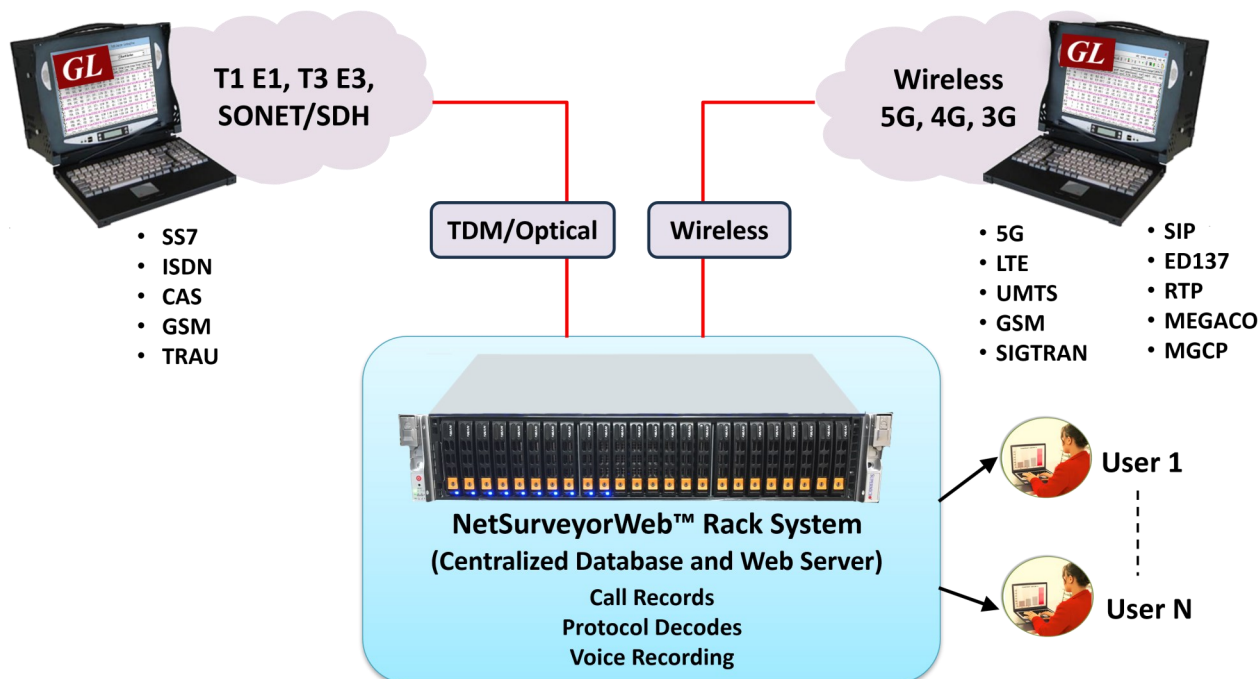


NetSurveyorWeb™

(Centralized network surveillance system for TDM / Wireless/ IP Networks)



Overview

Engineers and cyber security professionals must monitor the flow of voice and data traffic traversing a diverse range of networks including wireless, IP and TDM. GL offers a centralized web-based program (NetSurveyorWeb™) for capturing and analyzing traffic from multiple geographic regions. NetSurveyorWeb™ works in tandem with GL's PacketScan™ HD. [PacketScan™ HD](#) can be deployed in the field, capture high speed traffic and send all data to the centralized NetSurveyorWeb™. NetSurveyorWeb™ includes a web-based dashboard and a back-end database for long term storage.

NetSurveyorWeb™ supports service providers to perform all of the above functions. NetSurveyorWeb™ conducts real-time analysis, storage, retrieval, querying and display of Call Detail Records (CDR) by non-intrusively connecting to Analog, TDM, Optical, Wireless or IP networks. Supported protocols include [LTE](#), [IMS](#), [UMTS luCS](#), [UMTS luPS](#), VoIP (SIP, SIGTRAN, H.323, MAP, CAP, MGCP, MEGACO, ED -137), [SS7](#), [ISDN](#), [CAS](#), [TRAU](#), [GSM](#), and Analog Systems.

NetSurveyorWeb™ relies on protocol analysis probes placed at different physical sites. These probes capture, decode and organize traffic into calls and send CDR, signaling frame details, and other statistics to NetSurveyorWeb™. The probes capture data locally on high-speed networks and come equipped with protocol analysis software for convenient field analysis. The probes can be customized to capture on legacy interfaces (T1, E1, Analog) or Ethernet and SONET / SDH networks.

The central system comprises of a database engine, web server, and NetSurveyorWeb™ (PKV170), a web-based application, to facilitate data storage and retrieval through web browser clients. The NetSurveyorWeb™ client application remotely or locally facilitates to view database using a simple web browser application. It includes database to store real-time and/or historic data.

For more information, please visit [NetSurveyorWeb™](#) webpage.

Applications

- Comprehensive analysis from overall network health to detailed protocol monitoring
- Call Detail Records, fraud detection and location, remote protocol analysis and troubleshooting, real-time signaling monitor, traffic optimization engineering, and statistics

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Applications (Contd.)

- 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

Main Features

Web Based UI

- Access real-time and historic data remotely via browser based clients
- Interfaces with Oracle database
- Web administration features to monitor the connected probe status, database loader status, alarms, and perform database maintenance
- Multi-user support

Call Detail Records

- Customize column views with sorting capabilities for call detail records
- Provides End-to-End Call Flow analysis
- Easy navigation of records to display Previous or Next Hour, Day, Month, Year through navigation tool
- Export call detail records based on time filter or index as PDF and CSV files
- Send call flows or reports to specified email addresses
- Save and play back voice calls
- Download the selected Call Trace in *.hdl and *.pcap formats
- 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 and 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)
- Voice Quality Analysis
- Signal level, Noise Level, and Echo
- Delay Measurements
- Signaling Messages and Traffic Types
- Call Duration and Call Volume
- Call Status (Completed, Busy, Success, Failure)
- Export graphical and tabular reports as PDF and HTML file formats with an option to send emails as well

Physical Layer Monitoring

- Physical Layer Alarms (Link Status, Carrier Loss, Sync Loss, and so on)
- Automatically alert users when "Calls of Interest" occur
- Set alarm conditions and generate alerts of different types such as 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

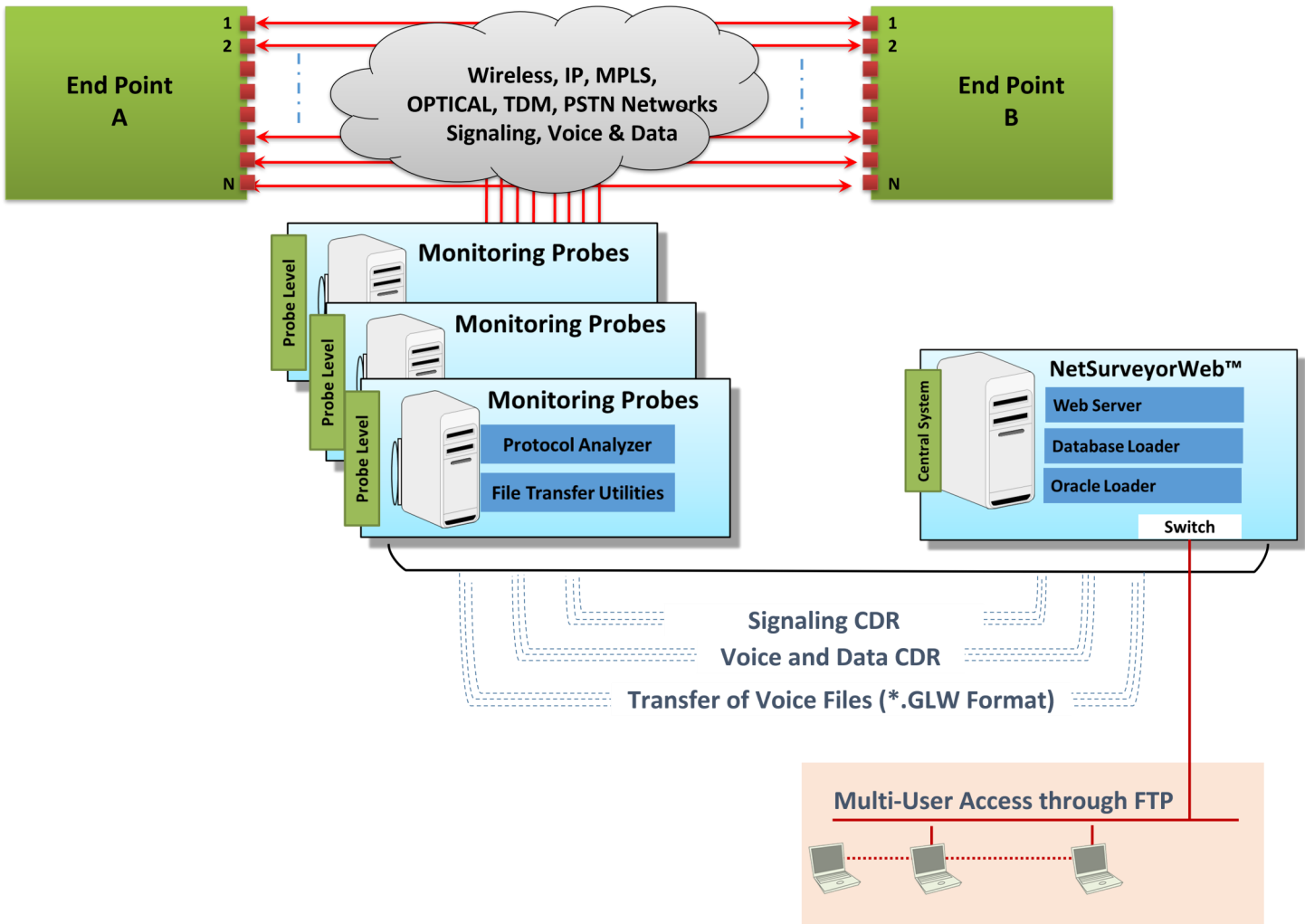
Alerts and Indicators

- 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

System Architecture

GL's NetSurveyorWeb™ has a three tier architecture. The first layer consists of GL's **Protocol Analyzer Probes** which are capable of tapping into live call traffic and non-intrusively capture signaling message summary and build CDRs. The second layer is the **Data Layer** where the captured data is stored into a database. This layer consists of a listener, and a SQL DBMS (such as Oracle) components. Listener will listen to the connected probes, receives data, and feeds the data to DB. The last layer is the **Data Access Layer** controlled by Web Server and Client application where the data presentation logic is contained.

Users can log into the central system locally or remotely to view the collected real-time and historic data including call parameters, layer 1 **status** display, as well as layer 2 and 3 analysis. Also available is the ability to filter the call records using a variety of filtering mechanisms including time/date, signaling and traffic parameters.



System Architecture

Call Data Records (CDR) View

GL NetSurveyorWeb

Refresh Protocol: VOIP (SIP & H323) Type: CDR

Quick CDR \ All Calls

Date: 2020-07-24 2020-07-24 Time: 00:00:00 23:59:59 Ok

Today Yesterday Last 7 Days Last 30 Days All

End to End Callflow Actions Query Execution Time : 0.04687 Seconds

Quick Search: TrafficSumID

	SNo	Calling Number	Called Number	StartTime	Duration	Call Success	Voice Quality-L	Voice Quality-R	Failure Cause	C_MOS-L	C_MO
<input type="checkbox"/>	1	0140@10.10.1.6	0140@10.10.1.5	2020-07-24 03:31:02.035	00:01:16.664	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	2	0082@10.10.1.6	0082@10.10.1.5	2020-07-24 03:30:44.354	00:01:19.524	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	3	0053@10.10.1.6	0053@10.10.1.5	2020-07-24 03:30:32.373	00:01:07.643	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	4	0052@10.10.1.6	0052@10.10.1.5	2020-07-24 03:30:31.873	00:01:28.525	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	5	0039@10.10.1.6	0039@10.10.1.5	2020-07-24 03:30:25.663	00:01:44.456	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	6	0024@10.10.1.6	0024@10.10.1.5	2020-07-24 03:30:20.962	00:01:25.764	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	7	0012@10.10.1.6	0012@10.10.1.5	2020-07-24 03:30:17.302	00:01:06.833	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	8	0004@10.10.1.6	0004@10.10.1.5	2020-07-24 03:30:15.782	00:01:51.826	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	9	0003@10.10.1.6	0003@10.10.1.5	2020-07-24 03:30:15.732	00:01:10.284	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	10	0180@10.10.1.6	0180@10.10.1.5	2020-07-24 03:30:10.562	00:01:35.335	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	11	0157@10.10.1.6	0157@10.10.1.5	2020-07-24 03:30:04.821	00:01:09.613	1	Good	Good	0	4.20	4.20
<input type="checkbox"/>	12	0153@10.10.1.6	0153@10.10.1.5	2020-07-24 03:30:03.841	00:02:10.047	1	Good	Good	0	4.20	4.20

Call Detail Records 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 one or more parameters in the **Quick Search** option.

Whitelist

User can configure the list of interested calling/called number to mark them as Whitelist and perform the action such as saving the trace file on the probe. This information is sent to the database and can view the Whitelisted calls separately in the NetSurveyorWeb™ and also download the trace file in *.hdl format.

Call Data Records (CDR) View (Contd.)

Quick View CDR

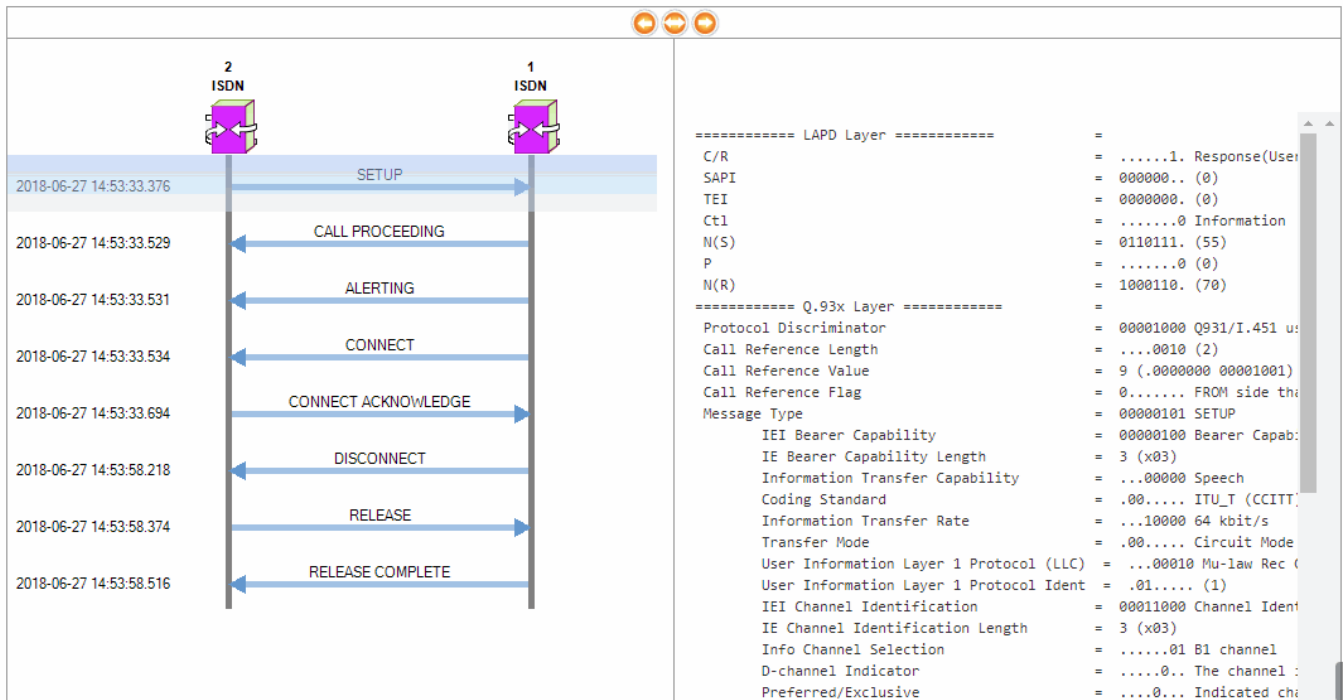
Quick CDR View is a combination of Custom Filters and Column View, user can create their own Quick View groups and add the required columns in the created group to be displayed on the Data View. Default Quick CDR View is provided for all the protocols such as All Calls, Failed Calls, Passed Calls, VoLTE 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 signaling decodes, thus providing visibility into complete end-to-end call flow.

End-to-End Call Flow

The stitched CDR data enables users to perform end-to-end analysis of communication sessions traversing the network. This analysis tracks the complete call flow, from its origination point to the destination, including any intermediate network devices along the path.



Ladder Diagram and Protocol Decodes

Call Flow

The call flow provides visibility into each individual call. The call flow is depicted through graphical and tabular view which allows verification of the status and the messages exchanged in a call between the Called and the Calling numbers.

The screenshot displays the 'SIP Call Flow' interface. On the left, a navigation menu includes 'Quick CDR', 'Custom CDR', 'Priority NOI Calls', 'Default KPIs', 'Priority Setup', 'Config', 'Admin', and 'Utilization'. The main area shows a 'Call Graph View' between two SIP endpoints: 192.168.12.51 and 192.168.12.190. The graph shows a sequence of messages: INVITE, 100 Trying, 180 Ringing, 200 OK, ACK, BYE, and 200 OK. To the right, the 'SIP Layer' details are shown, including headers like 'Via: SIP/2.0/UDP', 'From: 0008', 'To: 0008', and 'Call-ID: GL-MAPS-7422510-1652802887-50769872-3164@192.168.12.51'.

SIP Call Flow

Selected Call Trace Download

The user can download the selected call trace in the *.hdl and *.pcap formats.

The screenshot shows the 'Quick CDR \ HDL Trace' section of the application. It includes a date range filter (2021-08-01 to 2021-08-12) and a time filter (00:00:00 to 23:59:59). Below the filters is a table of call records. The table has columns for 'SINo', 'Calling Number', 'Called Number', 'StartTime', 'Duration', 'Call Success', 'Voice Quality-L', 'Voice Quality-R', 'Failure Cause', 'C_MOS-L', 'C_MOS-R', 'Payload-L', and 'Post'. A red box highlights the 'Download CallTrace' button in the 'Actions' column of the fifth row.

This close-up shows the 'Download CallTrace' button being clicked. A tooltip appears with the text 'Download CallTrace' and the IP address '192.168.13.120'. Below the tooltip, a download bar shows the filename '1259101927_000....pcap' with a download icon and an upward arrow.

Download the Selected Call Trace

Alarm Settings

Users can trigger alarms whenever calls of interest occur, a network link failure is detected, or at scheduled intervals. NetSurveyorWeb™ can send email alerts, generate visual alerts in the user interface, make audible alerts, SMS alerts, export or log data. Alarm severity types can be set as Minor, Major, or Critical.

Flexible options are provided to save alarm filters as profiles, add, edit or delete the existing alarms, selection of user KPIs, and selection of Custom filters. Schedule alarms and alerts for hourly, daily, monthly, or yearly.

The screenshot displays the 'Duration' filter configuration. The filter name is 'Duration' and it is set to 'Basic' mode. It consists of two conditions: 'Duration' equal to '00:00:52.000134' and 'Duration' equal to '00:00:40'. The alarm threshold is set to 'Minor' severity, 'Periodic' type, with an interval of '5 Minute' on 'All Days' starting from 'Now' to 'NoLimit'. The alarm alert options include 'Show Visual Alert', 'Audible Alert', 'Alarm Logging', and 'Send E-Mail Alert'. An email alert configuration is shown with 'Myost@gl.com' as the recipient and the subject 'Billing Duration Alarm Alert'. The message content is 'This Call has exceeded Billing Duration of 40 secs.' To the right, a 'Webpage Dialog' window shows a large red 'ALARM' button with a 'Click-OK & Continue' button below it.

The screenshot shows an email alert report from GL Communications Inc. The report is generated on 2015-09-07 10:59:54. It details an SS7 alarm based on CIC value. The alarm configuration includes: Alarm Name: SS7CIC, Alarm ID: 151, Alarm Condition: ((CIC = '1')), and Alarm Severity: Minor. The alarm status shows it started on 07-09-2015 10:59:53 with a 5-minute sampling duration. The total run count is 1, and the result is a list of call IDs: 829579, 829578, 829577, 829576, 829575, 829574, 829573, 829549, 829524, 829572, 829548, 829523, 829571, 829547, 829521, 829570, 829546, 829520, 829569, 829545. The report also includes support and other links such as 'Contact US', 'Latest News at GL', 'Download Software', and 'Call & Signaling Analysis'.

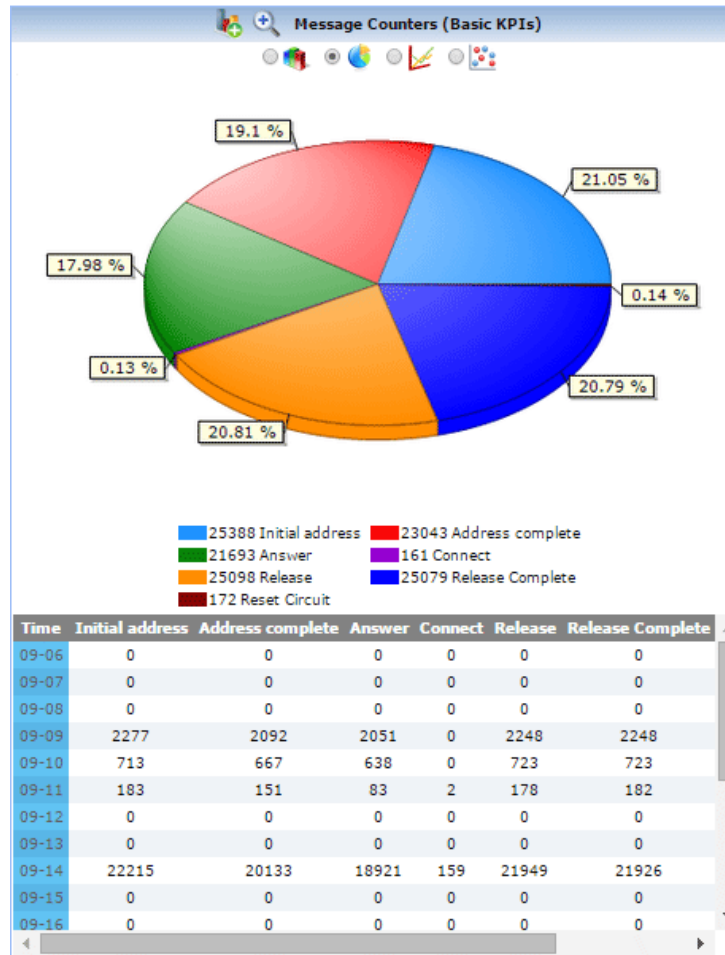
Alarm Settings and Email Alerts

Graphs and Reports

Report provide an overall summary of the captured signaling, and traffic over the entire network with the help of useful graphs. Graphs are available in the form of Bar Graph, Pie Chart, Dot Graph, along with the data in tabular format for each of the plotted graph. Reports can be generated for all calls or filtered records only. Customized graphs for various metrics such as Call Completion Ratio, Answer Call Ratio, Answer-Seizure Ratio, and Call Duration

Report Configuration

NetSurveyorWeb™ allows users to add new KPIs and customize the reports based on SQL Queries using Report Configuration feature. The Add / Import KPI feature allows user to Add / Import the required KPI to the existing KPI group. This will avoid the user from creating the new KPI if it is readily available. Also, with the add option, the KPI profiles will be automatically updates whenever the user who created this KPI does any modification. The import option will give full permission to the user to edit the KPIs as required.



Time	Initial address	Address complete	Answer	Connect	Release	Release Complete
09-06	0	0	0	0	0	0
09-07	0	0	0	0	0	0
09-08	0	0	0	0	0	0
09-09	2277	2092	2051	0	2248	2248
09-10	713	667	638	0	723	723
09-11	183	151	83	2	178	182
09-12	0	0	0	0	0	0
09-13	0	0	0	0	0	0
09-14	22215	20133	18921	159	21949	21926
09-15	0	0	0	0	0	0
09-16	0	0	0	0	0	0

Report Configuration
Enable Alarms

My Profiles: disp
Clear Previous
Load
Delete
Reset KPI Group
View Other Profiles
Reset Basic KPIs

Report KPI

KPI Name:

Chart Type: Bar Pie Dot Line Area Scatter

Chart Size: Half Full

[Add KPI](#)

Query

```
SELECT count(case when lower(ISUPMESSAGETYPE)='initial address' then ISUPMESSAGETYPE end) as "Initial address",
count(case when lower(ISUPMESSAGETYPE)='address complete' then ISUPMESSAGETYPE end) as "Address complete",
count(case when lower(ISUPMESSAGETYPE)='answer' then ISUPMESSAGETYPE end) as "Answer",
count(case when lower(ISUPMESSAGETYPE)='connect' then ISUPMESSAGETYPE end) as "Connect",
count(case when lower(ISUPMESSAGETYPE)='release' then ISUPMESSAGETYPE end) as "Release",
count(case when lower(ISUPMESSAGETYPE)='release complete' then ISUPMESSAGETYPE end) as "Release Complete",
count(case when lower(ISUPMESSAGETYPE)='reset circuit' then ISUPMESSAGETYPE end) as "Reset Circuit" from
GLT_PROT_SUM_SS7 Where TimeFilter_PlaceHolder GROUP BY TIME
```

Report Configuration

Supported KPIs

Protocol Type	Basic KPIs
VoIP SIP (SIP and H.323)	<ul style="list-style-type: none"> • Answer Call • Call Duration • Listening MOS • Conversational MOS • Session Request Delay (Successful Calls) • Session Request Delay (Unsuccessful Calls) • Session Disconnect Delay • Failure Cause • Average Packet Loss
SS7	<ul style="list-style-type: none"> • Call Completion • Disposition Count • Billing Duration • Message Counters • Link_MessageCounters
T1 E1 Layer 1	<ul style="list-style-type: none"> • T1 E1 Events
ISDN	<ul style="list-style-type: none"> • Call Completion • Call Types
GSM	<ul style="list-style-type: none"> • Mapped Vs UnMapped • SMS • Top 5 SMS • Total CDRs on different links • Total SMS on different links
GSM A	<ul style="list-style-type: none"> • Answer Call • Call Duration • Listening MOS • Conversational MOS • Failure Cause • Average Packet Loss %
TRAU	<ul style="list-style-type: none"> • Call Duration
IuCS	<ul style="list-style-type: none"> • Answer Call • Call Duration • Listening MOS • Conversational MOS • Failure Cause • Average Packet Loss
IuPS	<ul style="list-style-type: none"> • Answer Call • Call Duration • Failure Cause • Session Request Delay (Successful Calls) • Session Request Delay (Unsuccessful Calls) • Session Disconnect Delay
VoIP SIGTRAN	<ul style="list-style-type: none"> • Call Types • Billing Duration • Message Counters

Buyer's Guide

Item No	Product Description
PKV170	Network Surveillance Software with Centralized Database Engine and Client
PKV175	T1 E1 Physical Line Monitoring Option for Network Surveillance - requires PKV170
PKV172	ISDN/SIGTRAN Call Detail Record (CDR) Option for Network Surveillance - requires PKV170. requires OLV100 at
PKV092	CAS Call Detail Records (CDR) Option for Network Surveillance. requires OLV092 at the central site.
PKV173	SS7/SIGTRAN Call Detail Record (CDR) Option for Network Surveillance - requires OLV120 for SS7 and PKV106 for SIGTRAN at the central site.
PKV174	GSM (TDM or IP) and TRAU Call Detail Record (CDR) Option for Network Surveillance - requires OLV150 for GSM and OLV153 for TRAU at the central site.
PKV176	VoIP (SIP, MGCP, MEGACO etc.) Call Detail Record (CDR) Option for Network Surveillance - requires PKV101 at the

Item No	Related Software
PKV169	Network Surveillance Lite Software.
PKV171	Network Surveillance Agent Toolkit

Item No	Related Hardware
PKV100	PacketScan™ - (Online and Offline)
PKV120	PacketScan HD™ w/4 x 1GigE
PTE001	tProbe™ Dual T1 E1 Laptop Analyzer
XTE001	Dual T1 E1 Express (PCIe) Boards
TTE001	tScan16™ T1 E1 Boards
FTE001	QuadXpress T1 E1 Main Board
ETE001	OctalXpress T1 E1 Main Board plus Daughter Board

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

For more information, please visit [NetSurveyorWeb™](#) webpage.



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