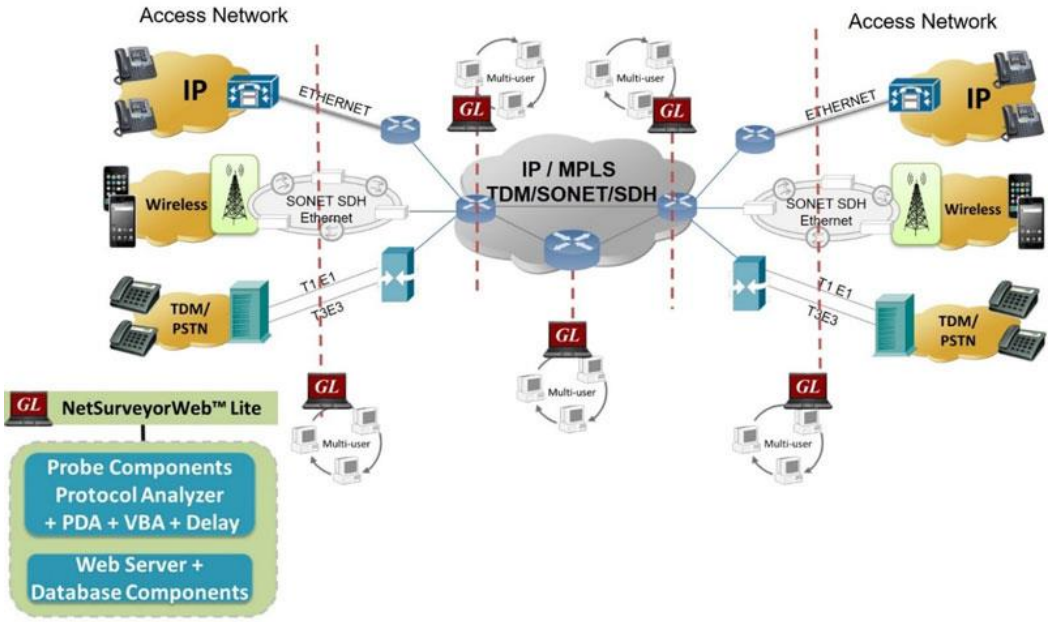
Protocol Analysis w/ Packet Data Analyzer and NetSurveyorWeb™ Lite Application



Overview

GL's **Packet Analyzers** with enhanced **Packet Data Analysis (PDA)** for live monitoring of signaling and traffic over different transmission lines, including T1, E1, T3, E3, and OC-3 STM-1 / OC-12 STM-4. PDA then processes the captured packets, identifies, and segregates calls based on signaling and traffic parameters.

PDA is distributed with GL's ISDN, SS7, CAMEL, MAP, INAP, CAS, UMTS, and GSM protocol analyzers, allowing users to capture, analyze, and report of every call-in detail.

For operators looking for cost-effective and simple plug-and-play solution, GL offers **NetSurveyorWeb™ Lite (PKV169)**, an integrated and simplified web-based system that is distributed at probe level. The **NetSurveyorWeb™ Lite** works with any GL's protocol analyzer probes as an addon tool, enhancing the capabilities of network surveillance for 24/7 availability, real-time and historical storage of CDRs, non-intrusive monitoring, handling larger volume of data at probe level, play voice files, analyze voice/fax traffic, perform critical voice/fax/delay measurements, consolidate different reports, build custom KPIs, filters to quickly drill-down to calls-of-interest, alerting, and reporting. Both the web-server components and database engine run on the probe system, allowing for easy plug-and-play and simplified deployment process to start monitoring the networks.

When used in conjunction with Voice Band Analyzer and Call Data Records, the captured signaling and voice can be used to trouble-shoot customer complaints of voice call quality, voiceband data, fax quality, tones, and dual tone transmission issues.

For more details, visit https://www.gl.com/call-data-recording-and-analysis.html, https://www.gl.com/distributed-probe-level-web-based-network-monitoring-system.html.

- **Non-Intrusive Record Calls over T1 E1, and Analyze**
- **Analysis of ISDN and SS7 Protocol**
- **Real-time and Offline Analysis**
- **Includes Protocol Analysis & Traffic Analysis Views**
- **Filter and Search Features**
- **Analyze Signaling Protocols**
- **Automatic & Manual Termination of Recording**
- **Active Calls, Call Graph, Call Summary**
- **Traffic Optimization / Engineering / Statistics**
- **Customize Decode Options**

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PDA Main Features

Packet Data Analysis	• A host of counters gives the user an instantaneous snapshot of the traffic on the network. • Pictorial representation of the statistics including ladder diagrams for the calls of various protocols. • Ability to export and analyze call detail records of completed calls in CSV file format. • These reports can be further analyzed using GL's NetSurveyorWeb™ Lite.
Triggers and Actions	Filter captures based on protocol parameters followed by a set of actions for the completed calls.
Auto ISDN Trigger & Capture Options	• Capture ISDN calls with CRV, ISDN message type, channel, direction, called and calling numbers. • Supports capturing ISDN calls with or without NFAS options
Auto SS7 Trigger & Capture Options	• Detect and capture SS7 calls by defining DPC, OPC, and CIC groups. • Capture SS7 calls on multiple T1 E1 trunks using a signalling link on a different physical trunk than the telephony circuits.
Export Options	• Exports Summary View information to a comma delimited file for subsequent import into a database or spreadsheet. • Capability to export detailed decode information to an ASCII file
Record/Playback	Recorded trace files can be played back using HDLC playback application.
Call Detail Recording	Call Detail Recording feature includes data link groups that help in defining the direction of the calls in a given network and form logical groups comprised of unidirectional (either 'Forward' or 'Backward') data links.
Remote Monitoring	Remote monitoring capability using GL's Network Surveillance System.
Additional Features	• Status bar displaying information regarding running percent utilization, Number of frames captured, CRC errors and Frame errors etc. • Trace files for analysis can be loaded through simple command-line arguments. • Multiple trace files can be loaded simultaneously with different GUI instances for offline analysis.

NetSureyorWeb™ Lite Main Features

Call Detail Records	• Ability to customize column views with sorting capabilities for call detail records. • Easy navigation of records to display Previous or Next Hour, Day, Month, Year through navigation tool • Ability to export the call detail records displayed based on time filter or record index as PDF and CSV • Ability to play voice files for GSM and TRAU protocols • Decode SMS in different languages for GSM CDRs • Provides options to view CDR, Ladder Diagram, and Protocol Decodes of a selected frame in a single view.
Filter & Search Calls of Interest	• Drill-down to calls of interest with filter and/ or search options • Customize Filters (Date, Time, and other call control parameters. • Apply single or multiple filters for data analysis; use logical operators between filters
Key Performance Indicators (KPI's	• Voice Quality (MOS, R-Factor) • Signal level, Nosie Level, and Echo • Delay Measurements (RTD, OWD) • Signaling Messages and Traffic Types • Call Duration and Call Volume • Call Status (Completed, Busy, Success, Failure)
Physical Layer Monitoring	• Physical Layer Alarms (Link Status, Carries Loss, Sync Loss, …) • Automatically alert users when "Calls of Interest" occur • Set alarm conditions and generate alerts of different types like email alert, visual alert, audible alert, or even log into tables for future analysis. • Provides database query methods to gather status, statistics, events, and results.
Alerts and Indicators	• Automatically alert users when "Calls of Interest" occur • Set alarm conditions and generate alerts of different types like email alert, visual alert, audible alert, or even log into tables for future analysis • Provides database query methods to gather status, statistics, events, and results

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ISDN and SS7 Protocol Analyzer Features

Summary, Detail, and Hex dump Views

The analyzer displays Summary, Detail, and Hex Dump Views in different panes. The ISDN Summary View displays Device Number, Frame Number, Time, Length, C/R, SAPI, TEI,P/F, N(S),N (R), Func, CRV, Called and Calling No and so on. The SS7 Summary View displays Frame Number, Time, Length, BSN, BIB, FSN, FIB, SCCP message type, called / calling number, and so on. 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 formats. The contents of detail and hex dump view can also be copied to clipboard.

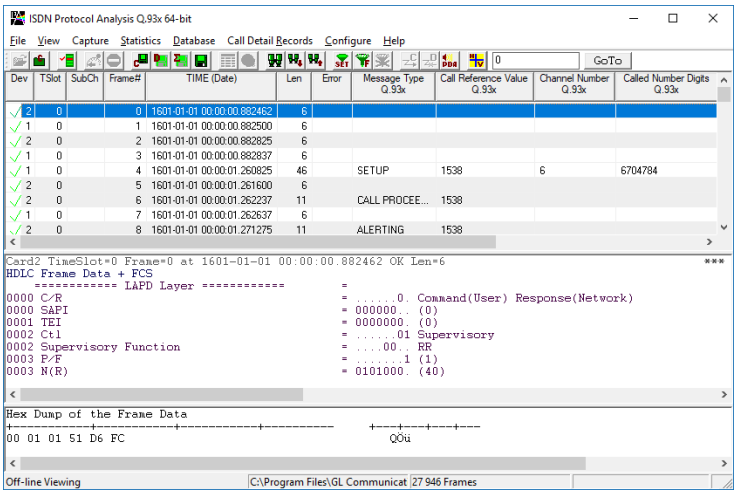

Figure: ISDN Summary, Detail, & Hex dump Views

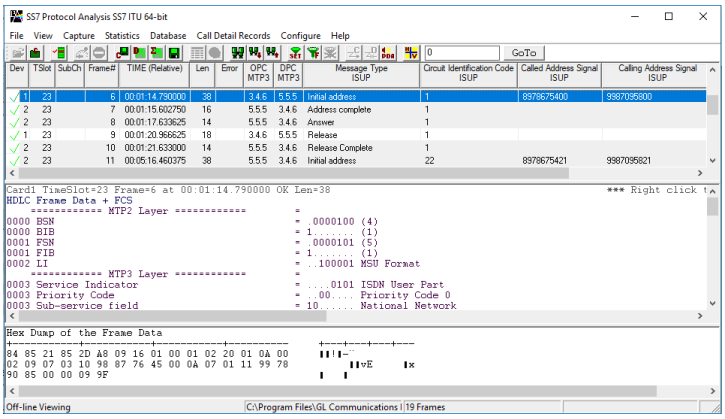

Figure: SS7 Summary, Detail, & Hex dump Views

Real-time and Offline Analysis

Users can capture and analyze ISDN frames using either real-time or remote analyzers, and record all or filtered traffic 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 capturing requires user to specify timeslots, bit inversion, octet bit reversion, user/network side, FCS, and data transmission rate.

Recorded trace file can be played back on T1/E1 using the HDLC file Playback application.

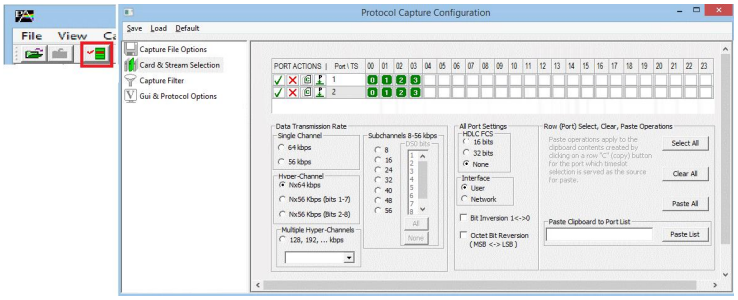

Figure: Stream / Interface Selection

Filtering and Search

Users can record all or filtered traffic into a trace file. Filter and search capabilities adds as another powerful feature to the ISDN analyzer. These features isolate required frames from all the captured frames in real-time/remote/offline.

Users can specify custom values for frame length to filter frames during real-time capture. The frames can also be filtered after completion of capture based on C/R, SAPI, TEI, CTL, different ISDN message types and more.

Similarly, search capability helps user to search for a particular frame based on specific search criteria.

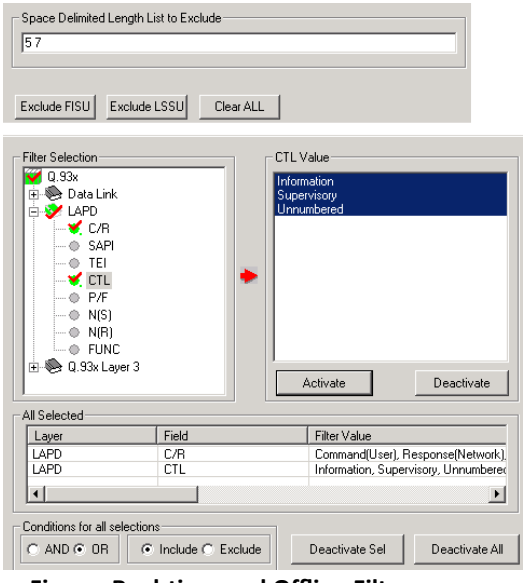

Figure: Real-time and Offline Filter

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Packet Data Analysis (PDA)

Summary View

The Call Summary part contains the description of the TDM calls. This view is the primary gateway through which all the other call related options provided by Packet Data Analyzer could be exercised.

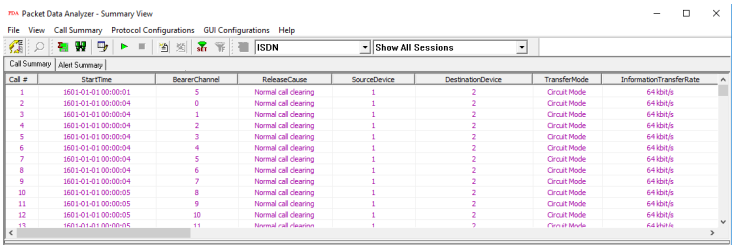

Figure: ISDN Call Summary

ISUP Calls

Display statistical information on number of ISUP calls that are attempted, established, failed including the traffic statistics if each call.

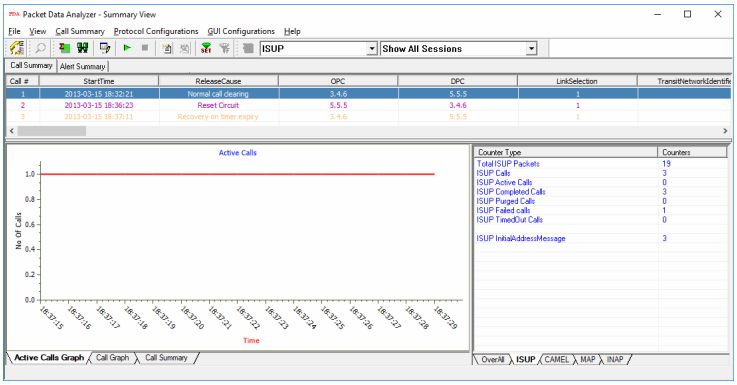

Figure: ISUP Call

ISDN Calls

Display statistical information on number of ISDN calls that are attempted, established, failed including the traffic statistics if each call.

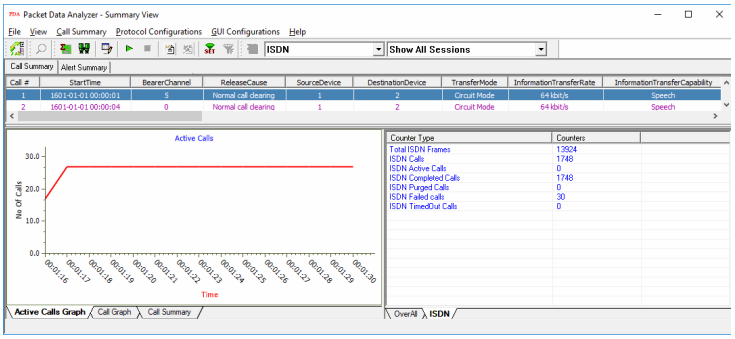

Figure: ISDN Call

Graphs in PDA – Summary View

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

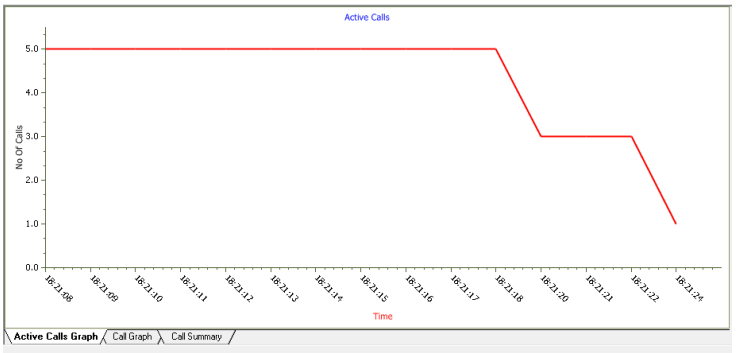

Figure: Active Calls Graphs

ISDN Call Graph – The Call Graph displays the message sequence of captured ISDN call, with decode of the selected message displayed to the right of message sequence.

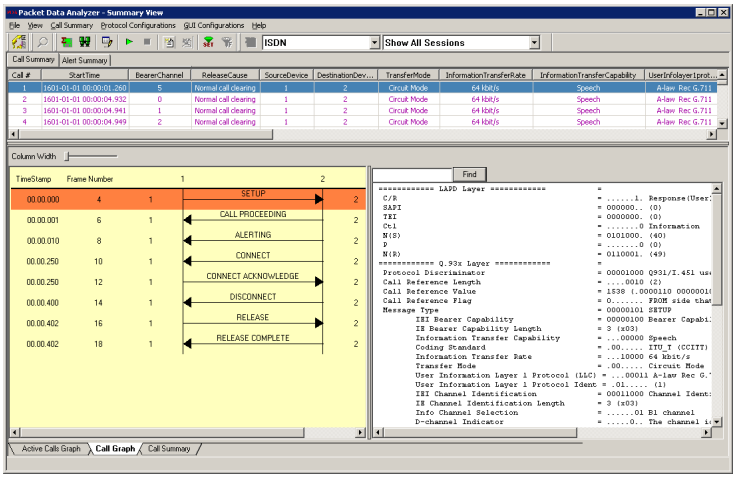

Figure: ISDN Call Graph

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Packet Data Analysis (PDA)

ISUP Call Graph – The Call Graph displays the message sequence of captured ISUP call, with decode of the selected message displayed to the right of message sequence.

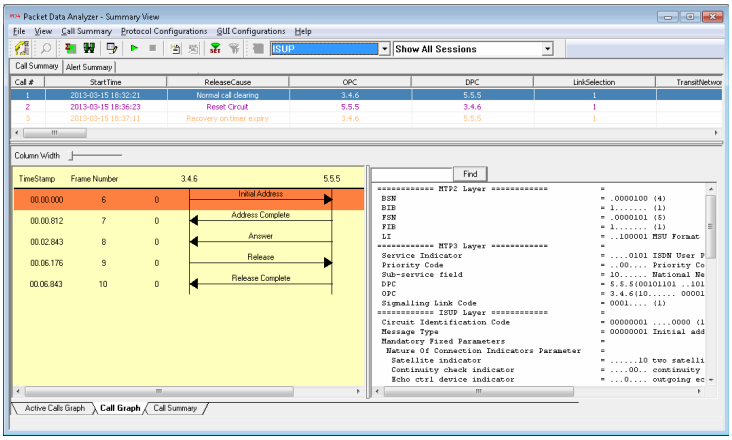

Figure: ISUP Call Graph

Signalling Parameters – The Call Summary tab displays the signaling parameters of each call for ISUP, ISDN, CAMEL, INAP, MAP, and CAS in a tabular format.

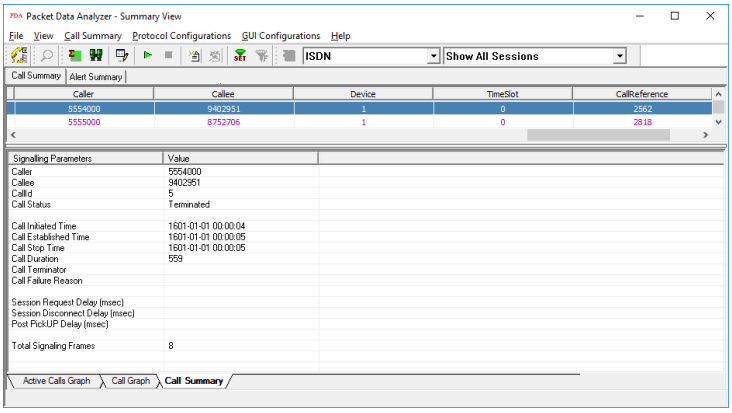

Figure: Signalling Parameters

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.

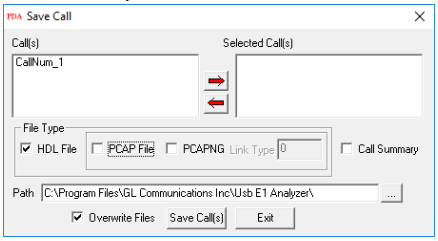

Figure: Save Call

Export CSV

This option is used to export Traffic Call Detail Records (CDRs from PDA) and Frame Summary for the selected protocols in the specified path. Two sub folders "CDR" and "Frame Summary" will be created under specified directory. Traffic CDR files and Frame summary files are created under these specific sub directories.

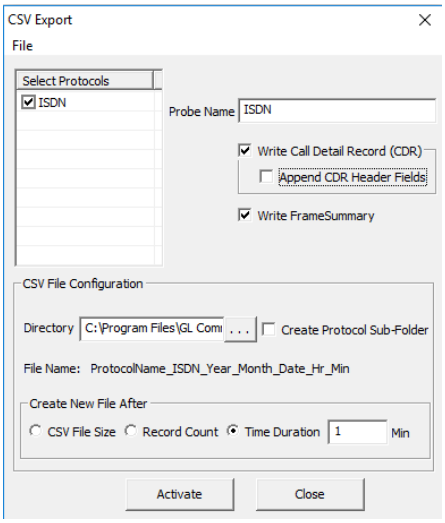

Figure: Export to CSV

Triggers and Action Settings

Triggers and Action Settings allow the user to filter calls based on certain SS7 and ISDN parameters followed by a set of actions for the completed calls.

Action column lists one or more actions to be performed on the filtered 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, creating Call Detail Records in CSV file format, and extracting Fax from calls in TIFF format.

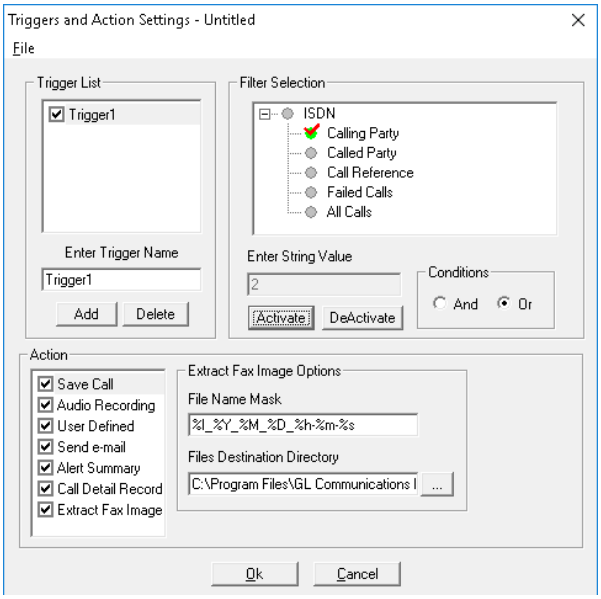

Figure: Triggers and Actions Settings

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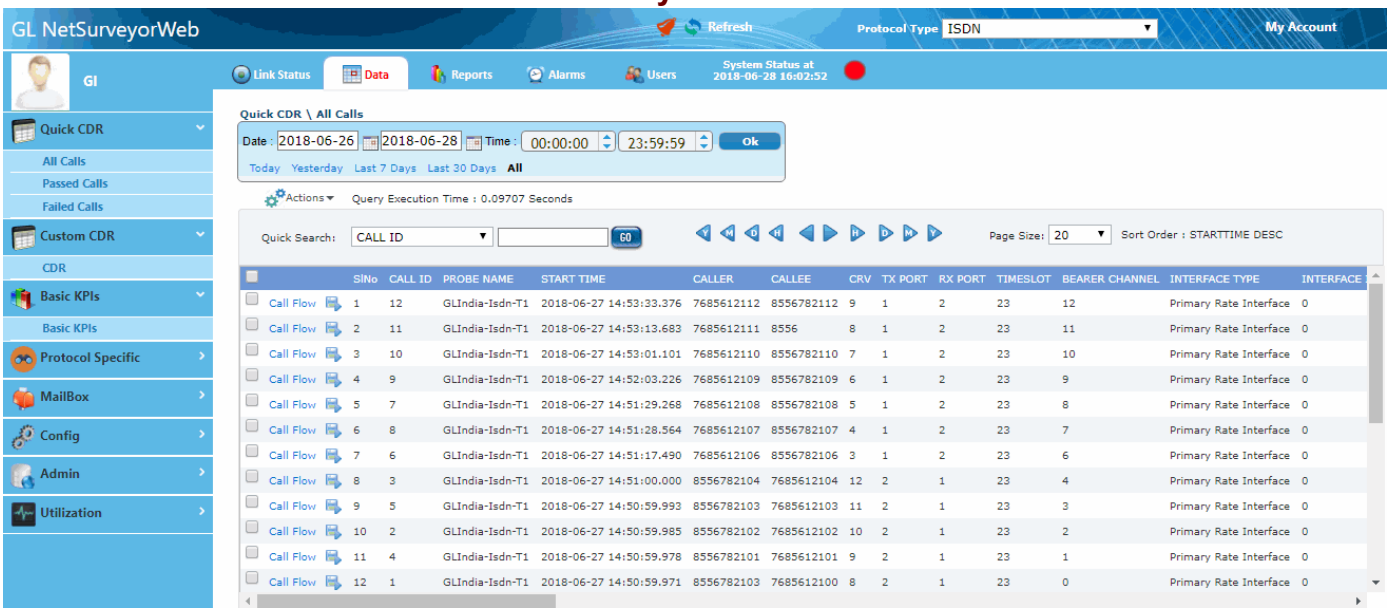
NetSurveyorWeb™ Lite



Call Data Records (CDR) View

The real-time data view provides visibility into each individual call. Each call can be investigated based on call control, signaling and traffic parameters. Flexible filtering can help you organize and identify “Calls of Interest”. The CDR view includes -

Frame Summary

Frame summary view provides summary of signaling data along with the decodes in the form of Hexdump.

Traffic Summary

This option is currently available only for IP calls. Each call can be expanded to reveal per stream RTP statistics. The RTP/audio parameters such as payload type, total packet count, missing / duplicate / reordered / discarded packet count or %, MOS/R-Factor, cumulative packet loss, delay, and jitter values are displayed.

Graph View for each call

This call flow graph allows easy verification of the messages exchanged and the status of the call.

Users can also select any messages and observe the corresponding decode message details in the decode view.

Merge View

This feature display Ladder diagram and Decodes of the selected message in a single view. Hide/Show any of these views in order to easily view the information properly.

Navigation and Search Tools

Navigate through records easily using Previous and Next Hour, Day, Month, and Year options as required. A particular call of interest can be searched using the **Quick Search** option.

Quick View CDR

Quick CDR View is a combination of Custom Filters and Column View, user can create their own Quick View groups and add the required columns in the created group to be displayed on the Data View. Default Quick CDR View is provided for all the protocols such as All Calls, Failed Calls, Passed Calls, VoLTE Enabled Calls, CS Fallback, Poor LMOS, Good LMOS, Longer Duration Calls, and more.

Multi-protocol call flow

This feature is useful in testing inter-operability of different types of networks, say for example SIP-to-SS7. The Multi-protocol Call Flow provides the flow of messages exchanged between different nodes in the form of a ladder diagram along with the ability to display respective signalling decodes, thus providing visibility into complete end-to-end call flow.

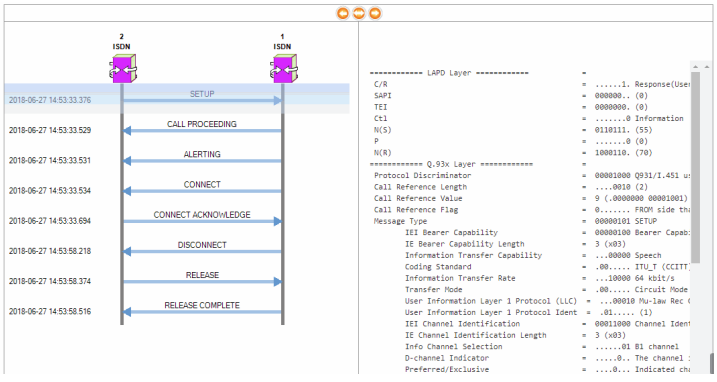


Figure: Ladder Diagram and Protocol Decodes

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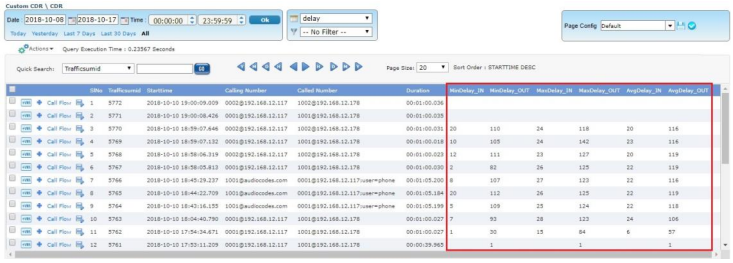
Delay Measurement (OWD)

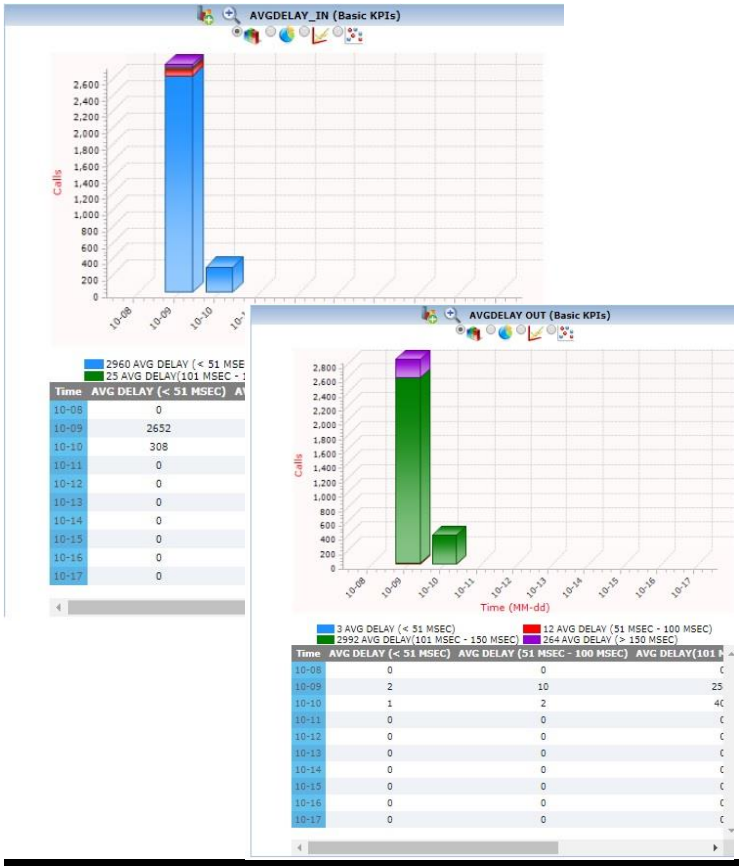
NetSurveyorWeb™ Lite also works with **Delay Measurement** tools to analyse captured voice traffic and provide precise one-way delay metrics. For a given call which traverse through Gateway, traffic is sampled at both TDM and IP analyzer at the same point of time running in the same server. These captured segments of SIP and ISDN calls will be saved in *.pcm formats. These samples will be given to delay measurement module which compares the samples based on the timestamp and provides the delay metrics.



Delay KPI

Average Delay In and Out

The below KPI shows average delay for In and Out direction. It is categorized as <51 sec, between 51-100 Msec, between 101-150 Msec, and greater than 150 Msec.



Buyers Guide

XX100 – ISDN Analysis Software (T1 or E1)

XX120 – SS7 Analyzer Software (T1 or E1)

Related Software

PKV169 – Network Surveillance Lite Software (Does not include PC; Includes Oracle 11g Express Edition and requires respective real-time protocol analyzer licenses on the Probe PC)

Requires one of the following protocol analyzer licenses.

PKV100 – PacketScan™ (Real-time and Offline) for SIP, MGCP, Megaco, H.323.

PKV103 – IP Based GSM & UMTS Analysis, requires PKV100

PKV105 – SIGTRAN Analysis, requires PKV100

PKV107 – LTE (Long Term Evolution) Analyzer, requires PKV100

XX150 – GSM Analysis Software (T1 or E1)

Related Hardware

PTE001 – tProbe™ Dual T1 E1 Laptop Analyzer

XTE001 – Dual T1 E1 Express (PCIe) Boards

TTE001 – tScan16™ T1 E1 Boards

FTE001 – QuadXpress T1E1 Main Board

ETE001 – OctalXpress T1E1 Main Board plus Daughter Board

UTE001 – Portable USB based Dual T1 E1 Laptop Analyzer

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