

Call Trace & Recording



Fraud Detection / Location



Remote Analysis and Trouble-shooting



Real-time Monitoring



Traffic Optimization / Engineering / Statistics



Revenue Billing Verification



Alarm Monitoring



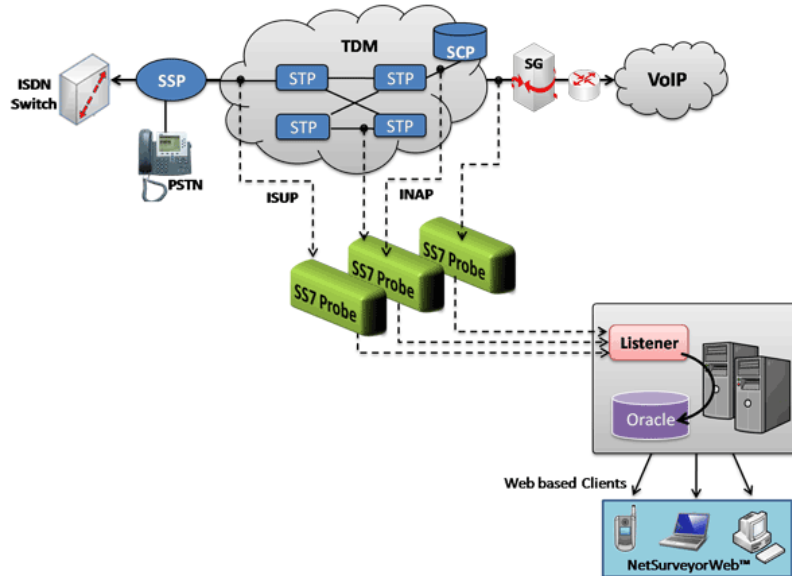
Quality of Service Measurements



CAS, ISDN, SS7, GSM, GPRS, and more...



NetSurveyorWeb™ (Real-time Network Monitoring System)



The SS7 network is the backbone for fast and efficient signaling, irrespective of network type - whether wireless, wired, or VoIP. Also, the inherent database features of SS7 make today's advanced intelligent features and services a reality.

To keep pace with this evolution, GL has enhanced its SS7 and ISDN monitoring and diagnostic system. Not only can it be used for billing verification, remote protocol analysis, and traffic engineering, but now it can also provide key performance indicators, failure analysis, and call trace capability, to name a few.

A network operator, service provider, or equipment manufacturer must have the means to perform the surveillance tasks cost effectively, remotely, automatically, and non-intrusively. Fortunately, the network backbone contains a wealth of information that can be monitored and collected to support these activities.

With the use of web server, the remote / local monitoring can be accessed using simple web based interface such as GL's **NetSurveyorWeb™**, customer applications such as a billing system or by a reporting tool such as Crystal Reports.

Main Features:

- T1/E1 Probes non-intrusively monitor physical lines of the network
- Probes connect via TCP/IP to ODBC compliant real-time database loader
- Only precise and filtered data (user selectable) is collected into the centralized database
- Users can log into the central system locally/remotely to view the collected data
- Users view the collected data for different purposes like Troubleshooting, Call Detailed Records, Traffic Monitoring, Quality of Service, etc
- Modular and distributed architecture

Typical Applications:

- Call Detail Records, fraud detection and location, remote protocol analysis and troubleshooting, real-time signaling monitor, traffic optimization engineering, and statistics.
- Determine actual call signaling routes to verify network functionality under all situations including congestion and loss of SS7 nodes.
- Revenue and billing verification, alarm monitoring, intrusive testing.
- Quality of service measurements, call trace and recording.

Protocols:

- CAS, SS7 (Variants), ISDN (Variants), GR303, V5.X, INAP CS1 & CS2, INAP+, IS41-C, GSM A and A-bis Interface, GPRS Gb, ETSI MAP

For more details, please visit our web page <http://www.gl.com/netsurveyor.html>.

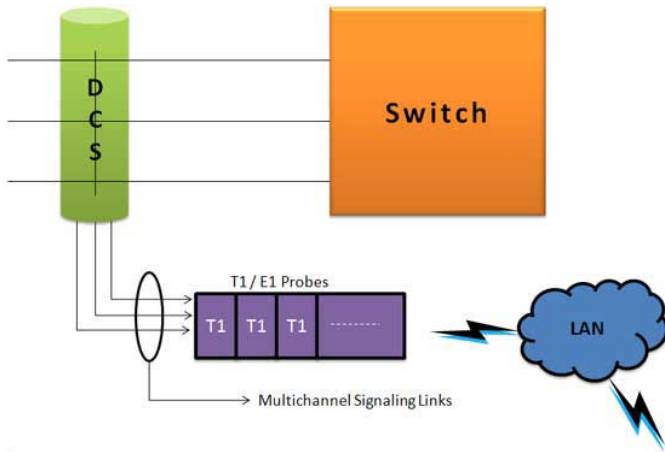


GL Communications Inc.

818 West Diamond Avenue - Third Floor. Gaithersburg, MD 20878 • (V) 301-670-4784 (F) 301-670-9187
Web Page Address: <http://www.gl.com/> • E-Mail Address: gl-info@gl.com

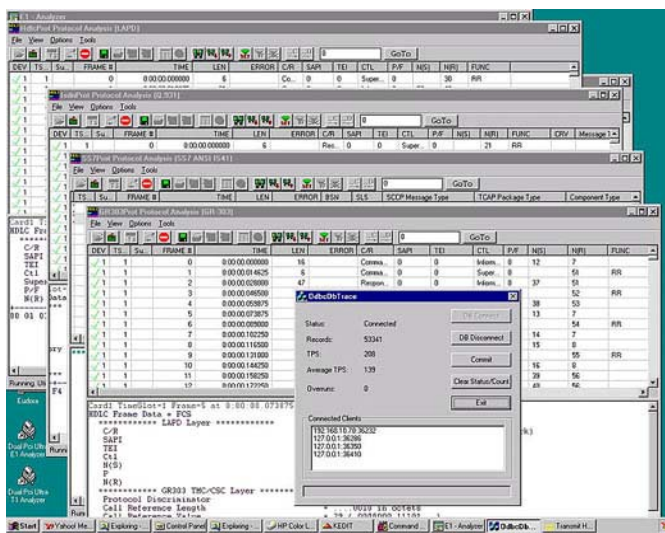
T1/E1 Probe Interface Characteristics

- Single or Dual T1/E1 Cards with Multiple Cards per PC – up to 6 Dual PCI T1/E1 Cards per PC
- Multiple Link Sets Per T1/E1 (through Digital Cross Connect Grooming) – multiple 64 kbps signaling channels per T1/E1 can be monitored simultaneously by grooming through a digital cross-connect – see diagram below
- T1/E1 Cards can also be connected non-intrusively in Monitor or Bridge Modes, or alternatively the data can be looped through the cards
- 50 to 100 SS7 signaling links per 4U rack PC probe
- SS7 Redundancy supported



Typical Client Configurations

- Shown below is a typical client configured for protocol analysis monitoring of ISDN, SS7, and Lap D from four different T1/E1 Probes in the network. Data is shown being captured in real-time and displayed at a central site.
- The probes are accessible through IP addresses and programmable for capturing only the data required for database storage.
- At the Client location database records can be accessed, processed, and displayed in a variety of ways.



Typical System Configuration - SS7 Billing / Monitoring System

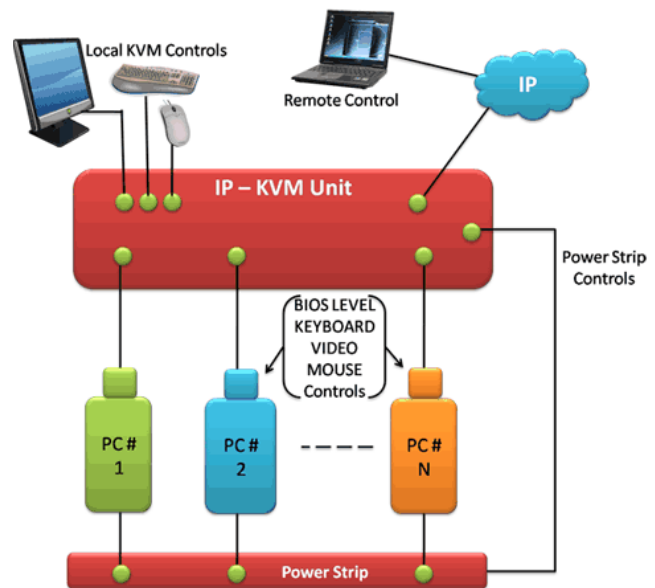
The SS7 Billing / Monitoring System is mainly made of Off-the-Self personal computer, Microsoft's Windows 2000 Professional Operating System, GL's USB based Dual T1/E1 Laptop unit or HD T1/E1 PCI Cards, and GL's Analyzer application. Following is a typical system configuration for higher reliability:

- High Availability Personal Computer (for Probe)
- Microsoft Windows® 2000 Professional OS or Higher (for Probe).
- GL's Dual Ultra T1 (or E1) Cards
- GL's Analyzer Software suite and associated license
- Data Collector Utility software (At Probe)
- Accessibility to probes - KVM over IP is recommended instead of Microsoft Net-Meeting software to access remote probes
- Centralized Computing Platform
- UPS is recommended for all Probes, KVM Switch and Central System
- Standby Probe for disaster recovery
- Probe Maintenance downtime consideration

Typical System Configuration

KVM over IP is recommended instead of Microsoft Net-Meeting software to access remote probes. NetMeeting software operation could have effect on performance of the probe. Since KVM over IP is an external device and should have no effect on performance and availability of the probe.

Accessibility to probes can be greatly improved from any distance, at any time, regardless of the probe's state. This network element can also provide real-time access to Probe for diagnostic and near real-time call details. Static IP address is usually provided to the KVM Switch.



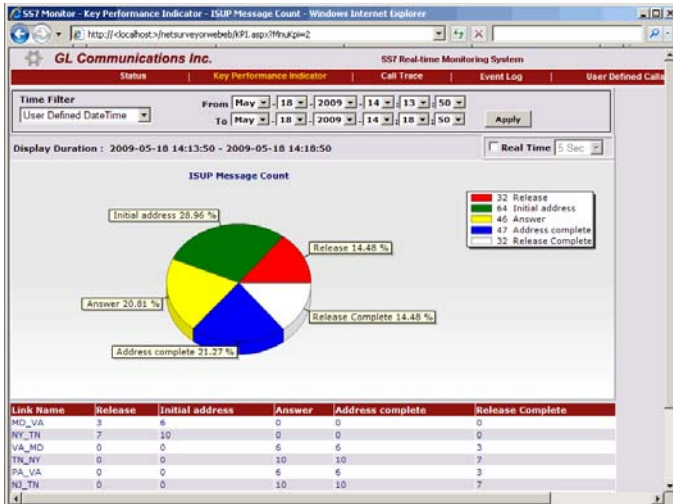
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NetSurveyorWeb™

A user-friendly web-based client, which accesses the results provided by the SS7 and ISDN signaling probes through a web server. As depicted in the screenshot below, one can view real-time and historic data including call ID, probe name/location, call disposition, called and called number, call duration and so on. Also available is the ability to filter the call records using a variety of filtering mechanisms including time/date, called/calling numbers, SS7 OPC/DPC codes, and easy-navigation through records through a simple web browser. Visit <http://www.gl.com/netsurveyordemo.html> for more details.



Components of GL's NetSurveyorWeb™

GL's Network Monitoring System uses a three tier distributed architecture –

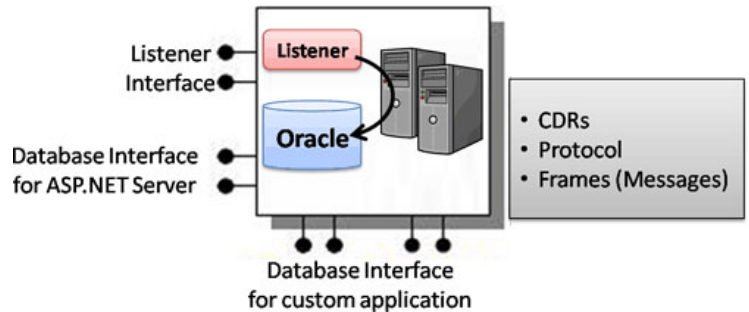
- First layer - T1/E1 probes to monitor various protocols and send records to database.
- Data layer - is the Database Store Layer where data records are stored into a centralized database (Oracle, SQL-Server, DB2, etc.) using ODBC.
- Data Access layer - is the Data Access Layer where various client applications can interrogate database records and provide a user friendly interface for query and display.



Data Layer

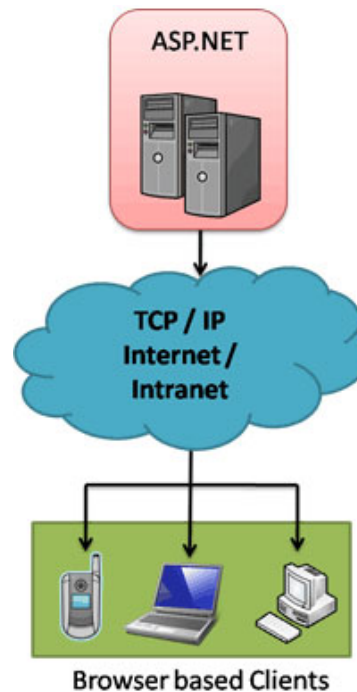
An SQL DBMS is used to store the CDRs and Signaling Summary data. This provides a very flexible and expandable architecture for data storage and data access

A listener application is co-hosted with the database server running on the Data Layer. It collects the data posted by the probes and then updates the database using the collected data.



Data Access Layer

The database could be accessed in real-time over the web using applications such as GL's NetSurveyorWeb™, or queried by customer applications such as a billing system or accessed by a reporting tool such as Crystal Reports, for aggregation and analysis of historic data.



Using the NetSurveyorWeb™

LINK STATUS

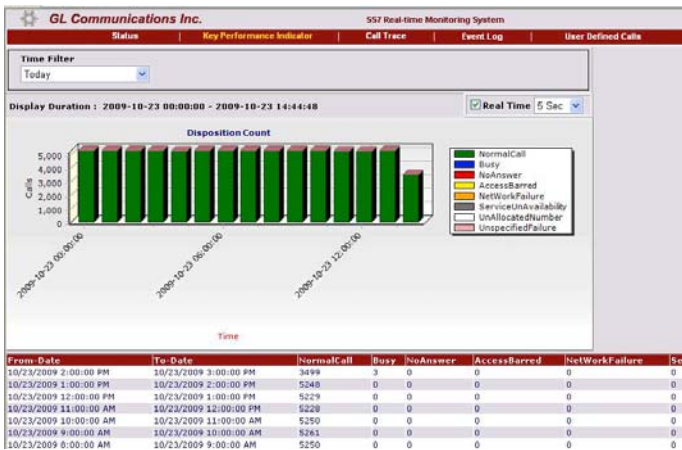
Displays physical and data link status Sync Loss, Carrier Loss and MTP layer status for all the available probes across the network

Probe Name	Link Locations	Sync Loss	Carrier Loss	MTP Layer Status
R4P1	MD8 - MD1	R4P1:2	X	X
	MD3 - MD1	R4P1:4	X	X
	VA - MD8	R4P1:6	X	X
	IL - MD2	R4P1:8	X	X
	VA - MD3	R4P1:10	X	X
	IL - MD8	R4P1:12	X	X
	MD1 - MD9	R4P1:1	X	X
	MD1 - MD3	R4P1:3	X	X
	MD8 - VA	R4P1:5	X	X
	MD3 - IL	R4P1:7	X	X
R4P2	AZ - VA	R4P2:2	X	X
	MO - VA	R4P2:4	X	X
	AZ - UT	R4P2:6	X	X
	MO - HV	R4P2:8	X	X
	UT - CA	R4P2:12	X	X

KEY PERFORMANCE INDICATOR

Performance Indicator provides –

- Call Completion Ratio – displays Total Successful Calls, Failure Calls and also Percentage of Successful Calls as applied in Time filter
- ISUP Message Count – displays the pie graph for the individual messages count related to any particular Probes and cards with in selected time filter.
- Disposition Count – graphically depicts count of the individual messages related to particular Probes for the specified time filter



Buyers Guide

XX170 - Network Surveillance Software with Centralized Database Engine and Client

Related Software

XX100 - T1/E1 Real-time ISDN Protocol Analyzer

XX120 - T1/E1 Real-time SS7 Protocol Analyzer

Related Hardware

UTE001 - Portable USB based Dual T1 or E1 Laptop Analyzer

HTE001 - Universal HD T1/E1 Card

CALL TRACE

Currently the Call Trace menu supports following data views - Real-time Data View, Record Navigation View, and Filtered Data View.

- REAL TIME DATA - displays the Call Records or Signaling data for SS7 or ISDN calls in real-time. Users can readily use available time filters or customize the view.
- RECORD NAVIGATION - customizes the real-time data view according to the applied Starting Record Index. Users also have an option of viewing records for different networks.
- FILTERED DATA - displays call details related to calling numbers and called numbers as specified in the user defined call menu along with applied time filter.

CALL ID	LINK NAME	LINK LOCATIONS	SYNC LOSS	CARRIER LOSS	MTP LAYER STATUS	DURATION	OPC
4833280	IL - MO, AZ - UT	MO - VA	X	X	X	00:00:42.09600	1.102
4833279	IL - MO, AZ - UT	MO - VA	X	X	X	00:00:42.06612	1.102
4833278	IL - MO, AZ - UT	MO - VA	X	X	X	00:00:50.89771	1.102
4833277	IL - MO, AZ - UT	MO - VA	X	X	X	00:00:50.86721	1.102
4833276	IL - MO, AZ - UT	MO - VA	X	X	X	00:00:35.88721	1.102
4833275	IL - MO, AZ - UT	MO - VA	X	X	X	00:00:35.85881	1.102
4833274	IL - MO, AZ - UT	MO - VA	X	X	X	00:00:42.12731	1.101
4833273	IL - MO, AZ - UT	MO - VA	X	X	X	00:00:42.08251	1.101
4833272	IL - MO, AZ - UT	MO - VA	X	X	X	00:00:52.1031	1.101

EVENT LOG

Displays all events corresponding to Layer 1 (Physical Layer), and Layer 3 (Data Link Layer), and User-defined calls that selects subset of the records based on the day-time filter. If filter is not present, event log displays all the calls in specified time filter.

TIMESTAMP	EVENT TYPE	EVENT DESCRIPTION
23-OCT-09 12:59:34.687125000 AM	Layer3	: 1.101.1<->-4.101.2 STATUS: DOWN
23-OCT-09 12:59:34.686750000 AM	Layer3	: 1.101.1<->-4.101.2 STATUS: UP
23-OCT-09 12:59:25.981625000 PM	Layer3	: 1.101.1<->-4.101.2 STATUS: DOWN
23-OCT-09 12:59:25.981125000 PM	Layer3	: 1.101.1<->-4.101.2 STATUS: UP
23-OCT-09 12:58:49.362750000 AM	Layer3	: 1.101.1<->-4.101.1 STATUS: UP
23-OCT-09 12:58:49.362750000 AM	Layer3	: 1.101.1<->-4.101.1 STATUS: DOWN
23-OCT-09 12:58:40.668125000 PM	Layer3	: 1.101.1<->-4.101.1 STATUS: DOWN
23-OCT-09 12:58:40.667625000 PM	Layer3	: 1.101.1<->-4.101.1 STATUS: UP
23-OCT-09 12:58:04.062125000 AM	Layer3	: 1.101.1<->-4.101.2 STATUS: DOWN

USER DEFINED CALLS

Filters the CDRs based on called number, calling number, OPC, and DPC criteria. By default, all calling and called numbers present in the database are loaded in the grid.

CALLING NUMBER	CALLED NUMBER	OPC	DPC
9818002597	9818002587	2342	3232
25748	56896	54	54

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