

Analysis of PPP Routed & Bridged Protocols



Supports LCP, PAP, BPDUs, SNMP, DNS, DHCP, HTTP, SMTP, POP3 and more



Test and Analyze PPP in Synchronous Environment



Real-time and Offline Analysis



Testing across WAN-LAN or LAN-LAN



Summary, Detail, Statistics, and Hexdump Views



Filter and Search Capabilities



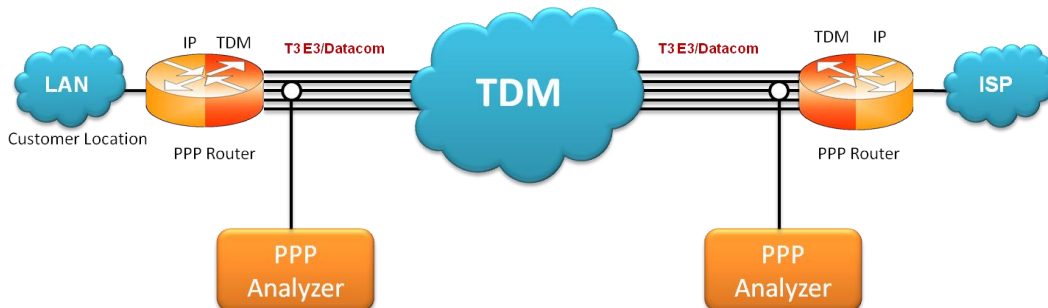
Statistics Based on Various Protocol Fields



Detail Packet Data Analysis with QoS and R-Factor



PPP Analyzer (Over T3/E3, Datacom Analyzer Units)



Overview

The Point-to-point protocol (PPP) is a link layer protocol, which encapsulates other network layer protocols like IP for transmission on synchronous and asynchronous communications lines. When transmitted over a T3/E3 line, PPP frames are based on the HDLC frame structure.

Today the PPP protocol standard finds wide use in synchronous connections between LANs, bridges, routers and other intermediate devices.

Two major features of PPP protocol are:

- Authentication
- Encapsulation of higher layer protocols

GL's PPP Analyzer captures a host of PPP protocols exchanged between the two nodes over T3/E3 links and provides useful analysis, which includes distribution of protocols, protocol fields, frame lengths, and frame status. User can decode and analyze protocols and can perform various statistics measurements.

Main Features

- Supports a host of protocols: PPP, IPCP, BCP, BPDUs, PAP, CHAP, HTTP, SNMP, STUN, FTP, DNS, and DHCP.
- Ability to test and perform numerous measurements across WAN- LAN or LAN-LAN connection.
- Ability to test and analyze HDLC based PPP protocol in synchronous environment.
- Search and filtering capabilities for both real-time and offline analysis.
- Provides summary, detail, statistics, and hex dump views. Ability to copy the contents from the detail and hex dump view
- Ability to capture and decode both PPP routed protocols, PPP bridged protocols.
- Any protocol field can be added to the summary view, filtering, and search features providing users more flexibility to monitor required protocol fields

PDA Main Features

- Supported protocols - SIP (Session Initiation Protocol RFC 2543 and RFC 3261), Megaco, MGCP, H323/H225, T.38 Fax, and RTP.
- Full RTP Analysis with audio capture/playback supported for all common codecs.
- Provides the registration summary of each SIP registration including the user agent, registrar, status, registration request delay (RRD), etc. and graphical view of the active registrations and registration trace of each registration.
- Call Quality Of Service (QOS) for all calls with E-Model based (G.107) MOS and R-factor
- Provides Video QoS Statistics such as Missing Packets, Delay, Gap, Video Frame Count, Media Delivery Index (MDI- (Delay Factor : Media Loss Rate)), and Frame Rate, and more.
- Supported Audio and Video codecs: Mulaw, Alaw, G.726 (40/32/24/16 kbps), G.726 with VAD, GSM610, G729, G729B, AMR (Wide and Narrow band codec), ILBC (20 , 30 msec), SPEEX, EVRC, EVRCB, H263+, and H264.

For more details, please visit our web page <http://www.gl.com/t3-e3-ppp-analysis.html>



GL Communications Inc.

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

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

PPP Analyzer Features

- Summary view provides the information about important fields: Dev #, Layer 3 Protocol, LCP message type, and higher protocol specific information in a tabular format.
- Hex Dump View displays raw frame data as hexadecimal and ASCII octet dump of a user-selected frame from the summary view.
- Detail view displays decodes of a user-selected frame from the summary view.
- Statistics view displays statistics based on frame count, byte count, frames/sec, bytes/sec, etc., for the entire capture data.
- Capability to export summary to the comma separated values (CSV) format for subsequent import into a database or a spreadsheet.
- Capability to export detailed decode information to an ASCII file

Summary, Detail, and Hex dump Views

The analyzer displays summary, detail, statistics, and hex dump views in different panes. The summary pane displays Frame Number, Time, Length, Error, PPP Layer3 Protocol, LCP Code, IPCP code, BCP code, PPP Message type, and more. User can select a frame in the summary view to decode all fields in the detail view. The hex dump view displays the frame information in HEX and ASCII formats.

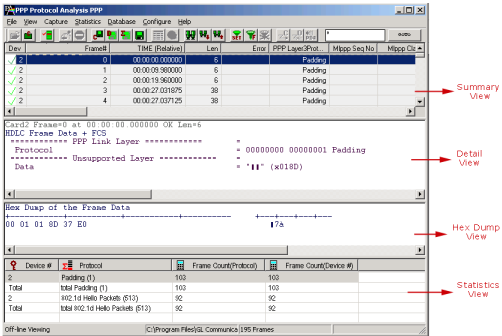


Figure: Summary, Detail, & Hex dump Views

Real-time and Offline Analysis

Multiple ports can be selected in a single instance of the analyzer to capture the frames simultaneously. The recorded trace file can then be analyzed offline and exported to an ASCII file, or printed.

The real-time capturing requires users to specify ports and frame check sequence (FCS) type.

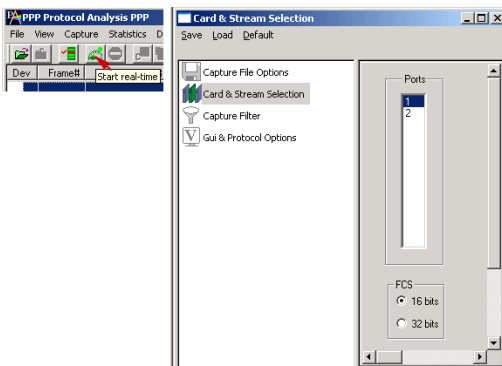


Figure: Stream / Interface Selection

Filtering and Search

There are two types of filters: real-time capture filter and offline filter. The real-time capture filter is used to limit frames captured to a trace file. The offline filter applies to the trace file before it is displayed.

Filtering and search capability adds a powerful dimension to the PPP Analyzer. This feature isolates frames of interest from all frames in real-time, as well as offline. In real-time capturing, filter allows capturing of frames having specified length, offset, mask, and value. The view filter applies to the captured frames and is based on on the data link and decoded protocol field values: Time, Length, Error, Layer3 Protocol, LCP, IPCP, PPP Message type, etc. Similarly, search capability helps user to search for a particular frame based on a specific search criteria.

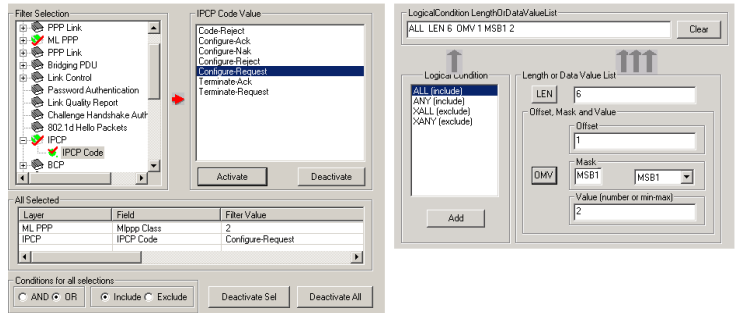


Figure: Real-time and Offline Filter

Statistics View

Statistics is an important feature available in the PPP Analyzer and can be obtained for all frames both in real-time as well as in the offline mode. Numerous statistics based on protocol fields can be obtained to study the performance and trend in a PPP network.

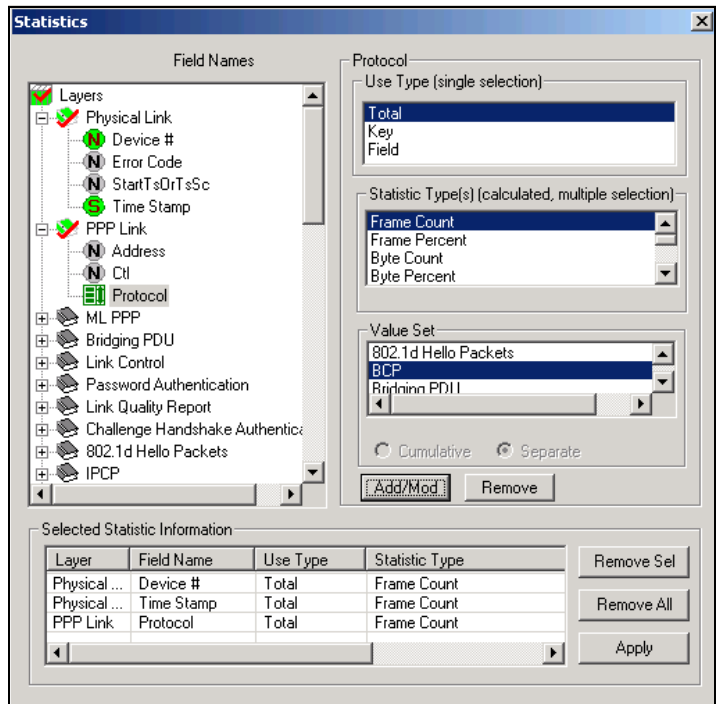


Figure: Statistics Definition Dialog



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

Packet Data Analysis (PDA) – Summary View

Main Features

- Call Quality Of Service (QOS) for all calls with E-Model based (G.107) Mean Opinion Score (MOS) and R-factor with individual and summary statistics presented in graphical and tabular formats.
- Calculates minimum, maximum, and average Round Trip Delay (RTD) values for SIP calls.
- Graphs are provided for key values to give a pictorial representation of the statistics; some of the graphs available are – active calls, average jitter, E-Model MOS/R-Factor/ Packets Discarded, RTP packets summary, ladder diagram for T.38 traffic, and call signaling.
- Displays summary of signaling, audio, and video (for all video calls) parameters of each call in call summary.
- Generates alert summary when particular vital parameters go beyond a specified value.

PDA - Summary View

TA Summary view displays summary of data transmission in each direction including calling number, called number, duration, max/min RTD, average RTD and so on. It includes separate statistical counts on total packets, calls, failed calls for SIP, H323, MEGACO, and RTP based calls. The user can get the statistics of active calls, purged calls, and so on.

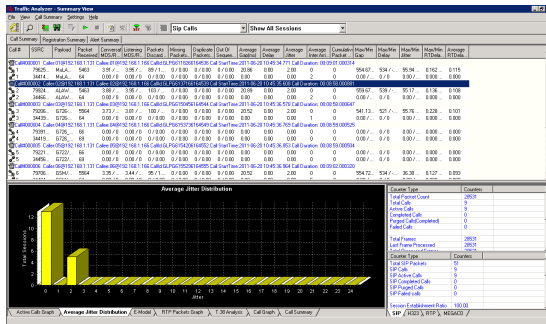


Figure: Traffic Analyzer Summary View

Call Summary – Signaling, Audio, and Video Parameters

The Call Summary displays the signaling, audio, and video parameters of each call for SIP, RTP, MEGACO, and H323 in a tabular format. 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.

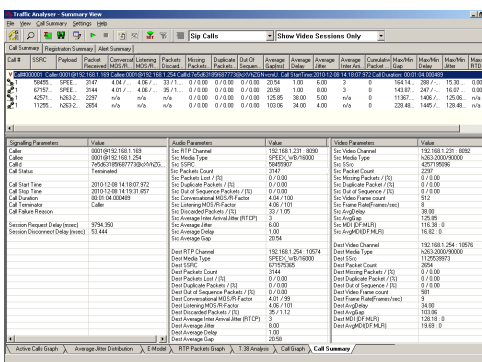


Figure: Signaling, Audio, and Video Parameters

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

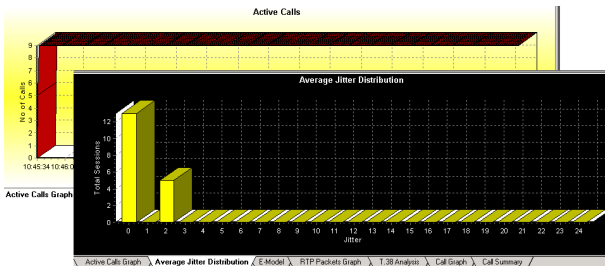


Figure: Active Calls and Average Distribution Graphs

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.

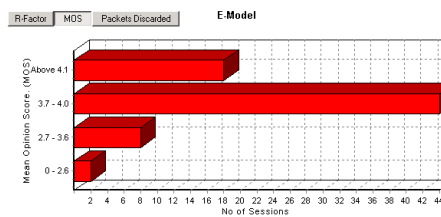


Figure: E-Model Graph

T.38 Analysis - Supports decoding, and monitoring of Fax (T.38 data) over VoIP. Identified T.30 messages is displayed in T.38 ladder diagram.

Call Graph - Displays the message sequence of captured VoIP (SIP or MEGACO) calls.

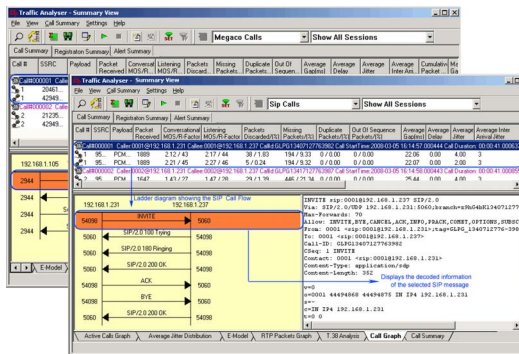


Figure: T.38 analysis and Call Flow Ladder Diagram



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

Packet Data Analysis (PDA) – Detail View

Main 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.
- Codecs: Mulaw, Alaw, G.726 (40/32/24/16 kbps), G.726 with VAD, GSM610, G729, G729B, AMR (Wide & Narrow band), ILBC (20 , 30 msec), SPEEX, EVRC, EVRCB, H263+, & H264

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.

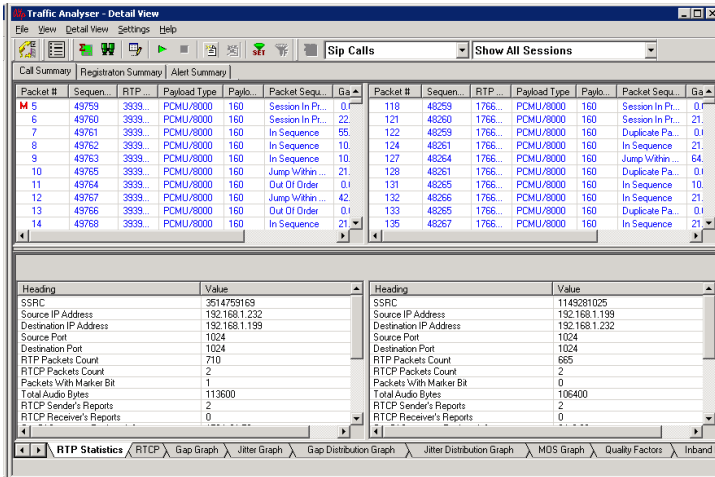


Figure: Traffic Analyzer Detail View

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.

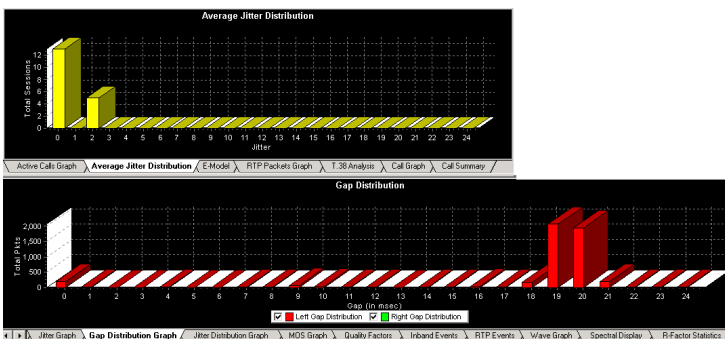


Figure: Gap/Jitter Distribution Graph

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

Quality Factor - Plots and compares Good Quality packets, Packets Discarded, and Echo level against total Packets for each individual session.

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.

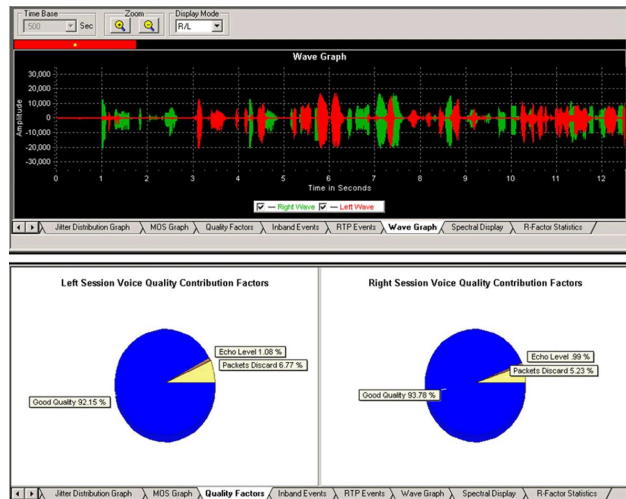


Figure: Wave Graph and Quality Factors

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.

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.

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

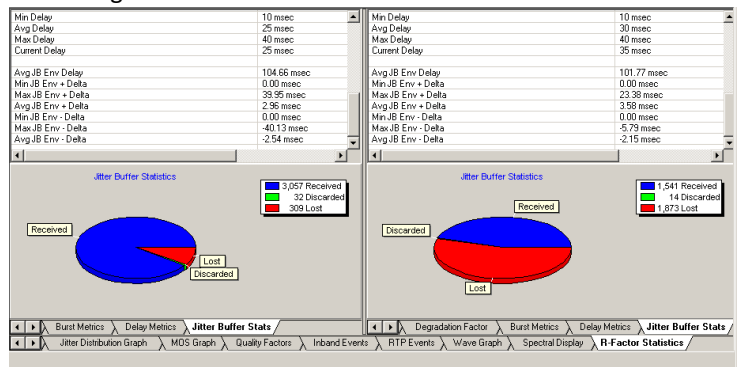


Figure: Jitter Buffer Statistics



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Other Features in PDA

Play Audio, Write to File, & Record Video

The Play Audio plays the selected call to the PC speaker.

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

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

Record Video option is available for both auto detected RTP calls and SIP calls. Supported video codecs are: H263++ (CIF 190/350 kbps, 512 kbps, QCIF 64 /80/128 kbps) and H264 is an industry standard for video compression, the codec offers better compression performance over previous standards.

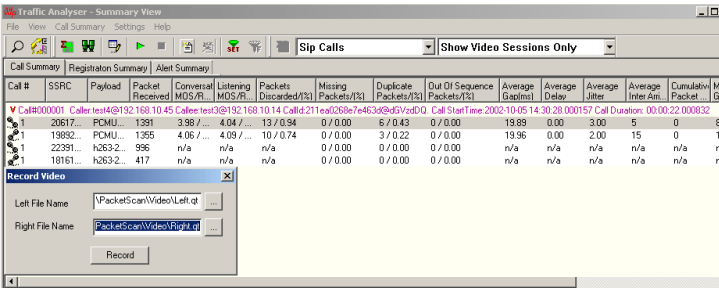


Figure: Record Video

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. Call Summary details could also be saved for a particular call and this will be saved 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.

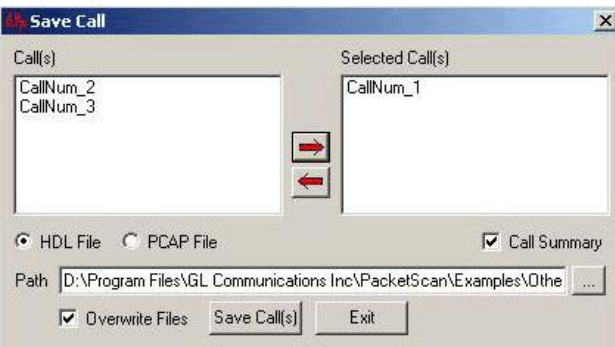


Figure: Save Call

RTP/RTCP Statistics and Inband 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.

Inband Events display inband DTMF and MF digits as they are received with details such as Timestamp, Type, Event, On-Time, Power, Freq1 / Power1, Freq2 / Power2.

Triggers and Action Settings

Triggers and Action Settings allow the user to filter calls based on certain SIP, RTP, MEGACO and H323 parameters followed by a set of actions for the completed calls. The actions include saving call to a file, recording audio to a file, sending an email, posting alert summary, viewing custom calls in summary view, and creating Call Detail Records in CSV file format.

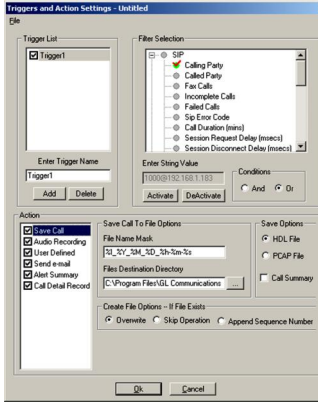


Figure: Triggers and Action Settings

Alert Summary

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.

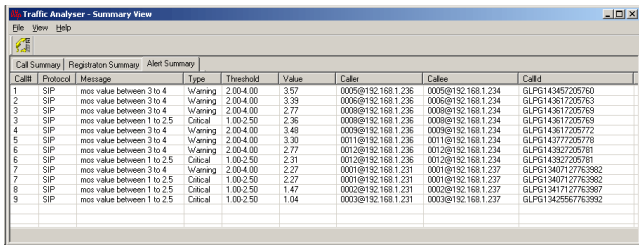


Figure: Alert Summary View

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, and registration request delay (RRD), and Re-registration Attempts.
- Provides graphical view of the active registrations and registration trace of each registration.

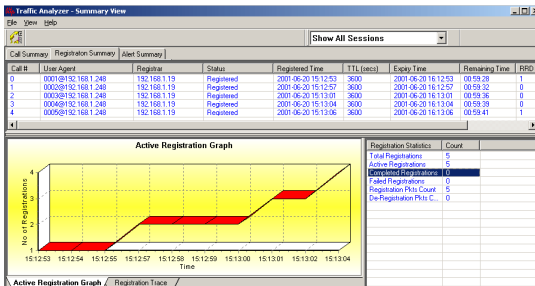


Figure: Registration Summary



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Supported Protocols & Specifications

Available Standards	Supported Protocols	Standard / Specification Used
PPP	PPP	RFC 1331,1220,1333,1548,1661, 1570
PPP SIGTRAN	MultiPPP (PPP Multilink Protocol)	RFC1717, RFC1990
	Multiplexed PPP	RFC 3153
	CRTP	RFC 2508
	Cisco HDLC	http://www.protocols.com/pbook/bridge.htm#CISCOROUTER
	CHAP (Challenge Handshake Authentication Protocol)	RFC1334 http
	IPHC (IP Header Compression)	RFC 2507, RFC 3544
	LCP (Link Control Protocol)	RFC1570, RFC1661
	NCP	RFC 801
	LQR (Link Quality Report)	RFC1333
	PPP (Point-to-Point Protocol) over HDLC	RFC1662
	PPP-BPDU (PPP Bridge Protocol Data Unit)	RFC1638
	BCP (Bridging Control Protocol)	RFC 3518
	IPCP (IP Control Protocol)	RFC1332
	IPCP Extensions for Name Server Addresses	RFC 1877
	PPPMuxCP	RFC 3153
	ISDN H.225	H.225 Q.931 Layer
	SCTP	RFC 2960
	SUA (SCCP UA)	RFC 3868
	SNMP (V1, V2)	RFC 1157,1155,1902,3416,2863, 2578,3418,2011,2012 etc
	SIP3261, MGCP, MEGACO, RTP, and RTCP	RFC 3261, RFC 3435, RFC 3015, RFC 2833, and RFC 3550
	H.263, H.245, and H.450	ITU-T H.263, ITU-T H.245, and ITU-T H.450.1 to H.450.12

PPP Emulation Capabilities

Automated testing can be accomplished using client-server based PPP Emulation and Analysis (PPP Tx/Rx) module. The application permits traffic generation and verification over PPP links through command line scripts. For more details on automated testing of PPP using Client Server click <http://www.gl.com/t3-e3-windows-client-server.html>.

Buyer's Guide

[TT3135 / EE3135](#) – T3 / E3 PPP Analyzer (GUI) Analysis and decode of PPP over T3

Related Software

[XX600](#) – Basic Client/Server Scripted Control Software

[XX634](#) – w/ Client-server HDLC Emulation and Analysis

[XX635](#) – w/PPP Emulation and Analysis

*Specifications and features subject to change without notice

Related Hardware

[TE3001](#) – Portable (USB) Dual T3 E3 / T1 E1 Hardware Unit– requires TT3001 or EE3001

[PTE025](#) – Optional Serial Datacom Analyzer Board for tProbe™

[LTS100](#) – Dual OC-3/ STM-1 OC-12 / STM-4 PCI Express Card

[FTE001](#) – QuadXpress T1 E1 Main Board (Quad Port)

[ETE001](#) – OctalXpress T1 E1 Daughter boards (Octal Port)

[PTE001](#) – tProbe™ Dual T1 E1 Laptop Analyzer (Require Basic Software)

[UTE001](#) – Portable USB based Dual T1 or E1 Laptop Analyzer Unit



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