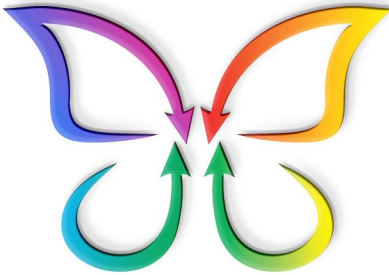


TELENIUM®



**Innovative Network
Management Solutions**

TELENIUM NETWORK MANAGEMENT

Courtesy of MegaSys Computer Technologies

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MegaSys

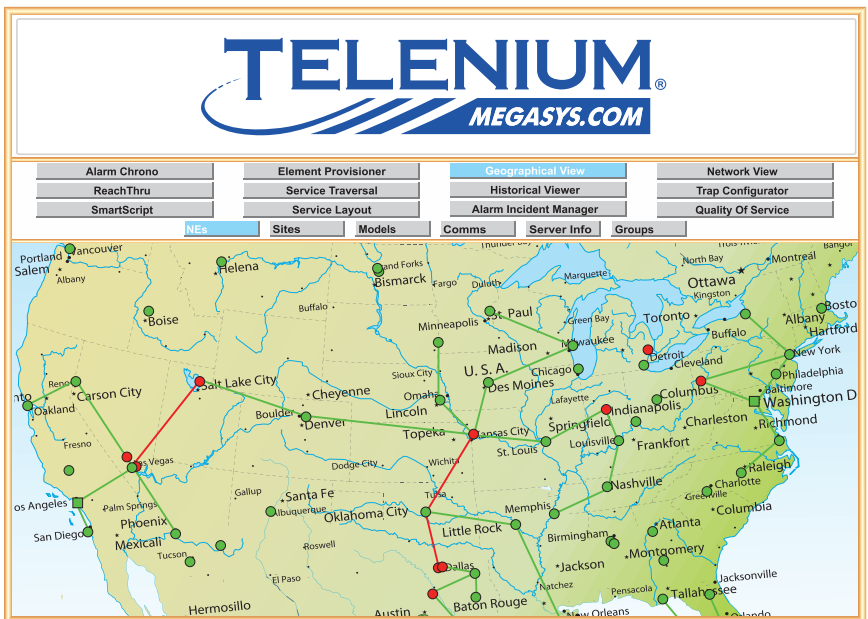
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CHAPTER 1: INTRODUCTION TO TELENMIUM



MegaSys® is the provider of Telenium® Network Management Solutions®. Focusing exclusively on telecom network management and provisioning, MegaSys has developed a powerful network management tool that provides complete EML/NML/SML functionality – including full FCAPS capability, auto-population of network architecture, circuit management, high throughput alarm processing and network element backup – integrated in an intelligent, high performance database.

Telenium's versatility, scalability, and ease of configuration is what makes it the network management solution of choice for utility, telecom, cable, government, and other service providers wanting to maximize the return on their network infrastructure investment while achieving compliance with regulatory standards, including FERC/NERC and CIP.



Telenium applications and features that are key to regulatory compliance.

This booklet highlights the Telenium features and applications that contribute to the successful management of a communications network.

It outlines managing all types of network devices with a single user interface for accurate representation of your network configuration, condition, and connections with photo-realistic dynamic graphics. It demonstrates Telenium Service Management applications that provide a real-time accurate view of the circuit path through your network. It also details the fault, configuration, administration, performance monitoring, and security control applications that have factored in the Utilities Telecom Council's selection of Telenium as the *Best Telecom Services Product* multiple times.

TELENIUM NETWORK MANAGEMENT AT A GLANCE

Telenium provides functionality to all aspects of the FCAPS model.

Fault	Configuration	Administration	Performance	Security
Alarm Handling	System Turn-Up	Track Service Usage	Data Collection	Control NE Access
Trouble Detection	Network Provisioning	Store History for Billing	Report Generation	Enable NE Functions
Trouble Correction	Auto-Discovery	Automatic Archiving	Data Analysis	Access Logs
Test and Acceptance	Backup and Restore		Quality of Service	
Network Recovery	Database Handling			

COMMUNICATIONS PROTOCOLS

Today's networks are populated with both new and legacy equipment, necessitating communication between your network equipment and your network management applications via many different protocols. Telenium successfully manages network elements using a wide variety of protocols including TL1, DNP3, SNMPv1, SNMPv2c, SNMPv3, ASCII, PDS, TBOS, MCS11, NETCONF, LARSE, DCP, DCPF, DCPX, FARSCAN, MOSCAD, PING, CLI, SYSLOG, DMS, Badger, NEC N21, 5ESS, IMUX 2000, PRESIDE, P4, DCM, MXVEW, and LLDP, ensuring its effectiveness as a single network management solution for all your network devices.

DATABASE PERFORMANCE

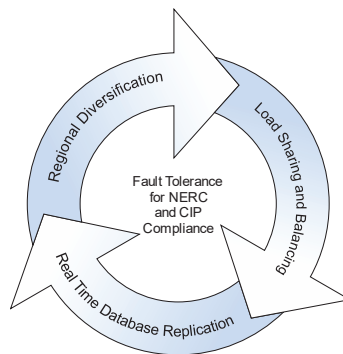
The Telenium system provides unsurpassed database performance and can handle thousands of alarms per second, continuously. This critical capability assures Telenium users that all information is available to the operators. There is no need to filter and potentially block key information.

DATABASE SYNCHRONIZATION



Telenium supports the ability to synchronize the same database on different appliances. For synchronized databases, a change to the database on one Telenium appliance is instantly synchronized on all other Telenium appliances, providing the following advantages:

- Instant replication of database information.
- No loss of visibility or control of your network in the event of an appliance failure.
- Optimized network resources by the distribution of database loads across multiple synchronized systems.
- Compliance with the survivability and redundancy requirements of NERC, FERC, and CIP.



Databases can be installed on multiple Telenium appliances on a local area or wide area network.

DATABASE SCALABILITY

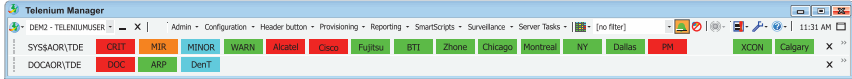
A key requirement for any network management system is scalability of the database. The Telenium system allows for massive scalability through its object-oriented database and its support of a distributed system architecture. Automatic consolidation of information between the Telenium EML systems and the Telenium NML and SML systems provides operators with a single pane-of-glass management capability.

CHAPTER 2: GRAPHICAL USER INTERFACES



Telenium provides several different dynamic graphical user interfaces to easily navigate, diagnose, and solve network issues.

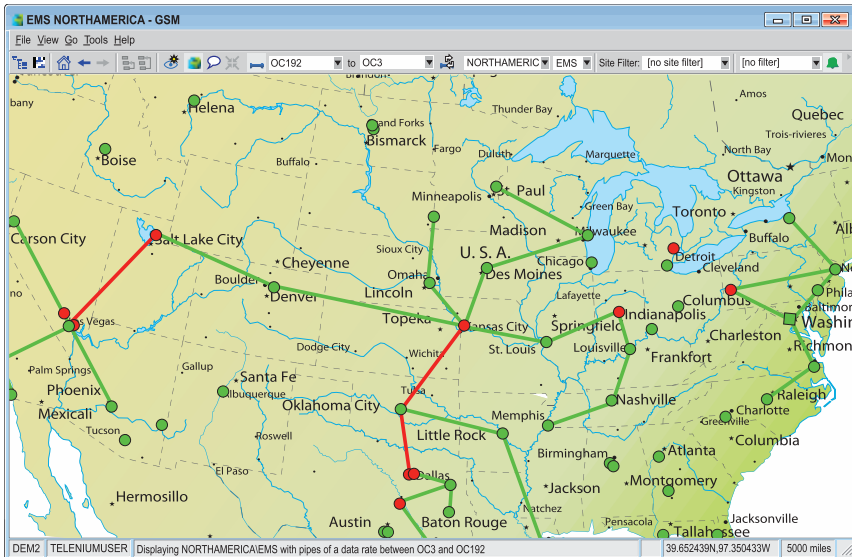
TELENIUM MANAGER AND TELENIUM CLIENT SUITE



Telenium Manager is the all-in-one network management interface. Opening Telenium Manager permits users to log on to Telenium databases and start Client Suite applications. The Telenium Client Suite is a group of applications used to monitor, provision, and maintain networks. The Telenium Manager Client Suite is installed locally on your PC.

GRAPHIC SCREEN MANAGER (GSM)

GSM is a graphical user interface that dynamically displays database information. A geographical GSM presents alarms and their network locations, while the graphical manager depicts real-life representations of physical equipment.



TELENIUM SMART TILES

Telenium’s Smart Tiles application is a dynamic solution featuring contextual navigation. It provides a customizable dashboard which simplifies tasks by reducing the number of application windows open at one time. Smart Tiles displays alarms, PM data, physical topology, facilities and circuits, and a host of additional views and Telenium applications that react dynamically to the operator’s selections, providing a cohesive representation of network and device statuses.

The screenshot displays the Telenium Smart Tiles application interface. At the top, there is a navigation bar with 'Smart Tile Tools' and 'Smart Tiles' tabs. Below this is a toolbar with icons for 'Parent', 'Refresh', 'Details', 'History', and 'Notes'. The main content area is divided into several sections:

- AOR (Area of Responsibility) Summary:** Three pie charts showing data distribution:
 - DATARATE:** 10GBE (9), MPLS (5), OCH (13), OC48 (32).
 - EQUIPMENT:** RTU (2), OPTICAL (2), MICROWAVE (5).
 - REGION:** GERMANY (5), JAPAN (2), NORTHEAST USA (6), WESTERN CANADA (3), SOUTHWEST USA (13).
- Map:** A map showing the location of Calgary, Alberta, Canada, with a yellow marker indicating the current site. The map includes labels for Fort Saskatchewan, Leduc, Camrose, Wetaskiwin, Leducbe, and Red Deer.
- Alarm List - Calgary (14):** A table listing recent alarms:


Time	Point ID	AID	Description	Condition	Site	Priority
12/1/2017 9:29:53 AM	cgjy-td-1	Analogs	Temperature	Hi	Calgary	10
11/29/2017 1:55:01 PM	cgjy-td-1	Analogs	Temperature	Hi	Calgary	5
11/23/2017 1:35:54 PM	cgjy-420-1	cgjy-420-1	ST-356	failure *	Calgary	12
11/13/2017 1:33:38 PM	cgjy-cs-3	cgjy-cs-3	ST-635	Failure	Calgary	25
- Alarm Detail:** A detailed view of a specific alarm:
 - RECEIVE SIGNAL LEVEL** on **CGJY-CS-2 CALGARY** (Priority: 45)
 - 11/10/2017 10:16:56 AM (Duration: 59 days 22:06:01)
 - Maint Region: (State: 1)
 - Condition: MN-SA *
 - Ticket: (Ack By: at 11/10/2017 12:03:53 PM)
- Graph:** A line graph titled 'RECEIVE SIGNAL LEVEL On Items' showing the signal level over time from 03/03/2018 to 03/13/2018. The Y-axis represents 'Value' (0 to 300) and the X-axis represents 'Date'.


TELENIUM ONLINE

Telenium Online is an application that enables viewing the Telenium system remotely via the Web. You can view and acknowledge alarms from a system-wide alarm list, view sites, NEs, and customers, as well as retrieve network element backup files.

Logon groups can be used to partition users in Telenium Online. Users who are part of a logon group only see the information that is allowed according to the privileges and priorities defined within the group.

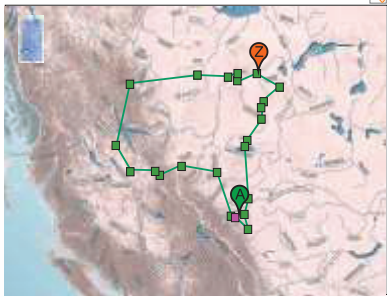
The service screen features a map view and connection layout of the service.





Service: ■ CAD-201

Description : T1 Protection for power generation
Type : T1FACILITY
State : Enabled
Customer : ■ MegaSys
Account : ■ DS1



Connection Layout for : FACILITY 210-001

■ Pipe [JSP-AB-KTY03/018:3:HSPPM:5365][JSP-AB-KTY04/T3:7-2]
■ [JSP-AB-KTY01/VT1:5-2-1-3][JSP-AB-KTY01/GCTP//35270:10:ZCTP/VT1#1]

JSP-AB-KTY-04

GT1:5-2-1-3

Alarm List Tue Mar 26 14:49:10 2013

Viewing Alarms 1 to 2 of 2 Filter: NO-FILTER

TimeStamp	Root	AID	Description	Condition	Prio	A	PLNK
15:46:54 05-FEB-13	6625:10:zCONN	[CALG-ABY-1-0...	Broken Connection	Alarm	88		354228:10:zDI
19:13:13 22-JUN-12	29894:10:zCONN	[CALG-ABX-1-1...	Service Affecting Incid...	Causal	85	Y	8078:10:zDI

Enter New Note View Modifications

Home
 Back
 Forward
 Log out

CHAPTER 3: FAULT MANAGEMENT



Telenor provides operators with fault management tools, allowing them to detect network failures and quickly navigate through affected equipment to isolate and correct any problems efficiently and effectively. This functionality is achieved through a fast, high resolution graphic interface connected to a high-performance database.

The unique object-oriented design of the database ensures the impact of an alarm within the network context is quickly and easily realized. This allows operators to identify equipment, facilities, and customers affected by these failures.

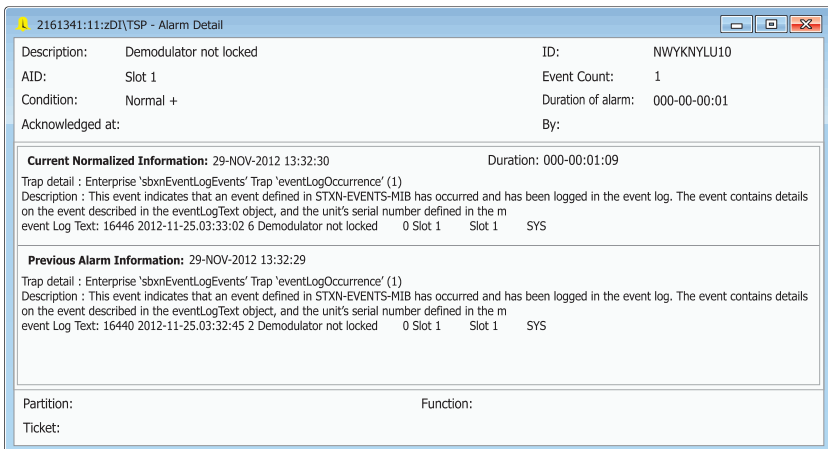
The Telenium system also self-monitors and raises alarms when disk or other system faults occur, such as when:

- Disk or memory capacities reach operationally low conditions.
- Applications consume excess CPU time.
- Applications shut down unexpectedly.

All Telenium system applications are monitored and automatically restarted if a failure occurs.

ALARM PROCESSING

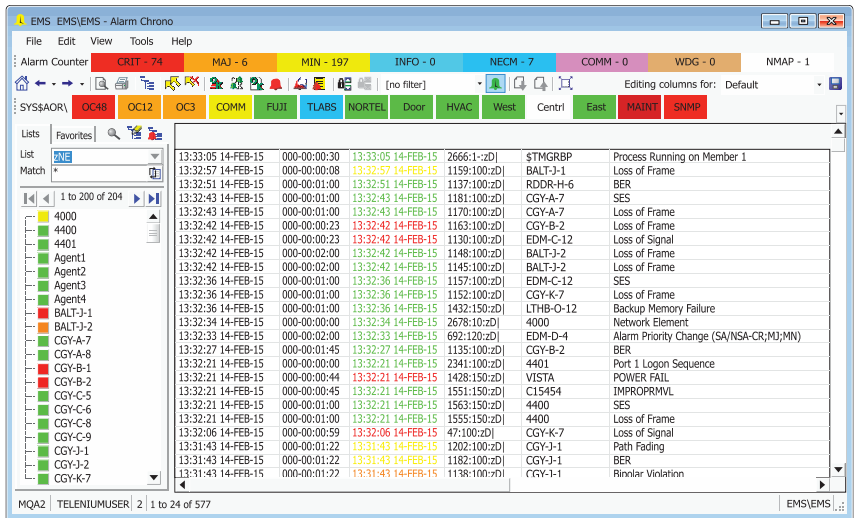
Alarms are displayed graphically within seconds of being received from the network element. Network fault management alarm data consists of conditions reported by the field equipment. All alarm event details, including the original message received from the element, can be archived for analysis. An adjustable periodic display of alarm events in your network is available from the Alarm Journal tile in the Smart Tiles application.



ALARM CHRONO

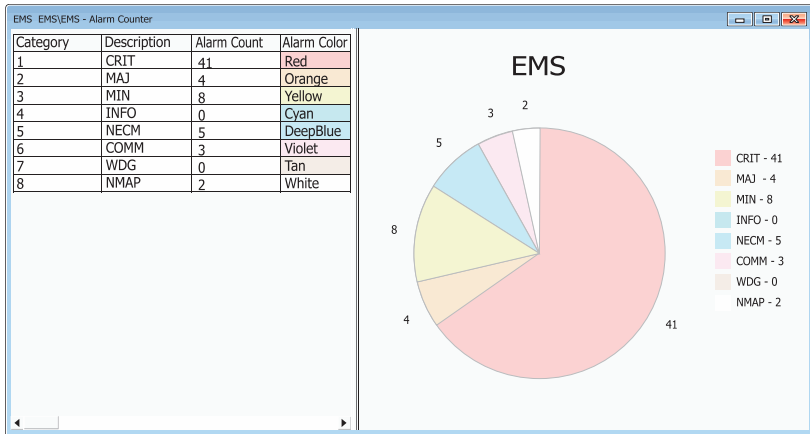
Alarm surveillance is crucial for detecting network problems. Telenium’s fault management applications continuously process thousands of alarms per second and automatically sort alarms into user configurable groups. System Administrators can color code alarms, so their priority reflects the severity of the originating alarm.

Alarm Chrono displays current alarm lists and alarm information for all equipment in the network, and can be used to acknowledge, enable, disable, and sort alarms for enhanced system monitoring. Alarm comments can also be added to alarms to help field technicians communicate with operators.



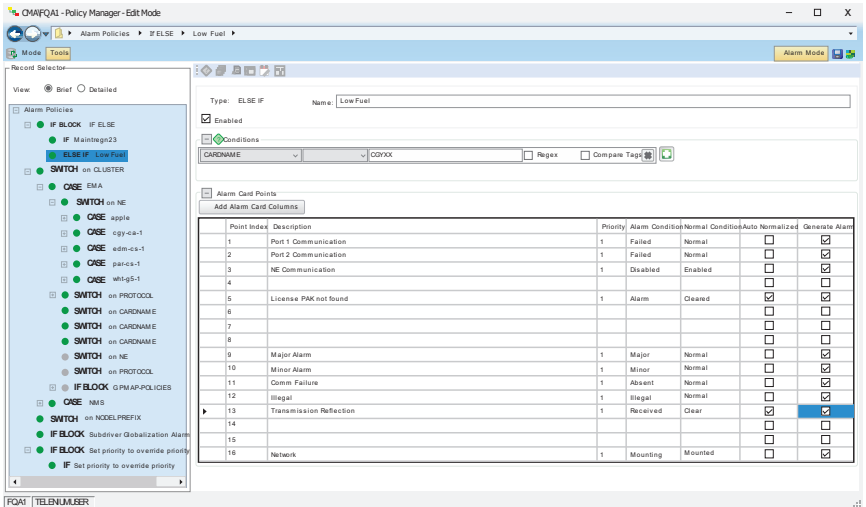
ALARM COUNTER

Alarm information can be exported into easy-to-use presentation views, charts, and 3D rotations through our Alarm Counter application. This tool provides a categorized count and graphical interpretation of active alarms, to quickly assess the health of the network.



POLICY MANAGER

Policy Manager gives you extensive control over every alarm, event and analog handled by the Telenium system. Policies can be created to affect a myriad of characteristics including setting alarms to one of 99 different priorities, enforcing analog threshold limit checking and modifying alarm descriptions to improve readability



ALARM HISTORY

The Alarm History application shows the local alarm history stored in the database. The number of history entries stored in the logs at the network element and global level is determined by a customizable parameter.

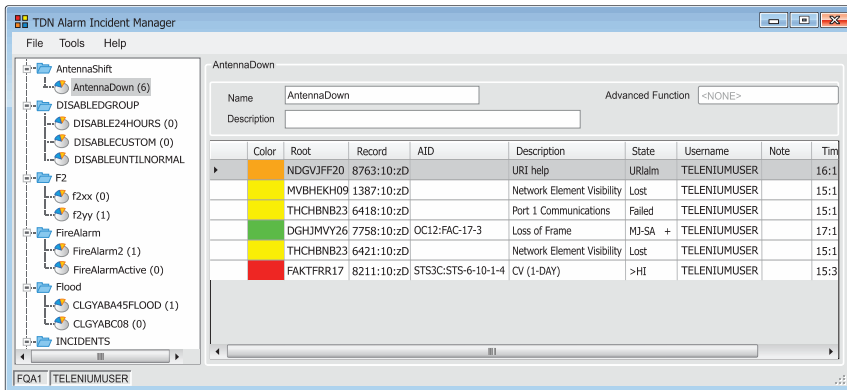
The screenshot shows the 'Alarm History' application window. The title bar reads 'Alarm History - 5:150:zNE\EMS'. The menu bar includes 'File', 'Edit', 'Export', 'Tools', and 'Help'. Below the menu bar is a toolbar with various icons. A 'Lists' panel on the left shows a search box with 'Match' and a list of filters including '4000', '4400', '4401', 'Agent1', 'Agent2', 'Agent3', 'Agent4', 'BALT-1-1', 'BALT-1-2', 'CGY-A-7', 'CGY-A-8', 'CGY-B-1', 'CGY-B-2', 'CGY-C-5', 'CGY-C-6', 'CGY-C-8', 'CGY-C-9', 'CGY-J-1', 'CGY-J-2', 'CGY-K-7', 'EDM-F-1', 'EDM-F-2', 'EDM-M-6', 'EDM-M-8', 'EDM-P-3', 'EDM-P-4', 'EDM-P-5', and 'HRVR-1-1'. The main area displays a table of alarm history entries.

Date/Time	NE	AID	Description	Condition
2012/04/12 10:4...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA +
2012/04/12 10:4...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA +
2012/04/12 10:4...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA
2012/04/12 10:4...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA
2012/04/12 10:4...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA +
2012/04/12 10:4...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA +
2012/04/12 10:4...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA
2012/04/12 10:4...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA
2012/04/12 10:4...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA +
2012/04/12 10:4...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA +
2012/04/12 10:4...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA
2012/04/12 10:3...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA
2012/04/12 10:3...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA
2012/04/12 10:3...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA +
2012/04/12 10:3...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA +
2012/04/12 10:3...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA
2012/04/12 10:3...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA
2012/04/12 10:3...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA +
2012/04/12 10:3...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA +
2012/04/12 10:3...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA
2012/04/12 10:3...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA +
2012/04/12 10:3...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA +
2012/04/12 10:3...	OPM34-HX	EQPT:VTX-13	IMPROPRMVL	CR-SA +
2012/04/12 10:3...	OPM34-HX	EQPT:PSX	FRNGSYNC	MJ-NSA

The status bar at the bottom shows 'DEM3 | TELENMIUSER'.

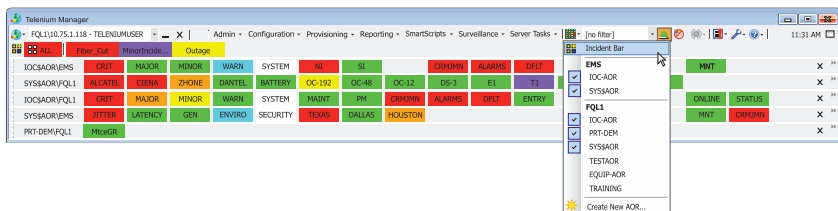
ALARM INCIDENT MANAGER

Telenium allows associated alarms to be organized into incidents for better tracking and control of alarm events. Once created, these incidents are available in other applicable Telenium applications.



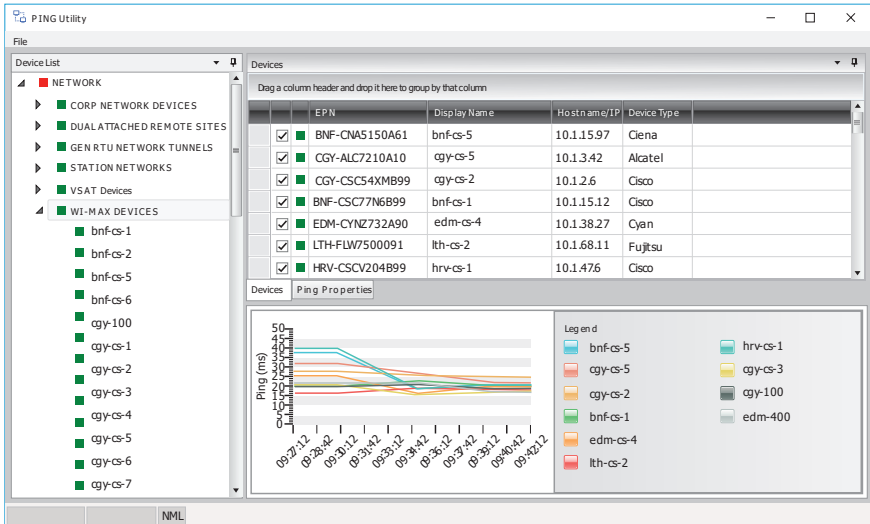
AREA OF RESPONSIBILITY (AOR)

Telenium AORs allow correlation of alarms based on user-defined parameters such as geographic location, network element type, alarm severity, alarm impact, and many other combinations of criteria.

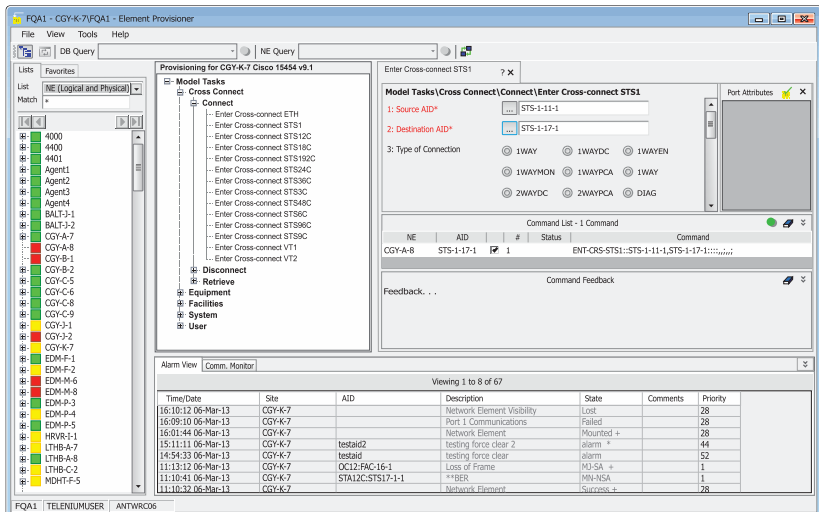


PING UTILITY

The PING Utility application displays the ping status of the selected network devices and indicates a loss of signal alarm if the ping timeout threshold has been crossed. Numerous networks can be displayed concurrently for a specified time range.



CHAPTER 4: CONFIGURATION MANAGEMENT



Network elements are accessed and managed over your network using Telenium's configuration tools.

TELENIUM MODELS

Telenium's unique concept of modeling network elements makes turning up and maintaining your network management system fast and simple. Models describe the entire range of card configuration, alarms, and provisioning commands available on a network element. This template can be applied multiple times to represent each unique element in your network. When combined with the AutoDiscover feature, you can have full network surveillance on your network within hours, not days. AutoDiscover queries the database to populate records to exactly match the physical configuration of a piece of network equipment.

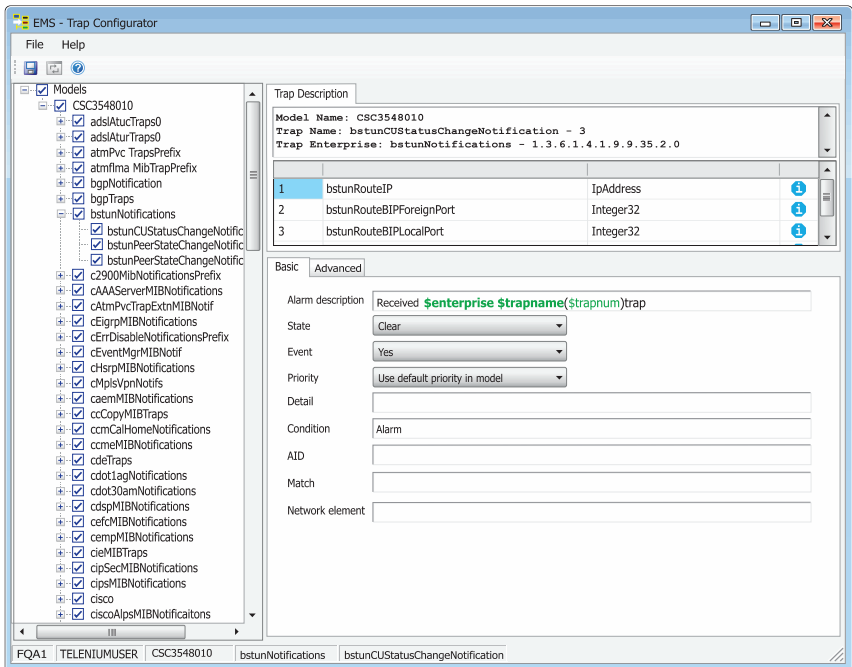
The screenshot displays the Telenium EMS software interface for a network element (NE) identified as **BTI 7200 R9.3**. The window title is "EMS CGY-KT-J2EMS | BTI7200093A1 - GSM". The interface includes a menu bar (File, View, Go, Tools, Help) and a toolbar. The main content area is divided into several sections:

- NE Info:** Displays the NE name "BTI 7200 R9.3" and associated data including Logical View, PM Schedule, Maintenance Mode, Comm Enabled, DB Query, and NE Query.
- Configuration Options:** A row of checkboxes for "Re-Sync All", "Re-Sync Alarms VERIFIED", "Re-Sync X-Connects VERIFIED", "Re-Sync Svc State VERIFIED", and "Auto Discover".
- Tree View (Left):** A hierarchical list of components under "NE Info" and "Main Shelf Info", including Main Shelf, Expansion Shelves, Serial Port, Management LANs, Craft LAN, Management LAN, User Alarms, D40MD Interfaces, Shelf Access ID, Main Shelf Interface, Cooling Units, System Control Pro Int, Multiplexer Interfaces, Optical Amplifier Int, DCN Interfaces, MUX/DMX Interfaces, Transponder Interfaces, Packet/VX Interfaces, GCCO Services, OSC Interfaces, OSPFs, OSPF's, Shelf Interconnect Slot, Power Units, Filler Cards, Shelf Interconnect Plugg, Dynamic Optical Layer, Expansion Shelf - 1, Expansion Shelf - 2, D40MD Interface (1-128), and D40MD Interface (129-255).
- Main Shelf View (Right):** A photograph of the "BTI 7200 Main Shelf" hardware, showing a rack of modules with various ports and labels.

The bottom status bar indicates "DEM2 MEGASYS | Displaying graphic: CGY-KT-J2EMS|BTI7200093A1". The Telenium logo is visible in the bottom right corner.

SNMP MANAGEMENT

This application allows system administrators to compile SNMP MIBs, create a model, and customize how Telenium processes traps received from the equipment associated with the MIBs. A model generated in this way will not support any of the higher functions offered by a full model developed by MegaSys, but still allows you to monitor the device.

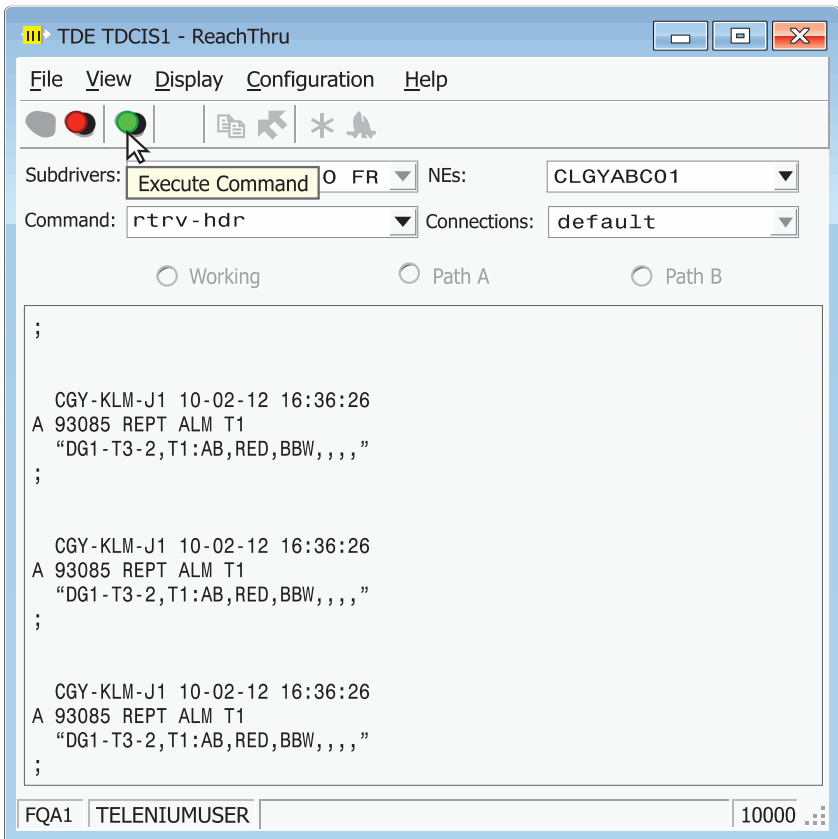


REACHTHRU

This diagnostic tool for communication issues reviews messages passed between a network element and the database, pinpointing the source of communication breakdowns so they can be fixed.

Messages consist of:

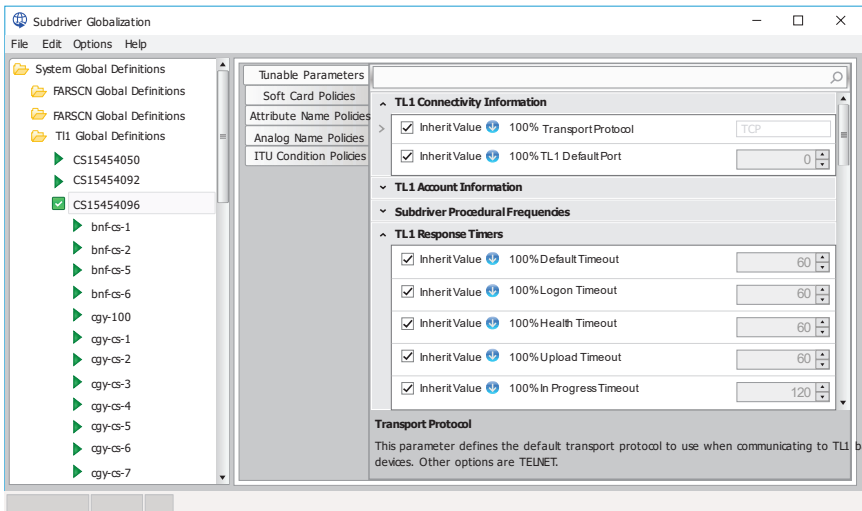
- Commands sent by the subdriver.
- Physical equipment responses to these commands.
- Autonomous messages sent by the equipment.



SUBDRIVER GLOBALIZATION

Subdriver Globalization helps to avoid frequent individual updating of model and communication parameters and helps manage tunable parameters and policies from a global view. Changes can be made to model and network element parameters and policies and then the settings can be saved in Subdriver Globalization.

Subdriver Globalization gives you the option to set parameters such as accounts, passwords, community strings and other security related information at a global, protocol, model, and network element level across the database.



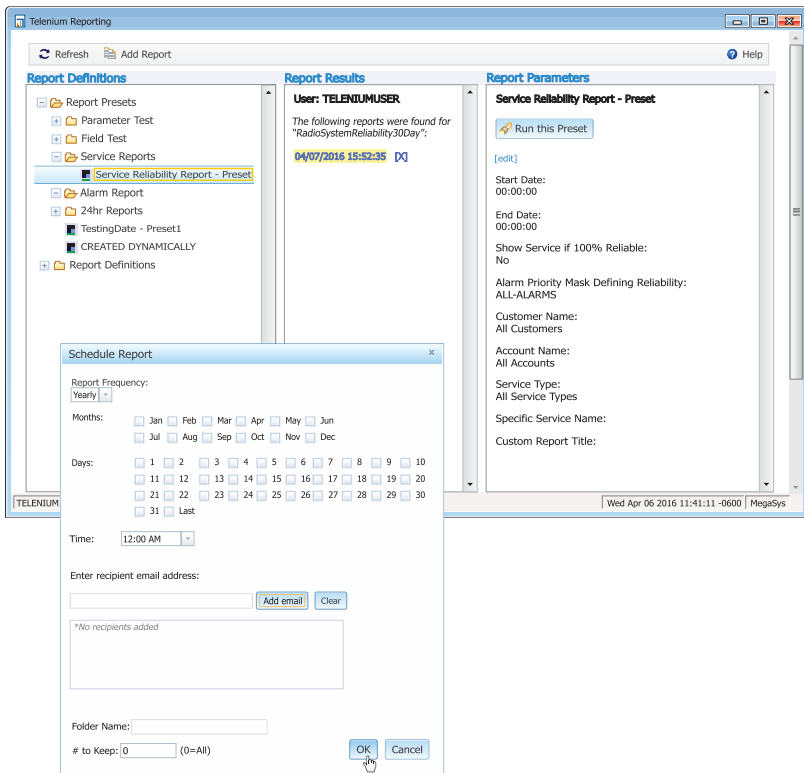
You always have an up-to-date listing of what is in your network because Telenium builds its database by querying the equipment directly. Inventory reports identify circuit packs and their associated service states and attributes, and are easily generated with Telenium's reporting tools. Telenium also provides a quick view of your current bandwidth allocation.

TELENIUM REPORTING



Regulatory
Compliance

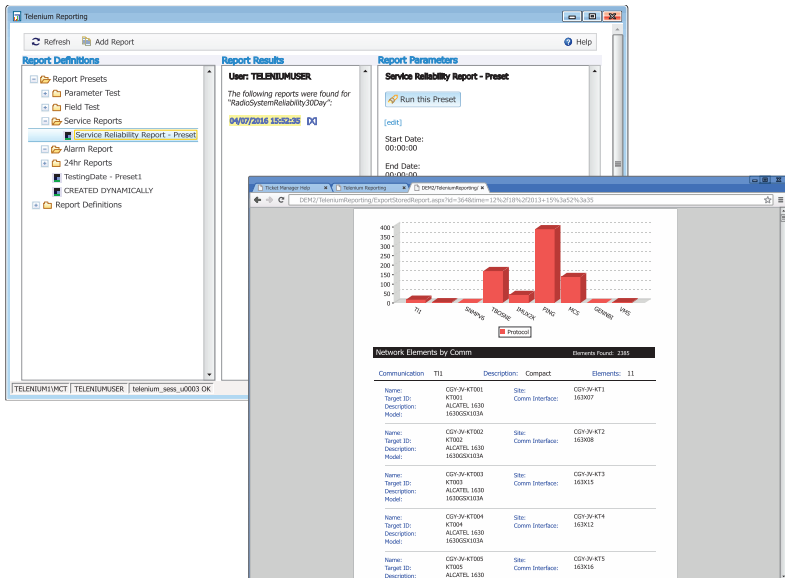
Telenium's reporting application is used to collect historical and online data, and automatically publish this data to reports that can be emailed to selected individuals or stored in a directory. Telenium Reporting includes the ability to create custom reports and also contains a selection of pre-defined reports.



TELENIUM REPORTING – PRE-DEFINED REPORTS

Pre-defined reports provide quick access to network data. Telenium Reporting includes a selection of ready-to-use reports, such as:

- General Network Element Information
- Network Element Inventory
- Network Element Performance
- General User
- QOS Manager Entries
- Service Reliability
- Network Element Reliability
- Site Visibility
- Alarm Frequency



HISTORICAL REPORTER



Review previous alarms, audits, logins, and performance management data to identify bottlenecks and potential opportunities.

Historical Reporter
⊞ Ⓞ ⓧ

Fields

Applied Filters

Export:

Grid: Alarms 4

From: 2013-06-19 00:00:00

To: 2013-06-19 02:00:00

Where:

Sort:

No	Time	Prio	Detail	NE	User	Service Count	AID	Site	Client	Protocol
1	06/19/2013 00:00:00	61	N	EML		0	NIGHTLY			
2	06/19/2013 00:00:02	61	N	EML		0	TO-SRCHFILES			
3	06/19/2013 00:00:02	61	N	EML		0	KITCHECK			
4	06/19/2013 00:00:02	61	N	EML		0	SDELINE			
5	06/19/2013 00:00:02	61	N	EML		0	3:10zTSKTY			
6	06/19/2013 00:00:02	61	N	EML		0	2:10zTSKTY			
7	06/19/2013 00:00:02	61	N	EML		0	PAKCHECK			
8	06/19/2013 00:00:02	1	Y	CGV-J2-KTY002		891	OC48-OC48-1-1	NORTH02	CDNMNTR01A	T11
9	06/19/2013 00:00:02	61	Y	CGV-J2-KTY002		144	OC48-OC48-3-1	NORTH02	CDNMNTR01A	T11
10	06/19/2013 00:00:02	63	N	SML		0	TO-SRCHFILES			
11	06/19/2013 00:00:02	63	N	SML		0	3:10zTSKTY			
12	06/19/2013 00:00:02	63	N	SML		0	2:10zTSKTY			
13	06/19/2013 00:00:02	63	N	SML		0	NIGHTLY			
14	06/19/2013 00:00:02	61	N	EML		0	SDELINE			
15	06/19/2013 00:00:03	1	N	SML		891	[CGV-J2-KTY004/ OC48-OC48-2-1]			
16	06/19/2013 00:00:03	1	N	SML		85	[CGV-J2-KTY002/8 T31-S7S1-EPG1-1-3- MG]			
17	06/19/2013 00:00:04	61	N	EML		0	PAKCHECK			
18	06/19/2013 00:00:04	63	N	SML		0	3:10zTSKTY			
19	06/19/2013 00:00:04	63	N	SML		0	NIGHTLY			
20	06/19/2013 00:00:04	63	N	SML		0	2:10zTSKTY			
21	06/19/2013 00:00:05	61	N	EML		0	NIGHTLY			
22	06/19/2013 00:00:05	21	Y	CGV-J2-KTY001		4	OC3-1-MS9-1	SOUTH01	CDNMNTR05A	T11

1 - 19774 of 19774 items

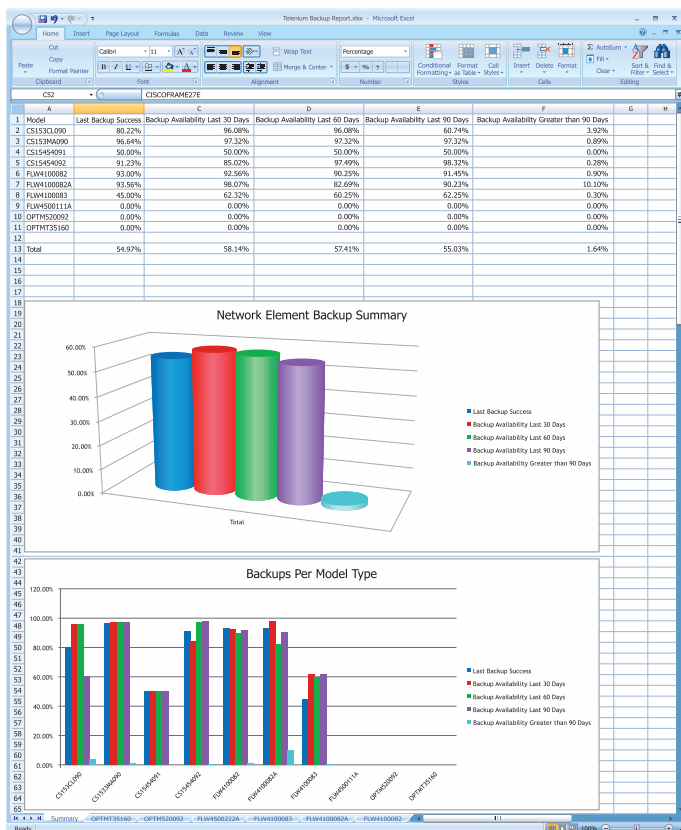
Filters: Alarms 4 x DB Logins 1 x PM Data 1 x

TELENUMUSER / telnum_sess_u0001 OK 1427WF_4 Thu Dec 19 16:57:16 2013

NETWORK ELEMENT BACKUP AND RESTORE

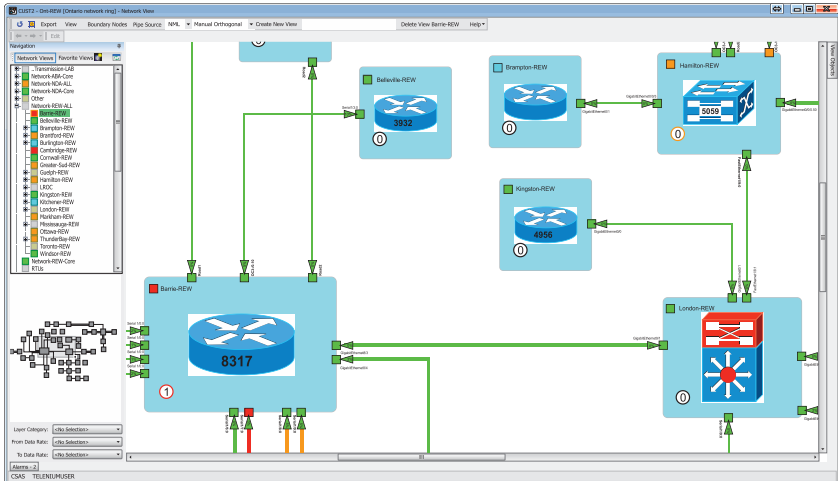


Telenium automatically backs up network element databases to the Telenium server. Backups can be scheduled as often as required, and the Telenium system automatically stores the last ten backups on its server. Telenium can also perform a restoration of a previously saved backup to the network element, providing rapid reinstatement of service to customers. If the network element is completely isolated, a field technician can simply download the backup image and restore it directly to the network element.



NETWORK VIEW

This application is used to view the topology of a telecom network. Network View displays pipes, port names, port loads, and alarm counts, as well as other information. The network can be presented in a variety of different formats.



SERVICE TRAVERSAL

This application presents the complete traversal of a service. You can identify missing pipes or cross connects and broken endpoints are displayed. You can also select a point in the depicted service to launch supporting Telenium applications to facilitate troubleshooting. The circuit topology presented is based on knowledge gathered by Telenium from the network elements.

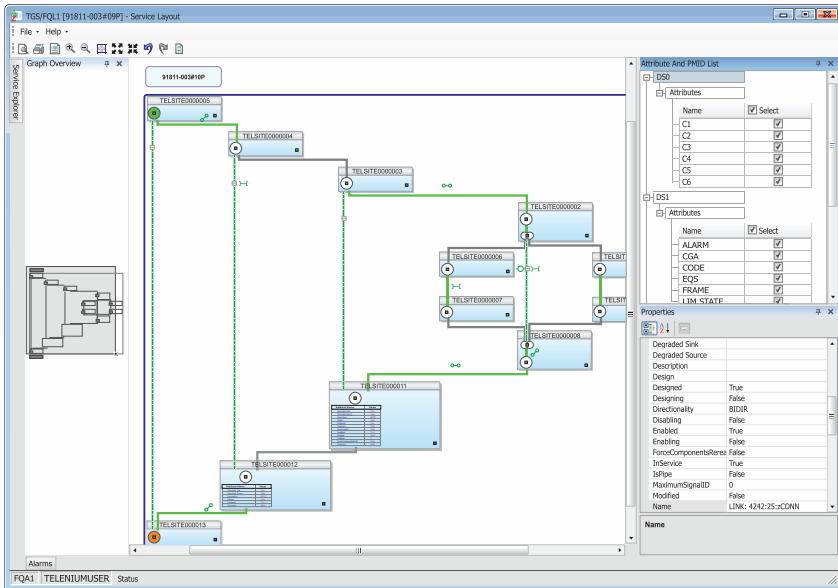
The screenshot displays the 'Service Traversal' application interface. On the left, there is a 'Lists' panel with a search bar and a list of services. The main area shows a network diagram with nodes and connections. A detailed view of a selected node is shown in a pop-up window.

Property	Value
Description	SEL OME65
IsBreakout	False
IsEdgeNetwork	False
IsGlobalNetwork	False
IsNE	True
IsUPSRing	False
Name	OME65-SEM-KTLV-N-
NE	
NumberPortProfiles	2
Pin	56:11::NETWORK
Selpnt	56:11::NETWORK
Site	<Site EPN="CGY-NA-

The interface also includes a 'Name' field at the bottom of the detailed view. The status bar at the bottom shows 'DEM3 | TELENIUMUSER Done'.

SERVICE LAYOUT

Capable of displaying the entire layout of a service connection, Service Layout presents only the high level view as a starting point. You can view details of the service, such as service attributes, performance monitoring information, and alarm information, by expanding the components or member connections.



CHAPTER 6: PERFORMANCE MANAGEMENT

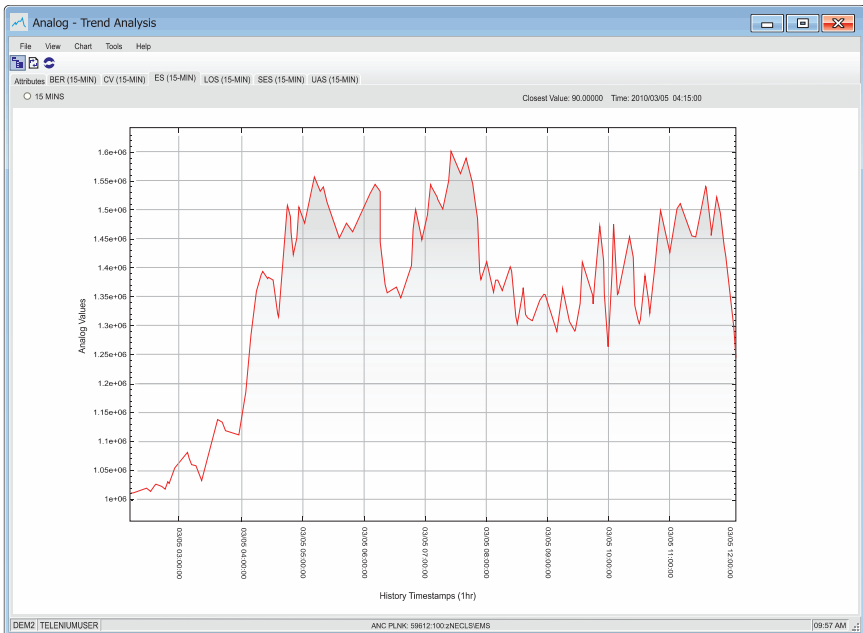


Performance management includes network utilization reports for capacity planning and switch reports for cost analysis, service quality metrics, reports for isolation of fault locations in degraded incidents, and archival of performance data for various management reports and trending.

REAL-TIME GRAPHICAL TRENDS

The most recent 120 values of network performance monitoring data are maintained in the database for immediate trend analysis. Network performance monitoring data can be archived to allow long-term analysis trending.

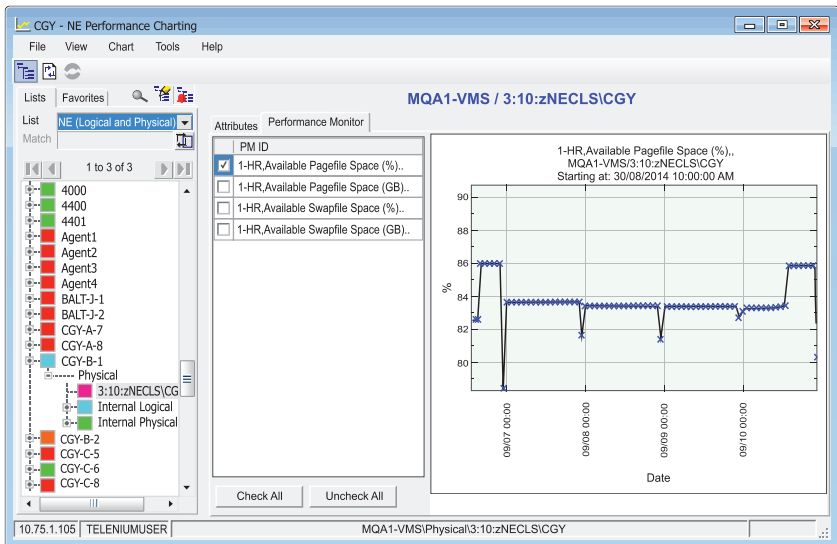
You can design performance trends with the Telenium Graphics Editor (GED) for monitoring bit error rates, and other user-definable network performance thresholds.



NETWORK ELEMENT PERFORMANCE CHARTING

Network Element (NE) Performance Charting displays any type of performance or analog data collected by the Telenium database.

Users have the option of viewing data as text values or one of three graph types: area, line, or step.



QUALITY OF SERVICE MANAGER



Use the Quality of Service Manager application to monitor all types of performance and analog data, and to automatically initiate alarms based on customizable service level agreement parameters.

☰ **QOS Manager** ☑ Edit Mode 🔔 QOS 🔴 Auto Rules 📄 Severity Levels 🔗 Help

#Entries Currently in Alarm

Classic Plus - Charts

#Entries Currently in Alarm by Severity Levels

Alarm duration

Duration of entry oldest alarm

Classic Plus - List Filter Sort by

Service Name	Customer/Account Information	Chrono Alarms
<input type="checkbox"/> G2-PSRTOIA01-PRTLNDAE052001	Customer: 1611TLS5 Account: SRG	🔔 (1)
<input type="checkbox"/> B3-ARBFIGH03-ATLSTBBLP035001	Customer: 0281BRH2 Account: EQU	🔔 (1)
<input type="checkbox"/> A1-GONFERD01-TBLNTSLD040001	Customer: 4047FRJ3 Account: MATI	🔔 (1)
<input type="checkbox"/> MA-RTDLAV001-VBRUSTA023004	Customer: 4046STS2 Account: MATI	🔔 (10)
<input type="checkbox"/> A2-GHITBRA42-SWSTGANTS10003	Customer: 2584IMU2 Account: ST	🔔 (10)
<input type="checkbox"/> N3-GILTEBRA02-TBBLITYV420501	Customer: 8357GVA5 Account: ST	🔔 (6)
<input type="checkbox"/> N3-GILTEBRA02-TBBLITYV420501	Customer: 8357GVA5 Account: ST	🔔 (13)
<input type="checkbox"/> A2-GHITBRA42-SWSTGANTS10003	Customer: 2588TNU2 Account: ST	🔔 (3)
<input type="checkbox"/> FA-YRDWRKI33-SMWRHTB84001	Customer: 8815XXL4 Account: ARCO	🔔 (1)

11-20 of 92 10 | 25 | 50 | 100 | All

CHAPTER 7:

SECURITY MANAGEMENT

Telenium utilizes a variety of features for network security controls to protect your network from tampering.

MULTIPLE LEVELS OF ACCESS



Set appropriate access privileges for a wide array of users. Users can be configured for no access, read-only access, or read/write access to the database. Users with read/write access can be further limited to write privileges on specific fields only.

User Identification* <input type="checkbox"/> Enable all (*) <input checked="" type="checkbox"/> Training <input checked="" type="checkbox"/> Alarm Block <input checked="" type="checkbox"/> System Admin. <input checked="" type="checkbox"/> System Configurator <input checked="" type="checkbox"/> RCC Operator <input checked="" type="checkbox"/> DCP Operator <input checked="" type="checkbox"/> Security <input checked="" type="checkbox"/> Provisioner	User Task Activation* <input type="checkbox"/> Enable all (*) <input checked="" type="checkbox"/> DBM Read/Write Mode <input type="checkbox"/> DBM Read-Only Mode <input type="checkbox"/> Create/Edit DI Help <input checked="" type="checkbox"/> GED Access <input checked="" type="checkbox"/> GSM Access <input type="checkbox"/> Can Send Messages <input type="checkbox"/> Can Receive Messages <input checked="" type="checkbox"/> Future Use	Session Activation Rights* <input type="checkbox"/> Enable all (*) <input checked="" type="checkbox"/> Read-Only Access Allowed <input checked="" type="checkbox"/> Read/Write Access Allowed <input checked="" type="checkbox"/> GSM Audio Alarm Y=On <input checked="" type="checkbox"/> Create Service Permitted <input checked="" type="checkbox"/> Upload Files in TelOnline
Supervisor : <input type="text"/> Home Phone : <input type="text"/> Office Phone: <input type="text"/>	Authentication Methods <input checked="" type="checkbox"/> Telenium Standard Allowed <input checked="" type="checkbox"/> LDAP Allowed <input checked="" type="checkbox"/> Server O/S Allowed <input checked="" type="checkbox"/> Windows Proxy Allowed	

USER ACTIVITY TRACKING



All of a user's activity, such as logins, login failures, alarm acknowledgements, provisioning commands, system configuration changes, and rejected attempts to perform any actions outside the user's rights and privileges is tracked in the Telenium database and is held in the historical files of the database for reference and reporting.

The screenshot displays the 'Historical Reporter' application interface. On the left, there is a 'Fields' sidebar with a tree view containing categories like 'DB Login Failures', 'Alarms', 'DB Login Failures', 'DB Logins', 'DB Write Log', 'Notification Log', and 'PM Data'. Under 'DB Login Failures', several sub-items are checked: 'AuthMethod', 'RemoteAddr', and 'Error'. The main area shows a table of activity logs with the following columns: No, Time, Action, User, Client, Server, and Server App. The table contains 25 rows of data, all for the user 'TELENUMUSER' on 'primary2' servers. The actions include 'LOGIN', 'LOGOUT', and 'LOGOUT'. The status bar at the bottom indicates '1 - 106 of 606 items' and shows active filters: 'Alarms 4', 'DB Logins 1', and 'PM Data 1'. The footer includes the text 'TELENUMUSER / telenium_sess_00001 OK', '71QIH_1', and '© Thu Dec 19 16:57:16 2013'.

No	Time	Action	User	Client	Server	Server App
1	06/19/2013 00:00:03	LOGIN	TELENUMUSER		primary2	watchdog_log
2	06/19/2013 00:00:03	LOGIN	TELENUMUSER		primary2	watchdog_log
3	06/19/2013 00:00:03	LOGIN	TELENUMUSER		primary2	hiscol_positech
4	06/19/2013 00:00:03	LOGIN	TELENUMUSER		primary2	watchdog_log
5	06/19/2013 00:00:03	LOGOUT	TELENUMUSER		primary2	hiscol_positech
6	06/19/2013 00:00:03	LOGIN	TELENUMUSER		primary2	watchdog_log
7	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
8	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
9	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
10	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
11	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
12	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
13	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
14	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
15	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	hiscol_positech
16	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
17	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
18	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
19	06/19/2013 00:00:04	LOGOUT	TELENUMUSER		primary2	hiscol_positech
20	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
21	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
22	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
23	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
24	06/19/2013 00:00:04	LOGIN	TELENUMUSER		primary2	watchdog_log
25	06/19/2013 00:00:04	LOGOUT	TELENUMUSER		primary2	watchdog_log

SECURE AUTHENTICATION



Telenium supports both the Lightweight Directory Access Protocol (LDAP) and the Remote Authentication Dial-In User Service (RADIUS) for authentication to the Telenium database. Additionally, a user account must be defined within the Telenium database to describe the rights and privileges any users have once they authenticate with the external LDAP and RADIUS servers.

The screenshot shows a web browser window titled "Log In - Telenium Network Management System". At the top, there is a "Server" dropdown menu set to "TELENIUM1". Below this is the "TELENIUM SPECTRA" logo. There are two tabs: "Log In" (selected) and "Advanced". The login form contains the following fields and controls:

- Username:** A text input field containing "teleniumuser".
- Password:** A password input field, currently empty.
- Database:** A dropdown menu set to "MCT".
- Log In:** A button to submit the login information.

At the bottom of the window, there is a license notice: "This software is licensed and registered to: MegaSys Computer Technologies". The MegaSys logo and "Network Management Solutions" text are also present in the bottom right corner.

NE PASSWORD MANAGER



From the Telenium network management suite, appropriately privileged users can add, delete and revise all accounts and passwords on network elements. NE Password Manager provides an intuitive interface for the creation of user-defined macros of the procedures required to change user names and passwords on even the most complex devices.

The screenshot shows the 'NE Password Manager' interface within the 'Telenium Power Tools' application. The window title is 'DBS - Telenium Power Tools'. The interface is divided into several sections:

- Top Bar:** Contains tabs for 'Spreadsheet Management', 'Run Password Management' (selected), 'Run SNMP Management', 'Run Firmware Management', 'Run Custom', and 'Procedures'.
- Run/Stop Section:** Includes a 'Run' button, a 'Select all network elements' checkbox, and a 'Select only Failed/Not Validated network elements' checkbox. Below these are options to 'Unselect all network elements' and 'Execute'.
- Options Section:** Contains checkboxes for 'Hide network elements without a valid profile', 'Enable create missing accounts', 'Hide network elements without valid procedure(s)', and 'Enable create extraneous accounts'.
- Network Elements List:** A list of network elements with their status. The first element, 'BARRIE03X001', is highlighted and has a status of 'Passed'. Other elements are 'Not Validated'.
- Accounts Section:** A list of accounts with checkboxes for 'Create Tech_manager4', 'Create Maint9', 'Delete Maint2', and 'Modify admin'.
- Network Element Terminal:** A terminal window showing 'User Access Verification' output. The output includes a password prompt, a successful login for 'meg-csc2600:enable', and a series of configuration commands: 'meg-csc2600#config', 'Configuring from terminal, memory, or network [terminal]?', 'Enter configuration commands, one per line. End with CNTL/Z.', 'meg-csc2600 (config)#username admin password admin level [Level]', 'meg-csc2600 (config)#exit', and 'meg-csc2600#exit'.
- Bottom Bar:** Shows the user 'TELENIUMUSER', the device 'FQL1 DBS', and a 'Process Complete!' status with a green progress bar.

FIRMWARE COMPLIANCE REPORTING



NERC and CIP v5 require reporting of current firmware versions of network elements. Firmware Compliance Reporting provides the firmware status of devices, and also issues a non-compliance report based on a comparison of actual firmware versions to the acceptable firmware versions entered into the Telenium application.

The screenshot displays the 'Run Firmware Management' window in Telenium Power Tools. The interface is divided into several sections:

- Run/Stop:** Includes options to 'Select only Failed/Not Validated network elements' and 'Unselect all network elements'. There are also checkboxes for 'Hide network elements without a valid profile' and 'Hide network elements without valid procedure(s)'.
- Evacuate/Select:** A list of network elements with their status. BARRIE03X001 is highlighted in red and marked as 'Failed'. Other elements like BELLEV01B002, BRAMP05T001, etc., are marked as 'Not Validated'.
- Options:** A section for configuring the terminal output.
- Network Element Terminal:** Displays the output of a terminal session for BARRIE03X001. The output shows the current firmware version (12.2(8)) and a detailed terminal dump including system boot logs, uptime (3 weeks, 4 days, 16 hours, 56 minutes), and hardware specifications (MPC860P processor, 93184K/5120K bytes of memory, etc.).

At the bottom of the window, the status bar shows 'Process Complete!' with a green progress indicator.

SECURE VISIBILITY OF SHARED INFRASTRUCTURE



SECURE GATEWAY EXCHANGE (SGX)

SGX has been developed to provide secure visibility to shared network infrastructure. The owner of shared or leased facilities can grant trusted access to independent users of network components, allowing cooperating providers to better manage their networks with real-time network usage and performance information while maintaining the security and confidentiality of all participants without impacting the integrity of any of the individual intranets.

The screenshot displays the 'EMA - Telenium Power Tools' application window. The main interface is titled 'Secure Gateway Exchange' and is divided into several functional areas:

- Management Controls:** Includes 'Add' and 'Remove' dropdown menus, an 'IP Address' field (SGX01.megasys.com), and a 'Port' field (2060). Action buttons include 'Restart Subdriver', 'MegaSys Server Default Reset', and 'Refresh Network elements'.
- Network Elements:** A list showing 'AIR' and 'AIRDABOC3D01' (which is selected with a checkmark). A 'Share Selected Network Elements' button is located below the list.
- Statistics:** A summary section for 'MegaSys_B' showing:
 - Name: MegaSys_B
 - Connection: Online
 - Status: Accepted
 - Remote system is licensed to received shares: Licensed
 - Queue Length (Outgoing): 0
 - Queue Length (Incoming): 0
- Flow Summary:** Shows 'Sending to MegaSys_B (2)' and 'Receiving from MegaSys_B (1)'. Below this is a table of outgoing network elements:

Network Element	Queue Length (Outgoing)	
BANFABOC3001	0	Remove
CALGABOC3D01	0	Remove

The bottom of the window shows a Windows taskbar with the system tray containing icons for 'TELENIUMUSER', 'FQL1', and 'DBS'.

EXTERNAL PERIMETER SECURITY



Telenium External Perimeter Security records all MAC and IP addresses detected by IP-based network equipment. Referencing user-defined authorizations, EPS raises configurable events and alarms upon detection of new or recurring connecting entities. Information presented to the operators and to the historical files includes the IP address, MAC address, DNS reverse lookup, and even the manufacturer of the LAN card. Users can implement specialized actions on detection of these unauthorized accesses to include generating audible alarms, launching Advanced Logic Processing to initiate blocking of access, emailing details of the event to specific users or user groups, and generating SYSLOG messages to a security management system.

Time/Date	Network Element	AID	Description	Condition	Site	Alarm Duration
04:39:05 15-APR-15	CLGYAB-ROUTER	ETH:1-3	Authorized Entity 04-22-4F-31-31-E2 - 10.75.1.3	Approved	CLGYAB	000-00:00:22
04:55:37 15-APR-15	ATLNGA-RADIO	ETH:4-1	Unauthorized Entity 24-77-03-4B-2E-E9 - 109.24.32.14	Detected	ATLNGA	000-00:01:05

CHAPTER 8: ADVANCED TELENUM FUNCTIONS

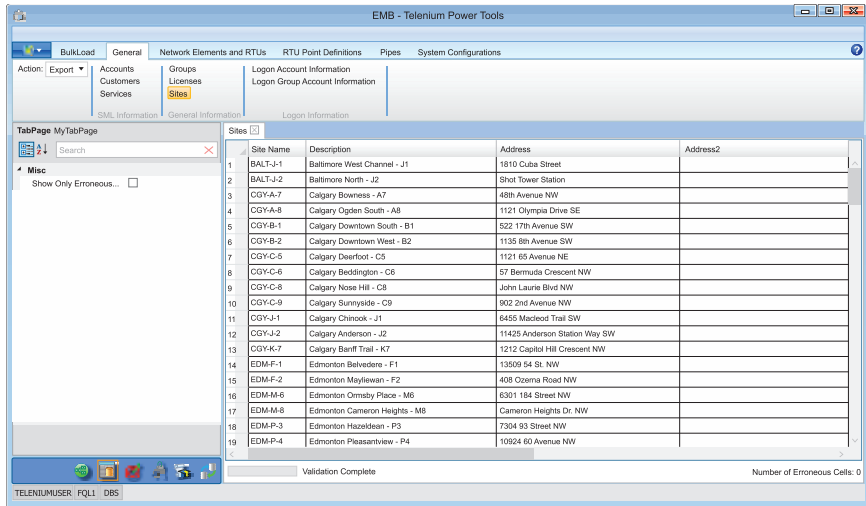
The screenshot displays the Telenium MegaSys Network Management Solutions interface. The main window is titled 'Telenium Configurator' and shows a network diagram with various components like 'Routers', 'Switches', and 'Servers'. A 'Telenium Backup Report' window is open, showing a table of backup statistics for various network elements. The table includes columns for element ID, name, and backup availability percentages for different backup policies. Below the table is a 3D bar chart titled 'Network Element Backup Summary' showing the total backup availability for each policy.

Element ID	Element Name	Last Backup Success	Backup Availability Last 30 Days	Backup Availability Last 60 Days	Backup Availability Last 90 Days	Backup Availability Greater than 90 Days
1	Router	100.00%	100.00%	100.00%	100.00%	100.00%
2	CS1312000	99.84%	99.84%	99.84%	99.84%	99.84%
3	CS1318000	99.84%	99.84%	99.84%	99.84%	99.84%
4	CS1318001	99.89%	99.89%	99.89%	99.89%	99.89%
5	CS1318002	99.84%	99.84%	99.84%	99.84%	99.84%
6	CS1318003	99.89%	99.89%	99.89%	99.89%	99.89%
7	CS1318004	99.84%	99.84%	99.84%	99.84%	99.84%
8	CS1318005	99.84%	99.84%	99.84%	99.84%	99.84%
9	CS1318006	99.84%	99.84%	99.84%	99.84%	99.84%
10	CS1318007	99.84%	99.84%	99.84%	99.84%	99.84%
11	CS1318008	99.84%	99.84%	99.84%	99.84%	99.84%
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Telenium’s advanced functions provide users with additional database management, alarm escalation, network restoration, and network element provisioning capabilities so they can efficiently configure and manage a wide array of network information from a few key applications.

BULK IMPORT/EXPORT

Import and export network information in a database using Microsoft Excel spreadsheets. This configuration management feature also allows you to make backups of a database, see what information is contained within your database(s), and input new data into the database from one simple tool.



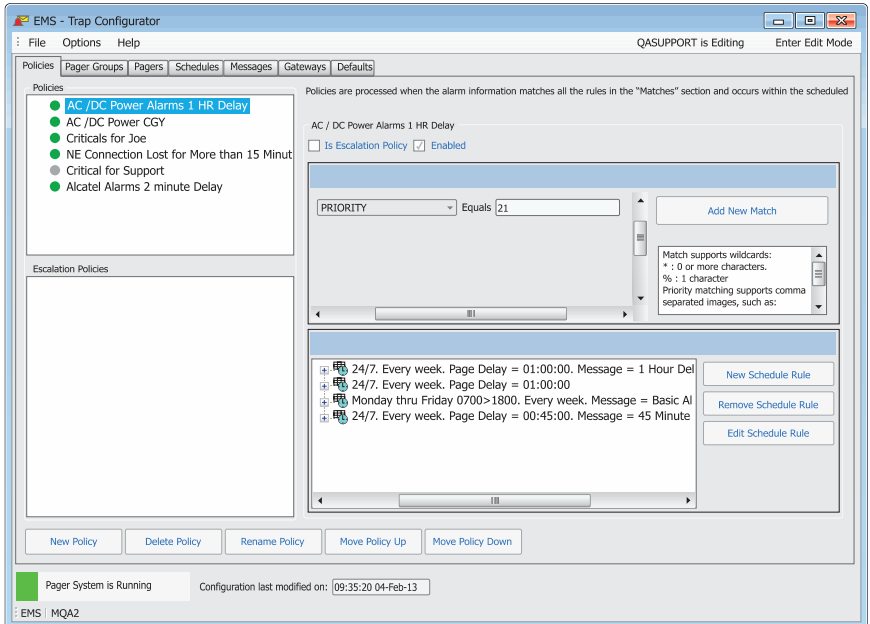
The screenshot displays the EMB - Telenio Power Tools application window. The interface includes a menu bar with options like BulkLoad, General, Network Elements and RTUs, RTU Point Definitions, Pipes, and System Configurations. Below the menu bar, there are several tabs and sections for user management, including Logon Account Information and Logon Group Account Information. A search bar is visible on the left side. The main area contains a table with the following data:

Site Name	Description	Address	Address2
1	BALT-J-1	Baltimore West Channel - J1	1810 Cuba Street
2	BALT-J-2	Baltimore North - J2	Shot Tower Station
3	CGYA-7	Calgary Bowness - A7	4881 Avenue NW
4	CGYA-8	Calgary Ogden South - A8	1121 Olympia Drive SE
5	CGYB-1	Calgary Downtown South - B1	522 17th Avenue SW
6	CGYB-2	Calgary Downtown West - B2	1135 8th Avenue SW
7	CGY-C-5	Calgary Deerfoot - C5	1121 65 Avenue NE
8	CGY-C-6	Calgary Beddington - C6	57 Bermuda Crescent NW
9	CGY-C-8	Calgary Nose Hill - C8	John Laurie Blvd NW
10	CGY-C-9	Calgary Sunnyside - C9	902 2nd Avenue NW
11	CGY-J-1	Calgary Chisook - J1	6455 Macleod Trail SW
12	CGY-J-2	Calgary Anderson - J2	11425 Anderson Station Way SW
13	CGY-K-7	Calgary Banff Trail - K7	1212 Capitol Hill Crescent NW
14	EDM-F-1	Edmonton Salvadore - F1	15859 94 St NW
15	EDM-F-2	Edmonton Maylawyer - F2	408 Cooma Road NW
16	EDM-M-6	Edmonton Carmaly Place - M6	6321 184 Street NW
17	EDM-M-8	Edmonton Cameron Heights - M8	Cameron Heights Dr. NW
18	EDM-P-3	Edmonton Hazelmere - P3	7304 93 Street NW
19	EDM-P-4	Edmonton Pleasantview - P4	10924 60 Avenue NW

At the bottom of the window, there is a status bar showing "Validation Complete" and "Number of Erroneous Cells: 0". The system tray at the bottom left shows the user "TELENIOUSER" and the database "FQLI DBS".

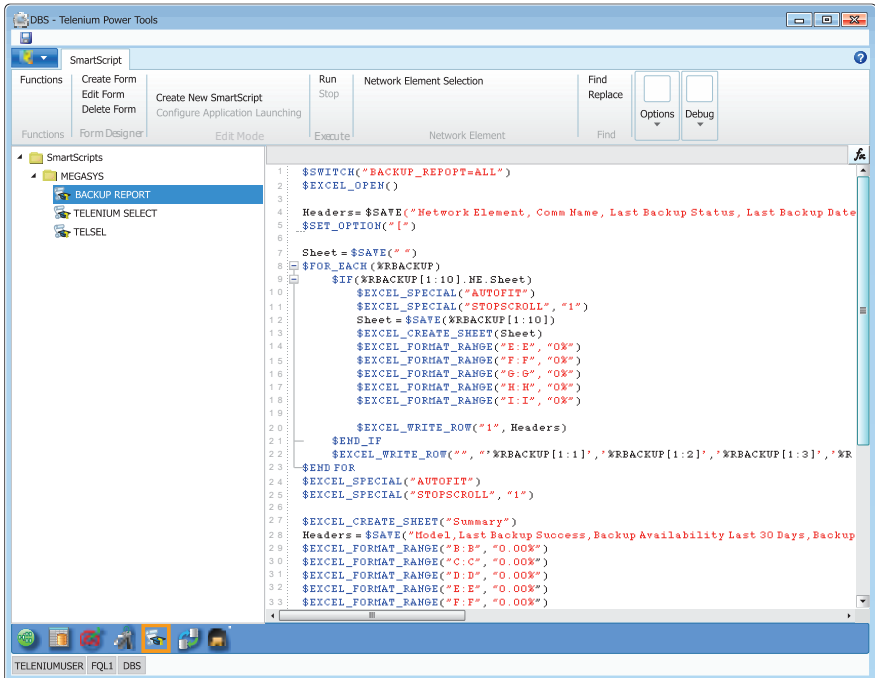
EMAIL AND ESCALATION MANAGER

Telenium will send email notifications to selected recipients. Emails and escalations are triggered by the occurrence of a configured policy based on specific alarm conditions.

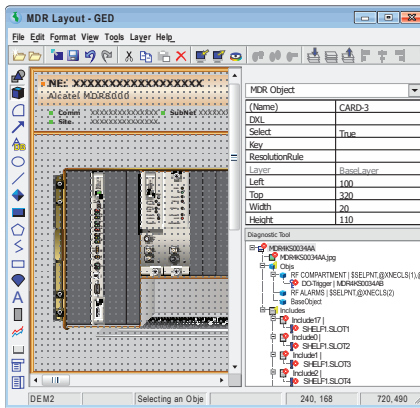


SMART SCRIPT MANAGER

Smart Script is the scripting language that interfaces with the Telenium database and with local and network applications such as Microsoft Excel, Access and SQL databases, enabling the user to write and execute complex queries and commands through a GUI interface.



GRAPHICAL EDITOR (GED)

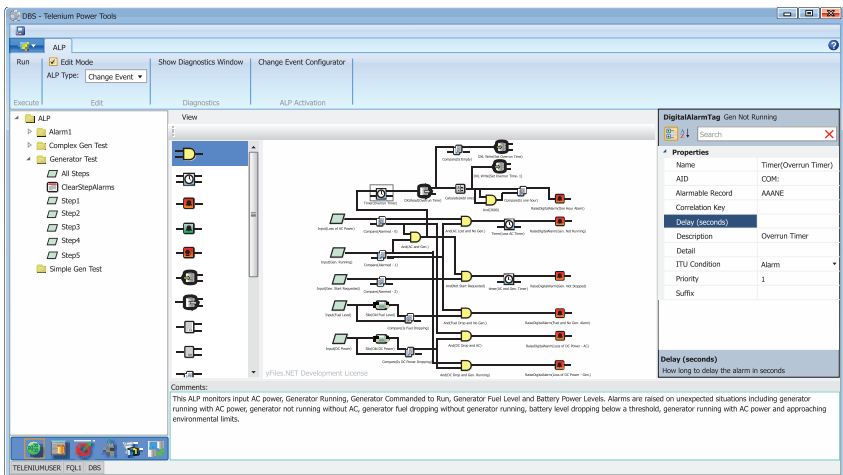


GED is a Telenium module that provides a development environment for creating maps and equipment displays, enabling users to create custom graphics based on their needs.

ADVANCED LOGIC PROCESSOR



Advanced Logic Processor is a new application to the Telenium suite that enables the designing of logic procedures (ALPs) that trigger based on any combination of events, including detection of alarms, changes to database fields, expiration of timers, and ON/OFF indicators. Activation of the ALP can generate alarms, modify database fields, execute scripts, or perform complex correlations.



TICKET MANAGER

Ticket Manager works with Alarm Chrono to provide dynamic ticket generation for network elements managed by the database. Create, edit, view, and report on alarms and trouble resolutions with Telemum tickets.

MCT - Ticket Manager

Layout: Logon @ Logon Group

ID	Type	Number	State	Severity	Title	Assigned To	Created By	Created Date/Time	Closed By	Closed Date/Time
COV13018	TMSALARM	TT000180	OPEN	High	EDM22 - Comm. Failed	GDONES	TELENUMUSER	3/26/2016 6:53:12 AM		3/27/2016 6:53:12 AM
COV13173	TMSALARM	TT000188	OPEN	Normal	EOPM-MODERN-AM - Modern AM Equipment	WALTERS	TELENUMUSER	3/24/2016 9:50:07 AM		3/28/2016 9:50:07 AM
COV15184	GENERIC	TT000187	CLOSED	High	Cisco Router	WALTERS	TELENUMUSER	3/23/2016 9:01:13 PM	WALTERS	3/24/2016 5:01:13 PM
COV15190	GENERIC	TT000186	CLOSED	Normal	BC DSI-1	AMANSON	TELENUMUSER	3/23/2016 4:49:11 PM	AMANSON	3/24/2016 4:49:11 PM
COV15173	RELAYMETER	TT000185	CLOSED	High	Comm Major Alarm	DMARCY	TELENUMUSER	3/23/2016 4:10:33 PM	DMARCY	3/24/2016 4:10:33 PM
COV16012	TMSALARM	TT000184	CLOSED	High	RTU LEFT - Comm. Failed	DMARCY	TELENUMUSER	3/23/2016 4:02:16 PM	DMARCY	3/24/2016 4:02:16 PM
COV16041	TMSALARM	TT000183	CLOSED	High	BLUJ - Comm. Failed	AMANSON	TELENUMUSER	3/23/2016 3:50:20 PM	AMANSON	3/24/2016 3:50:20 PM
COV15191	FIELDSP	TT000182	OPEN	Normal	Bridge 14 OPX line S150 noise	AMANSON	TELENUMUSER	3/19/2016 4:52:25 PM		3/20/2016 4:52:25 PM
COV16042	RTU	TT000181	CLOSED	Normal	RTU Failure	BISNITH	TELENUMUSER	3/19/2016 1:12:24 AM		3/20/2016 1:12:24 AM
COV16086	GENERIC	TT000180	OPEN	Normal	Fire Alarms System	AMANSON	TELENUMUSER	3/19/2016 9:12:49 AM		3/19/2016 9:12:49 AM
COV20278	RTU	TT000179	CLOSED	Normal	RTU failure	DSHANNON	TELENUMUSER	3/15/2016 6:48:39 AM	DSHANNON	3/14/2016 6:48:39 AM
COV16037	TMSALARM	TT000178	CLOSED	Normal	LTRBDRGCC001 - COM-SHELF - Loss of Timing Ref.	HWLIKES	TELENUMUSER	3/14/2016 1:39:44 PM		3/15/2016 1:39:44 PM
COV16138	TMSALARM	TT000177	CLOSED	Normal	GRNDPLS_CISCO - Post-2 - Rectifier Minor	AMANSON	TELENUMUSER	3/13/2016 2:36:52 PM	AMANSON	3/13/2016 2:36:52 PM
COV16032	RTU	TT000175	OPEN	Normal	Switch RTU Failure	AMANSON	TELENUMUSER	3/10/2016 5:56:23 PM		3/9/2016 5:56:23 PM
COV24673	GENERIC	TT000174	CLOSED	Normal	Interrogation West Line Microwave Failure	GDONES	TELENUMUSER	3/10/2016 8:34:52 PM	GDONES	3/9/2016 8:34:52 PM
COV16041	TMSALARM	TT000173	OPEN	Normal	CONORTHM1000 - EOPM-WM - Storage System Failure	GDONES	TELENUMUSER	3/8/2016 1:51:09 PM		3/27/2016 1:51:09 PM
COV16049	TMSALARM	TT000172	CLOSED	Normal	EDHWSTSTDB01 - Env-External Alarm	DSHANNON	TELENUMUSER	3/7/2016 10:54:30 AM	DSHANNON	3/6/2016 10:54:30 AM
COV16078	TMSALARM	TT000171	CLOSED	Normal	HGRHWCON101 - EOPM-EXTM1PUT-2 AC Power Failed	AMANSON	TELENUMUSER	3/6/2016 3:37:37 PM	AMANSON	3/5/2016 3:37:37 PM
COV16082	GENERIC	TT000170	CLOSED	High	PartnerSupport 1 Drop	HWLIKES	TELENUMUSER	3/5/2016 9:16:13 AM		3/5/2016 9:16:13 AM
COV24784	RTU	TT000168	CLOSED	Normal	Glenmore Pipe Antenna	HWLIKES	TELENUMUSER	3/5/2016 8:27:53 AM	HWLIKES	3/4/2016 8:27:53 AM
COV16059	TMSALARM	TT000167	CLOSED	Normal	Summersville RTU Failure	CSHAW	TELENUMUSER	3/3/2016 12:26:53 PM	CSHAW	3/2/2016 12:26:53 PM
COV16044	TMSALARM	TT000176	CLOSED	Normal	BNHWSTVTR0003 - REC-ACC3 - INCRAD	CSHAW	TELENUMUSER	2/28/2016 5:24:24 PM	CSHAW	2/27/2016 5:24:24 PM
COV19377	RELAYMETER	TT000174	OPEN	High	LTRBDRGCC03 - Rpt RAC30-1 - Rpt path failure	HWLIKES	TELENUMUSER	2/28/2016 5:05:05 PM	HWLIKES	2/27/2016 2:55:05 PM
COV16012	RELAYMETER	TT000173	CLOSED	High	Burbyway	CSHAW	TELENUMUSER	2/27/2016 1:28:49 AM		2/26/2016 1:28:49 AM
COV16028	TMSALARM	TT000172	CLOSED	Low	WCT080A05301 - EOPM-M					2/25/2016 1:28:49 AM
COV15488	TMSALARM	TT000171	CLOSED	Normal	LTRB06565001 - OC3-1-1					2/24/2016 9:34:15 AM

71 Results | 1 - 1

Create Ticket - TELENUMUSER

Type: FACILITYALARM

Title: _____

Site: _____

Network Element: _____

Assignment: TELENUMUSER

Severity: High Low Medium Normal

Note:

OK Cancel

DIAGNOSTIC AND RESOLUTION TOOL (DART)



DART is a suite of advanced Telenium tools designed to assist operators and technicians with detecting, diagnosing, and resolving network connectivity issues. DART also provides a real-time view of communication outages for NERC/CIP compliance to site isolation events and generates additional alarms should more than a specific percentage of network elements at a site become unreachable or unresponsive.

The screenshot displays the DART software interface, which is used for monitoring network health. The top window shows a dashboard with a list of sites on the left and a grid of site health indicators on the right. Each indicator shows a site ID and a percentage of network elements that are unreachable. The sites and their percentages are:

- BARRIE03X001: 100.00%
- BELLEVO1B002: 100.00%
- BRAMP05T001: 100.00%
- BRANT01X003: 12.50%
- BURLIN01S008: 1.15%
- CAMBRI23H001: 10.00%
- CORNW08G013: 100.00%
- GRSUD04X002: 100.00%
- GUELPH01B007: 11.11%
- HAMILT03G000: 50.00%
- KITCHE07J003: 100.00%

The bottom window provides a detailed view of a 'Network Element Status Alarm' for site 'mde_csh001_01'. It lists various network elements and their status:

- Network Element Status Alarms**
 - Part 1 Communications: Restored/Enabled
 - Network Element Communications: Network element Visibility
 - Part 1 Logon Sequence: Success
 - Part 2 Logon Sequence: Complete
 - Uploads Aborted/Cancelled: Cleared
 - Unprocessed Alarm Messages: Cleared
 - Alarm Sequence Error: Cleared
 - Database Change (DRSNG): Cleared
 - Set Network Element Time: Success
 - License RMW not found: Cleared
 - Autodiscovery: Success
 - Network Element: Mounted
 - Software Download: Complete
 - Unprocessed PM Messages: Cleared
 - Upload Failure: Cleared
 - Processor Error (SSTR, SART, SAR8): Cleared
 - Upload Failure (Timout): Cleared
 - Upload Failure (Timout TID - ITA): Cleared
 - Autodiscovery recommended (AED): Cleared
 - Upload Failure (Serial Dual Port): Cleared
 - NE Association is down (Normal): Cleared
- CDM Status Alarms**
 - Telenium Port A Physical Assignment: Alarm
 - Telenium Port B Physical Assignment: Normal
 - Telenium Port A Virtual Connection: Normal
 - Telenium Port B Virtual Connection: Normal
 - Network Element Autodiscovery Running: Complete

Additional features include a search bar, a 'Ping' graph showing network connectivity over time, and a 'Trace Route' section.

AUTO LOGON



Login to network elements' management interfaces via SSH, Telnet, http/https or even by launching the manufacturer's own application. User account and passwords are automatically passed to the management application and protected from the operator's view.

The image shows two overlapping windows. The background window is 'MCT - Telnetium Power Tools' and the foreground window is 'NETSMART 500 Dashboard'.

MCT - Telnetium Power Tools

Procedure Name: Auto Logon - App
 Procedure Type: AutoLogin
 Procedure Protocol: Application
 Description:
 Port:
 Application Location: \\Userdirectories\Users\Telnetiumuser\Desktop\NETSMART 500.link
 Window Name: NETSMART 500 Dashboard
 Test Environment:
 Network Element Name:
 Variable Name: Value | Username: Password |
 Add Column | Remove Column
 Routine: Login
 Clear Routine & Launch Routine Recorder

Action	Values
StartMacro	Height="525", Width="525"
Mouse	X="89", Y="41"
Mouse	X="118", Y="64"
Wait	Period="1"
Keyboard	Value="ExtLd]"
Keyboard	KeyCode="Tab", KeyValue="9"
Keyboard	Value="TELENIUMUSER"
Keyboard	KeyCode="Tab", KeyValue="9"
Keyboard	Value="TELENIUMUSER"
Keyboard	KeyCode="Tab", KeyValue="9"
Keyboard	KeyCode="Tab", KeyValue="9"
Keyboard	Value="[Expaddressip]"
Keyboard	KeyCode="Tab", KeyValue="9"
Keyboard	Value="130[port]"
EndMacro	

 Save | Save As | Cancel

NETSMART 500 Dashboard

NE Logon
 ID: CONF1400ES [Retrieve TID]
 User ID: telnetiumuser
 Password: *****
 Connection Mode: TCF/JP
 Connection Settings:
 IP address: 10 . 1 . 1 . 23
 Port: 111
 Logon | Close

CHAPTER 9:

EXPERIENCE THE Telenium ADVANTAGE

Telenium offers a comprehensive solution to organizations that demand a flexible, scalable, and reliable network management system.

SUPERIOR SERVICE MANAGEMENT

Telenium automatically determines how your circuits are routed through your network. Having a real-time accurate view of the circuit routing provides a significant cost and service advantage.

Alarms are automatically correlated to circuits, facilities, and customers; services and accounts are interrelated with customers; and all services are linked and displayed on the appropriate equipment and facilities.

The Telenium service manager can also assist with the design of new circuits by locating available bandwidth based on the circuit requirements.

SYSTEM SCALABILITY

Telenio will continue to deliver comprehensive network surveillance, configuration, and management as your system grows. National and international telecommunications networks with tens of thousands of managed devices use the same baseline Telenio software as smaller regional installations.

PRODUCT VERSATILITY

Telenio is fully configurable to address the specific requirements of your business processes and your users. Menus, alarm colors, graphics screens, alarm priorities, user privileges, notification escalations, and many other features are completely customizable to suit your network management processes.

MULTI-VENDOR COMPATIBILITY

Telenio supports a broad range of network element vendors, devices, and protocols. We are continually adding to our inventory of supported network elements to fulfill our customers' requirements.

3COM	AT&T	Cerent
4RF Communications	Austron	Ceterus
Accedian	Avaya	Charles Industries
Acme Packet	Aviat	Ciena
ADC Telecommunications	Avttec	Cisco
ADTRAN, Inc.	Badger	CNT
ADVA	Bard	Coastcom
Advantech Wireless	Bay Networks	Compatible Systems Corp
Airspan	Bayly	COMSAT
Alcatel	Best Power	Comtech
Alcatel/Lucent	Bestlink	Cordell
Alcatel/Newbridge	Brocade	Coriant
Allied Telesyn	BTI Systems	Corvis
Alpha Technologies	C&D Technologies	CXR Larus
AMETEK	Cabletron Systems	Cyan
APC	CalAmp	Dantel
Apcon	Calient	Datum
Appian Communications	Calix	Dedicated Networks Partners
Applied Innovation Inc.	Cambium Networks	DELL
Argus	Carrier Access	Digi
Asentria	Ceragon	Digital Link

Digital Solar Technologies	Lortec	RADwin
DMC Stratex	Lucent	Radyne
DPS Telecom	Lumentum	RBNi
DSC	MAHI	Redback
Dymec-Dynastar	Marconi	Redline
Eastern Research Inc.	MetaSwitch	RFL
Eaton	Metro-Optix	Rockwell
ECI Tel	Microwave Data Systems	RuggedCom
EFDATA	Microwave Networks	Safetran
Ekinops	Milgo	SEL
Electrospace	Mitsubishi	Sensatronics
Eltel-Valere	Moseley	Sensus
Emerson Networks	Motorola	Sentinel
Encore	Movaz	ServerTech
Ericsson	MRV	Servo
ETS	Multitech	Sherrex
Exalt	NEC	Siemens
EXFO	Netgear	Silver Spring Networks
Extreme Networks	Nicad	SixNET
Fial	NICE	Sorrento
Fore	Nokia	Spectrum
Fujitsu	Noran Tel	Sycamore Networks
GarrettCom	Nortel	Symmetricom
GE	Occam	Tadiran ECI
Generix	Ocular Networks	Tait Communications
GRC	Omnitron	TC Communications
Haliplex	Omnitronics	Technostrobe
Harris	OneAC	Tekron
IBM	ONI Systems	Telco Systems
Infinera	Optelian	Telect
Intellect	Optisphere	Telectronic
ION Networks	Oscilloquartz	Telica
Ipitek	OSICOM	Tellabs
IRIS	Perle	Telmar
ITL	Phoenix Broadband	Timeplex
JPS Communications	Pirelli	Transmode
Juniper Networks	PowerAgent	Turin Networks
Landis+Gyr	PowerTrunk	Varian
Larscom	Premisys	Voyant
Larus	Proxim Wireless	Westronic
LightPointe	Puregas	Xel Communications, Inc
Lineage Power	Racal	Zhone Technologies
Loop Telecom	RAD Data Communications	

Don't see your network element manufacturer on our list?

Contact us at (403) 295-0511 or sales@megasys.com as we are continually adding supported vendors to the Telenium suite.

RELIABILITY

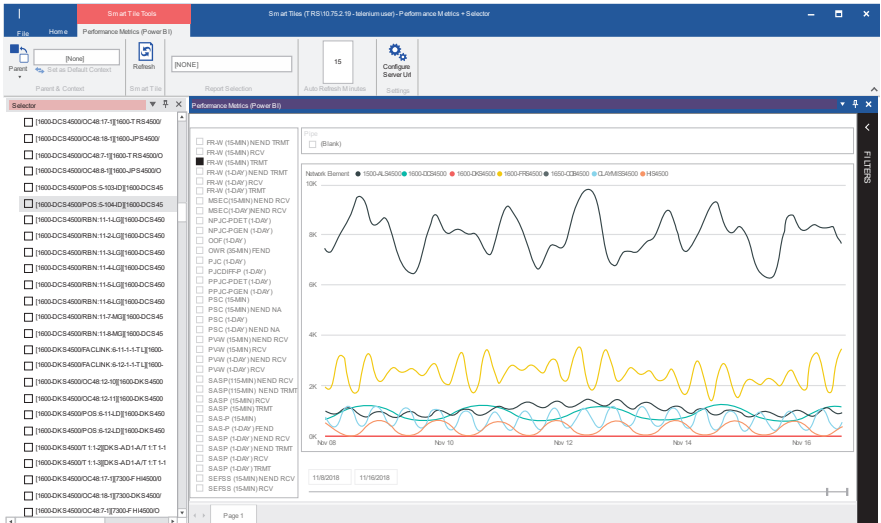
In network management, reliability is vital. Telenium addresses this requirement by implementing numerous strategies:

- Appliances are configured with hardware fault tolerance including RAIDed disks and redundant hot-swappable power supplies.
- The Telenium software monitors the appliance for disk errors and excessive system loading.
- The integrated Telenium watchdog ensures all key Telenium applications are operating properly.
- Escalation of alarms ensures round-the-clock management of your network, and quality of service configuration and reporting identifies potential issues with service level agreement commitments.
- Critical geographical fault tolerance is achieved with Telenium's database synchronization. All cooperating Telenium appliances are always current, and in the case of a malfunction, failover and subsequent resynchronization is automatically achieved.

TELENIUM PERFORMANCE METRICS

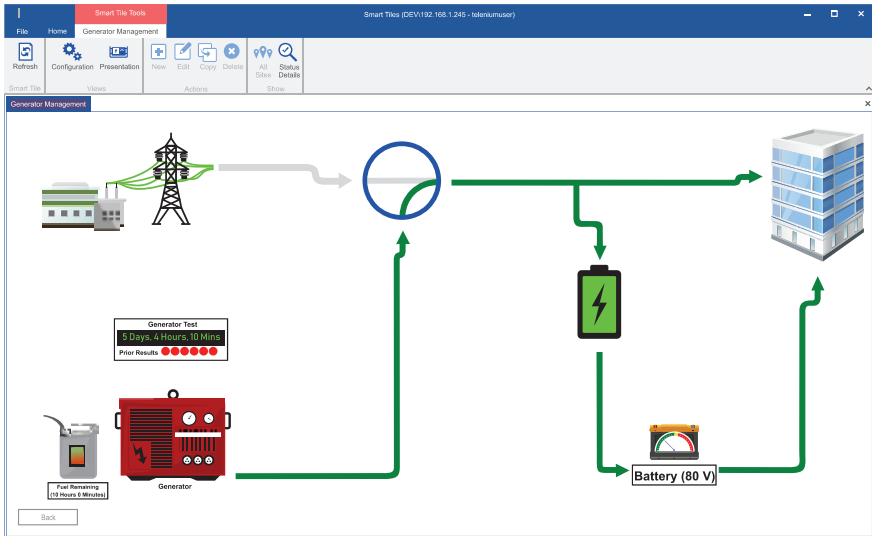
The utility industry is requiring increasingly high network performance and quality of service. Telenium collects performance data and defined KPIs from multiple vendor devices across the network and stores the information in a format that can be digested by analytics engines for the consumption of IT, OT, corporate users, and other utility stakeholders. Error rates, receive signal levels, latency, jitter, network availability: these statistics and more are used for strategic network management, SLA compliance, and network diagnostics.

Telenium Power PM offers configurable alarm thresholds to ensure that performance data outside acceptable ranges alert the appropriate operations centers for proactive diagnosis and resolution of potential network issues or to alert when service level agreement parameters are approaching.



TELEMUM GENERATOR MANAGEMENT

The Telemum Generator Management Smart Tile has been developed to profile and manage all the various components related to site power availability. This includes profiling the generator, fuel source, transfer switch, and battery chargers as well as DC power plant and AC power availability. This profiling technology allows the Telemum system to proactively monitor weekly generator testing, determine fuel availability, and validate that the entire power recovery components are working as required.



Sophisticated logic processes analyze all available data along with operator provided information to generate alarms in the Telenium dashboard for any number of events including:

- Generator running with no AC power failure outside of the gen-test period.
- Generator fuel levels and calculation of run-time remaining.
- Fuel levels declining unexpectedly such as when the generator is not running.
- Failed weekly generator tests such as a test that did not run, ran too short, or ran too long.
- Battery chargers not showing that the battery array is in a charge mode rather than a discharge mode.
- Transfer switches not switching to the generator when AC power is lost and the generator is running.
- Automatic RICE report generation.

History of all power related system events is maintained in the Telenium database for post analysis and historical analysis requirements.

MULTIPLE LANGUAGE SUPPORT

The Telenium system supports 8 bit Unicode Transformation Format data encoding so that information can be stored and displayed in multiple languages.

EXTENDED SUPPORT

MegaSys offers a variety of Telenium Extended Support Services (ESS) options that provide long-term sustainability and enhance the operation of the Telenium system. ESS benefits include:

- Software Upgrades – All licensed product upgrades including access to multiple versions of your network element models and the latest Telenium suite.
- Telenium LAB License – ESS subscribers can assess and test any Telenium product in a non-production environment.
- Documentation – MegaSys provides extensive documentation and computer-based training describing how to use and manage your Telenium system. This information is available in both hard copy and online formats.
- Technical Support – Our skilled support MegaSys staff is available to assist you with mission critical problems 24 hours a day. Trouble tickets can be submitted via e-mail, fax, phone, or our web based trouble ticketing system.
- Web Support – Access the latest software and documentation updates from our web support page. You can also enter or review current and past trouble tickets.

Contact us today to discover how you can experience the Telenium advantage.

**E-mail general.inquiries@megasys.com,
or reach us by phone at (403) 295-0511.**

