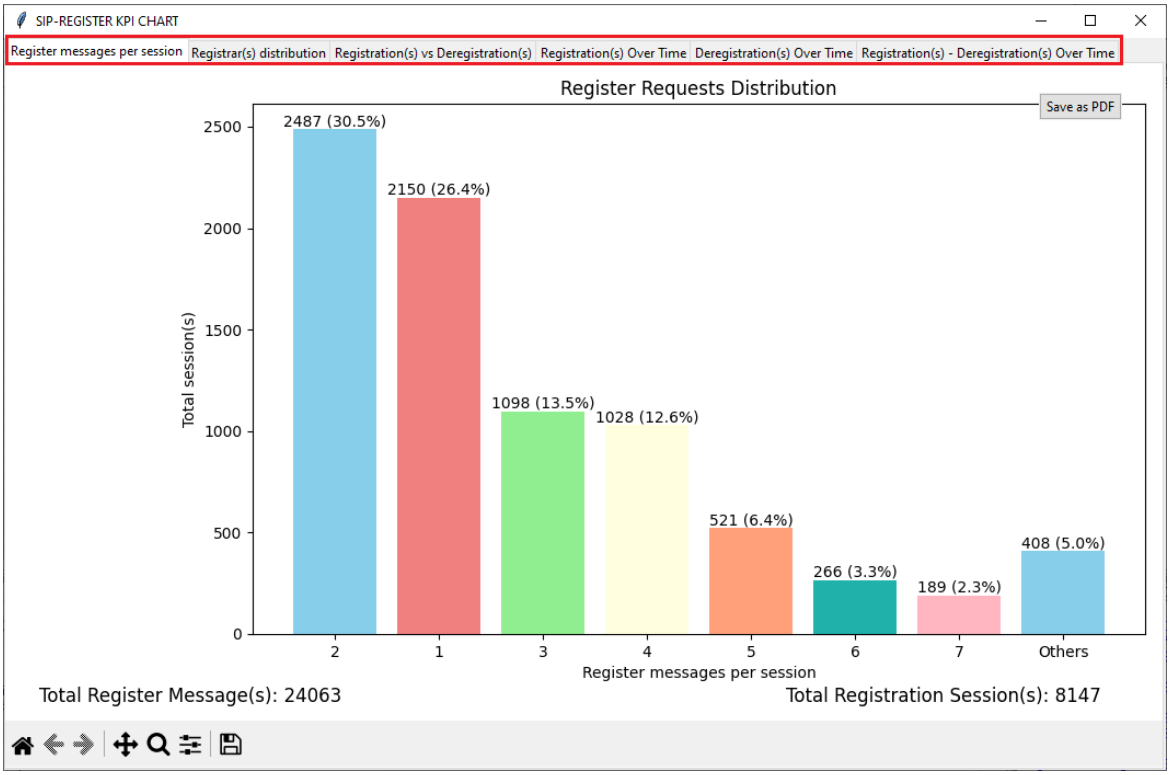


SIP-Call KPI Chart

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
	SNDCP
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

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.