Overview of M*Ware Convergent Manager and the M*Ware Services

2002-2003

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Introduction

This document gives an introduction to the Vertel M*Ware Convergent Manager. .

M*Ware™ offers a flexible, powerful software Development Environment (M*Ware DE) for building Management Systems. Using this DE product, Vertel developed an easy configurable Management Systems line of products, M*Ware Convergent Manager for service providers and network equipment vendors that deploy multi-technology telecommunication equipment.

M*Ware Convergent manager is available in different configurations.
The embedded configuration offers all components to rapidly develop multi protocol embedded agents.
The core configuration offers the components to build any type and protocol agent and manager applications.
On top of the core configuration, different sets of M*Ware Services can be used and plugged in.

There are sets of services to build:

- Element Management systems
- Network management systems
- Service Management systems.

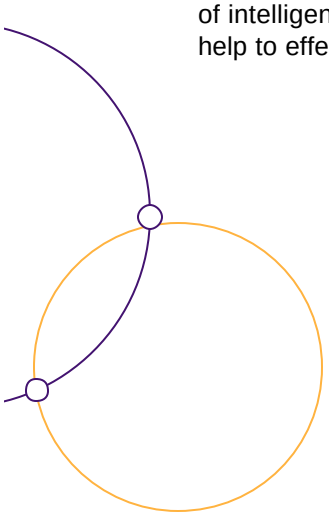
This introduction shows the extensive built-in features of the M*Ware Convergent Manager.

Various network management features such as Topology, Fault, Performance, Configuration, Software Distribution, and Security are described in this document.

M*Ware based products are designed to interact efficiently with every type on network element and provide all features for fault, configuration and performance management and control. Because the application is including mediation technology, these features effectively transform the data and data structures to the requirements upstream.

As a Network Management system, Convergent Manager NMS can interact with multiple Element Management Systems.
The services of M*Ware EMS are included in the NMS, and additional services are available toe ensure several management functions are transcended to a higher abstraction level. For example: where on element management level, end-port and node configurations are of major importance, on the network management level network connection management is added.

Similarly, on the service management layer, M*Ware Convergent Manager SMS can easily interact with multiple NMS interfaces provided by different vendors.
Convergent Manager SMS can be used as an Integrator (Umbrella management system); bridging disparate downstream systems to provide a singular, consistent upstream interface for NOC operators or customer care employees.
The standardized format of fault, configuration and performance data enables rapid configuration of intelligent services using the heterogeneous network facilities, Convergent Manager SMS will help to effectively manage Service Level Agreements (SLAs) as well as Quality of Service (QOS).



Salient features of M*Ware

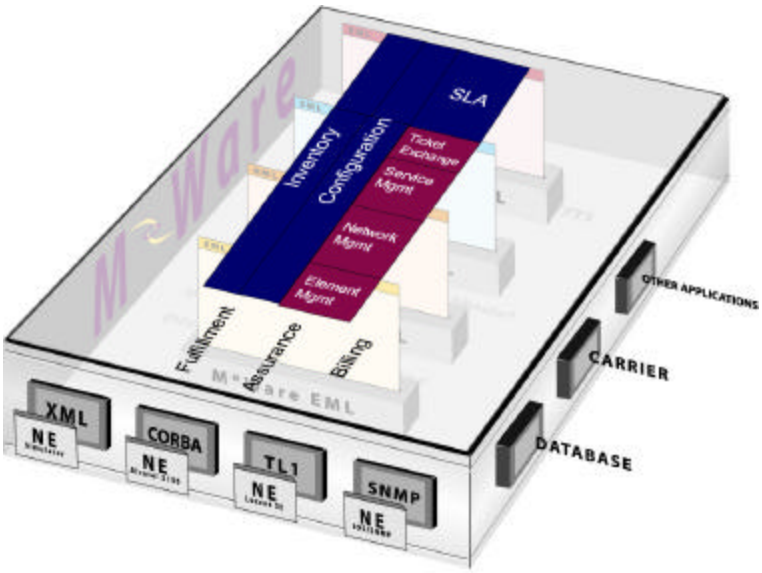


Figure 1.M*Ware Overview

- M*Ware offers a flexible and powerful software platform for building Management Systems. Vertel developed the easy configurable M*Ware Convergent Manager, an ideal solution for equipment vendors and network operators supporting a variety of protocols such as CMIP, SNMP, TL1 and ASCII in their network elements.
- M*Ware Convergent Manager allows system integrators and in-house development groups to configure focused and perfect fitting complete FCAPS-functional Management Systems rapidly in a cost-effective manner..
- M*Ware solutions are distributed and massively scalable. As a result, it can easily handle network growth.
- M*Ware transforms different network protocols into a common format in line with the industry standard Distributed Management Task Force (DMTF) Common Information Model and the OMG Model Driven Architecture,
- Implementing a network management solution based on the Common Information Model provides a better return on investment and maximizes the investment made on existing technology
- M*Ware Convergent Manager supports pre-existing standards such as ITU-T Recommendations, which are modeled using GDMO/ASN.1 and IETF RFC's, which are modeled as SNMP MIB definitions.
- M*Ware solutions are built over a CORBA bus and can integrate with any enterprise-level network management system that supports a variety of industry standard and proprietary protocol interfaces.

M*Ware Convergent Manager: System Components

As is shown in the figure, a management System consists of the following components.

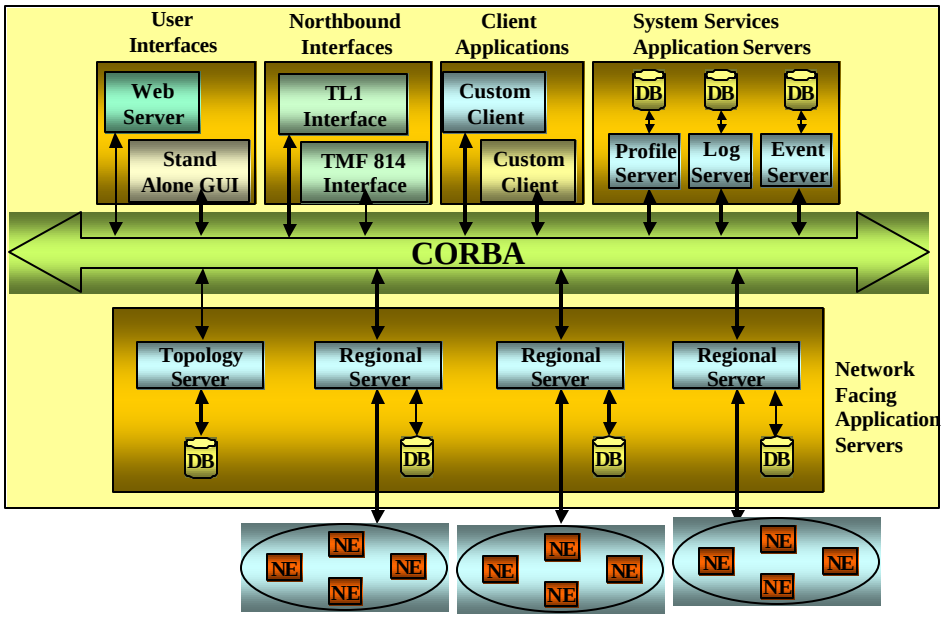


Figure 2.M*Ware Convergent Management System Architecture

Network Facing Application Servers

Network Facing Application Servers running on Workstations that communicates with the Network Elements. These network elements can be organized into logical sub networks, thus enabling a partitioned approach for network management.
Network facing application servers can be categorized as:

- Topology servers, containing topological information of the entire network that the Convergent Management System is managing.
- Regional servers managing a specific region of the network. Regional servers typically have technology-specific knowledge. For Example, a GE-Router Regional server would contain the OC48, GBED interface information that the Convergent Management System is managing.

System Management Servers

The M*Ware Convergent Manager also offers various system management functions by plugging in M*Ware Services.

Functions such as Event Management, Security Management and Log Management are offered through standards-based application servers, which are deployable as independent entities.

The System management servers communicate with the regional and topology servers via the CORBA Bus and are capable of sharing the information through a centralized database.

Databases

The application servers built over the M*Ware platform are persistent and can store the application data in a variety of relational and object oriented databases.

Some of the most commonly used databases are:

- Oracle for Enterprise level solutions
- GDBM for low-end solutions
- RAIMA for embedded solutions

Database schema used by the application server is a direct derivative of the common information model defined by the application developer. The M*Ware platform makes the database integration process seamless and trivial.

Graphical User Interface

Graphical User Interface applications, external management systems, or client applications, as shown in Figure 2, communicate with the application servers over a CORBA bus.

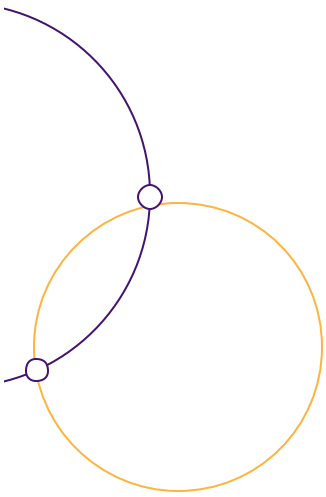
GUI applications are deployed as Stand Alone applications ***OR*** Web based applications.

The Web based front-end uses industry standard Java Server Pages and Java Servlet technology, thus enabling dynamic content generation for operators accessing an M*Ware Convergent Management System based system over a WEB Interface.

Interfaces

M*Ware Convergent Manager supports South bound and North bound interfaces for networks and external management systems such as Network Management Systems, Trouble Ticketing Systems, Network Surveillance Systems and Service Management Systems using variety of protocols such as:

CORBA
XML
CMIP
TL1
SNMP
ASCII



M*Ware Convergent Manager Services

This section briefly outlines the various M*Ware services, that offer the desired management functions of M*Ware Convergent Manager.

Topology

The M*Ware Topology Service has a well-integrated topology interface. The Topology interface provides a graphical interface to provision new topological networks or to view an existing topological network. The Topology interface enables rapid customization of the maps used as background images.

The Topology interface follows well-proven mathematical concepts for graph rendering. Some of the interesting concepts in the topology are:

- color-coded nodes based on the alarm severity of the network element
- color coded inter-node links
- informative tool tips showing various alarm counts and severity
- zooming capabilities
- browser-like navigational capabilities
- Users can create a Network or service Element.
- Easy specification of southbound protocol specific information used to communicate with the Network Elements.

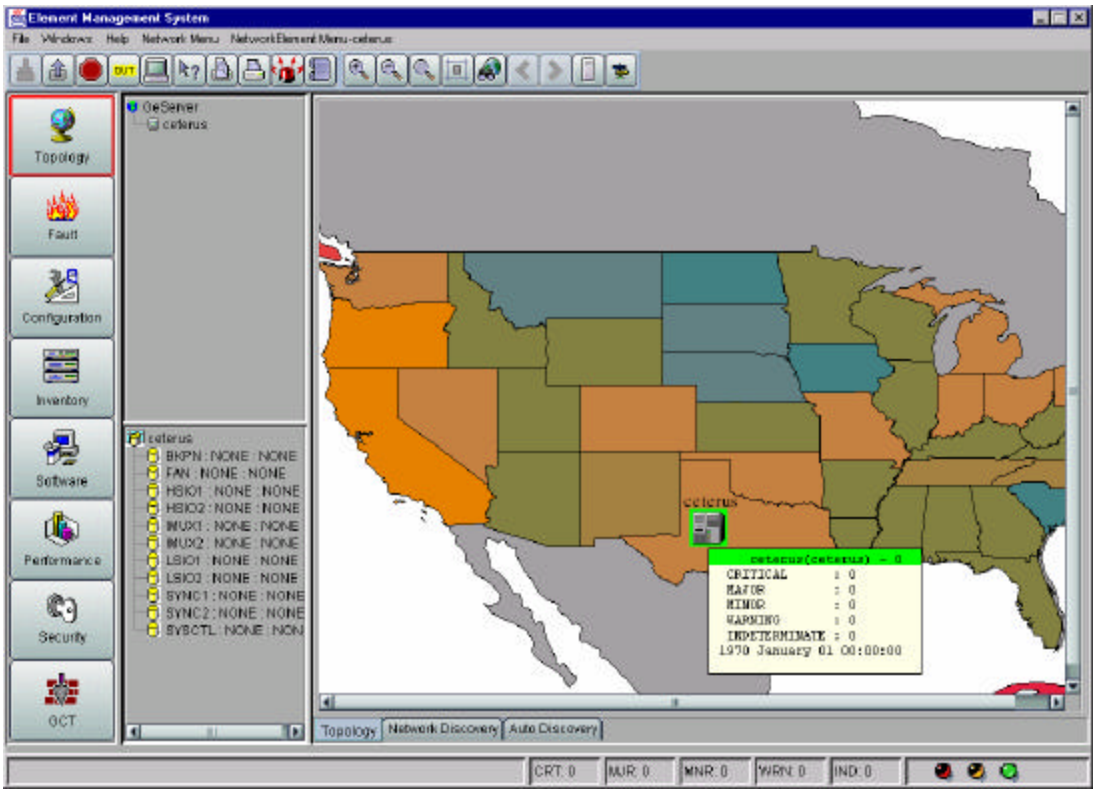


Figure 3.M*Ware Convergent Management System Topology Map

Inventory

Inventory management functionality is achieved by using the M*Ware Inventory Service.

Inventory service is modeled after the ITU-T M.3100 information model, which addresses the creation and configuration of equipment, equipment holders, circuit packs and other associated components.

The Convergent Manager graphical user interface enables users to visualize the equipment chassis with a color-coded display of shelves, slots, and circuit packs. The alarm conditions associated with chassis components are displayed as color-coded LEDs on the chassis.

The GUI also enables users to "drill drown" to the various slot and facility objects associated with a particular slot and perform various configuration activities and offers the capability to provision the slot with Circuit pack types, which can be plugged into the slots.

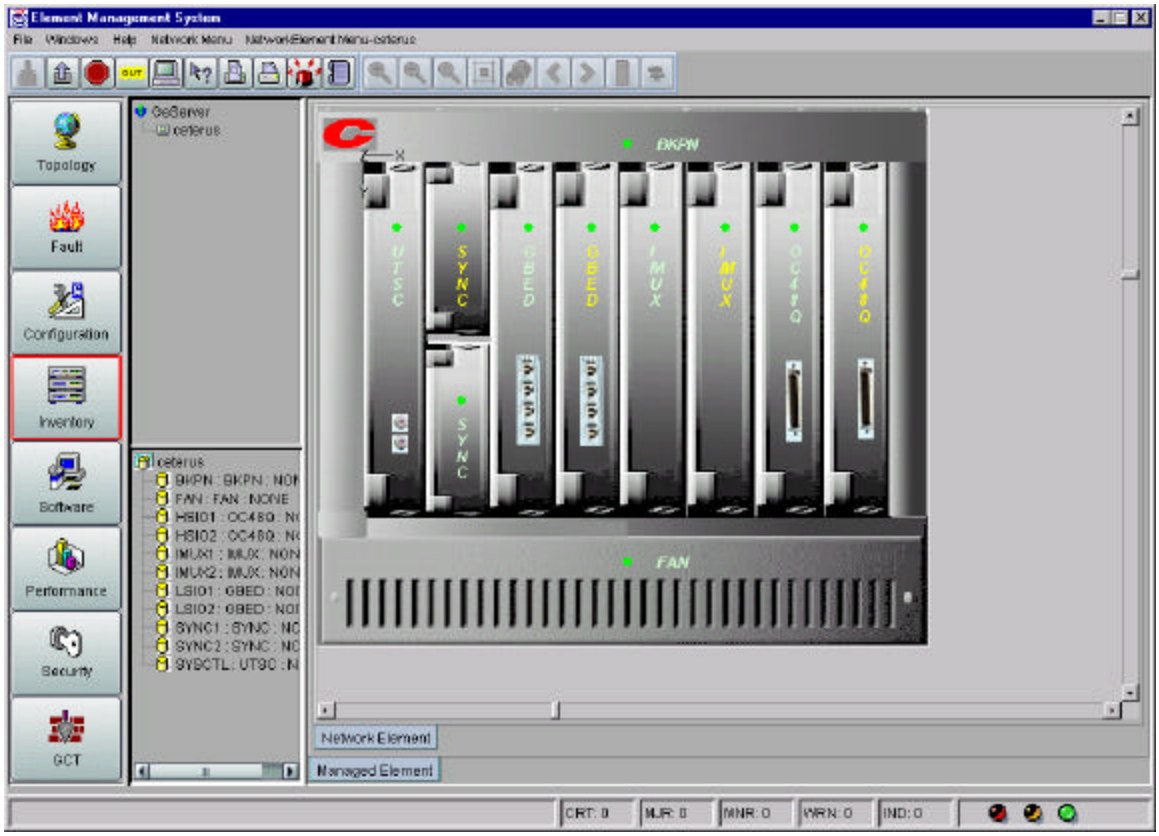


Figure 4. M*Ware Convergent Manager Equipment Inventory View

Fault

Fault Management is provided using the Fault Management Service, which is modeled after ITU-T X.733 and X.734 Recommendations, addressing various fault management features.

The M*Ware Convergent Manager GUI offers Color Coded visualization of alarm information.

Faults can be filtered depending on

- *Target*: Alarms for a particular target
- *ID range*: Alarms can also be filtered on their ID range.
- *Dates*: Alarms occurred between a from date and to date
- *Severity*: Alarms of certain severity
- *Entity type*: Alarms on a particular entity (such as Network Elements, Equipment Holder, Facilities)

Network Events and Faults can also be produced as reports.

Alarm display is categorized into

- *Recent Alarms*: Recent Alarms are alarms that occurred during a given operator session.
- *Active Alarms*: Active Alarms are alarms that are currently active—they have not yet been cleared or a corrective action has not yet been taken.
- *Reviewed Alarms*: Reviewed Alarms are alarms that have not been cleared but a possible corrective action has been taken.
- *Alarm History*: Alarm History contains the history of all alarm occurrences, including the clearing of alarm conditions.

The GUI enables users to configure the Alarm Severity Assignment Profiles.

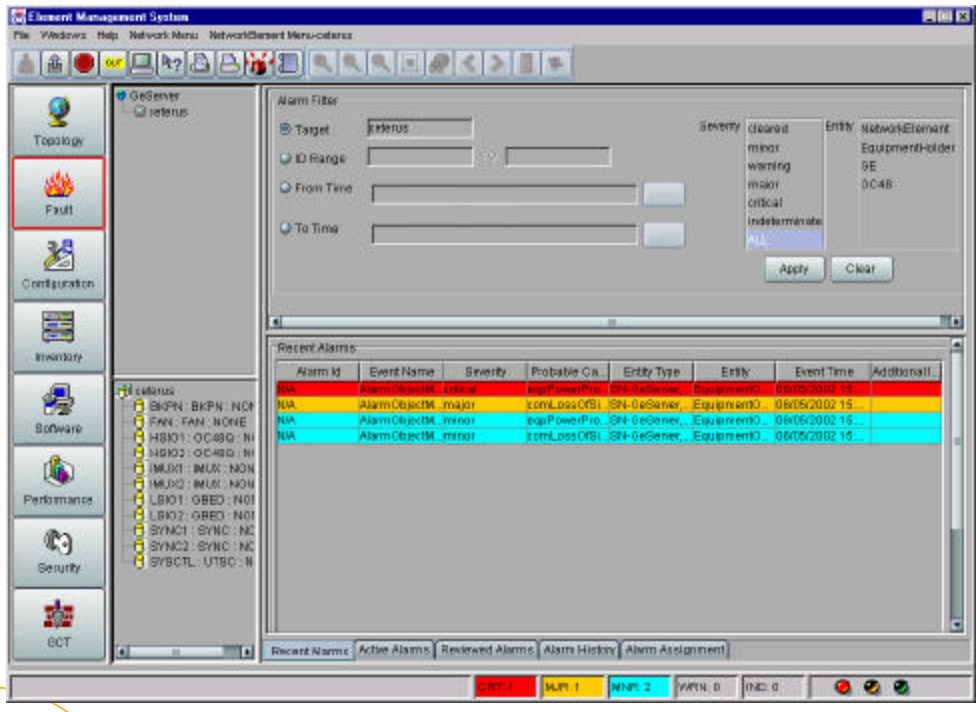


Figure 5. M*Ware Convergent Fault Management view

Configuration

The Convergent Manager offers customizable and standards based configuration functionality for various technologies including:

ATM
SONET/SDH
DS1
DS3
ADSL
OC3/OC48 and many more

These customizable components may be used for variety of applications, which are capable of managing equipments like DSLAMs, Gigabit Ethernet Routers, Add/Drop Multiplexer, Metro Long Haul Optical Switches, DWDM Switches etc.,

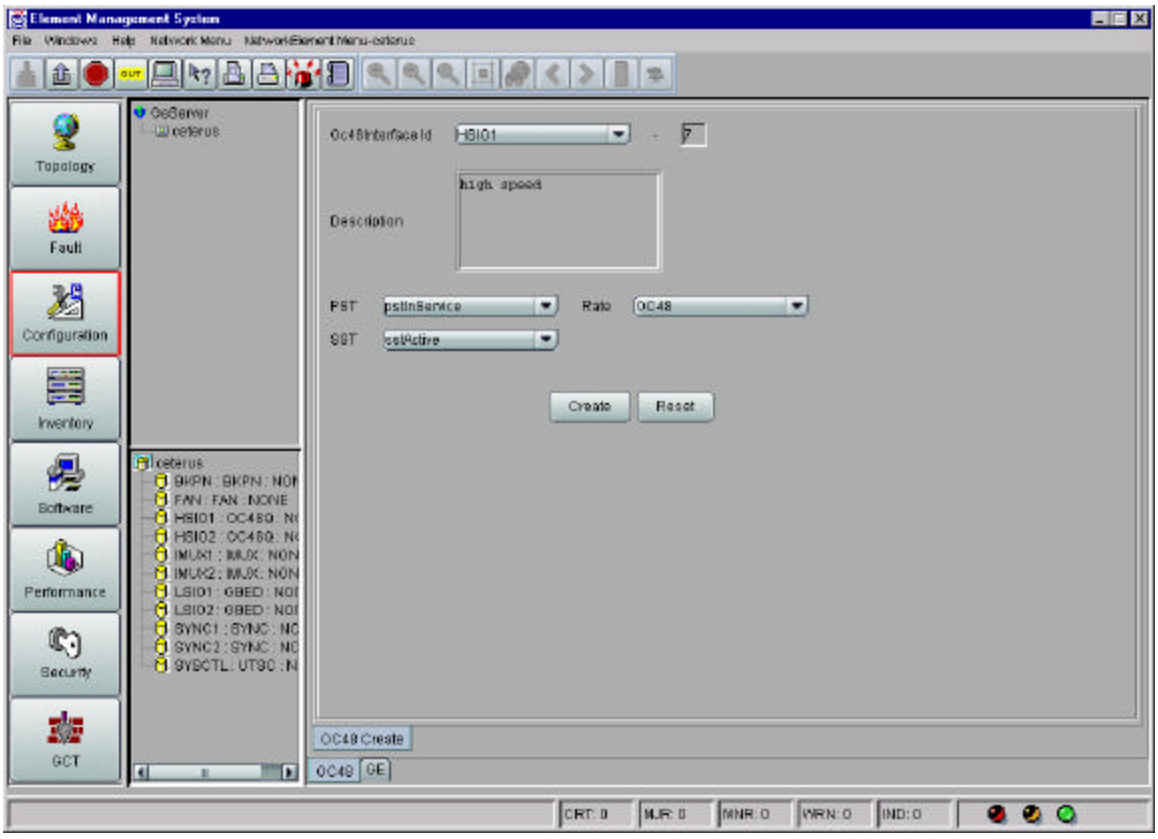


Figure 6. M*Ware Convergent Manager Configuration view

Performance

The Performance Management service definition is based on ITU-T Q.821 and Q.822 Recommendations.

M*Ware's Performance Management Service provides a well-defined set of APIs that perform PM data collection, threshold monitoring, QOS violation notification, and history data management. Technology specific "currentData" and "historyData" classes can be inherited from existing GDMO Information models or defined using UML. The Convergent Manager GUI enables users to view and analyze the performance data collected for a specific entity, such as the OC48 Facility.

The performance data can be plotted using different graphs

- Line Charts
- 3D Line Charts
- Column Charts
- 3D Column Charts

M*Ware Convergent Manager also offers customizable report generation.

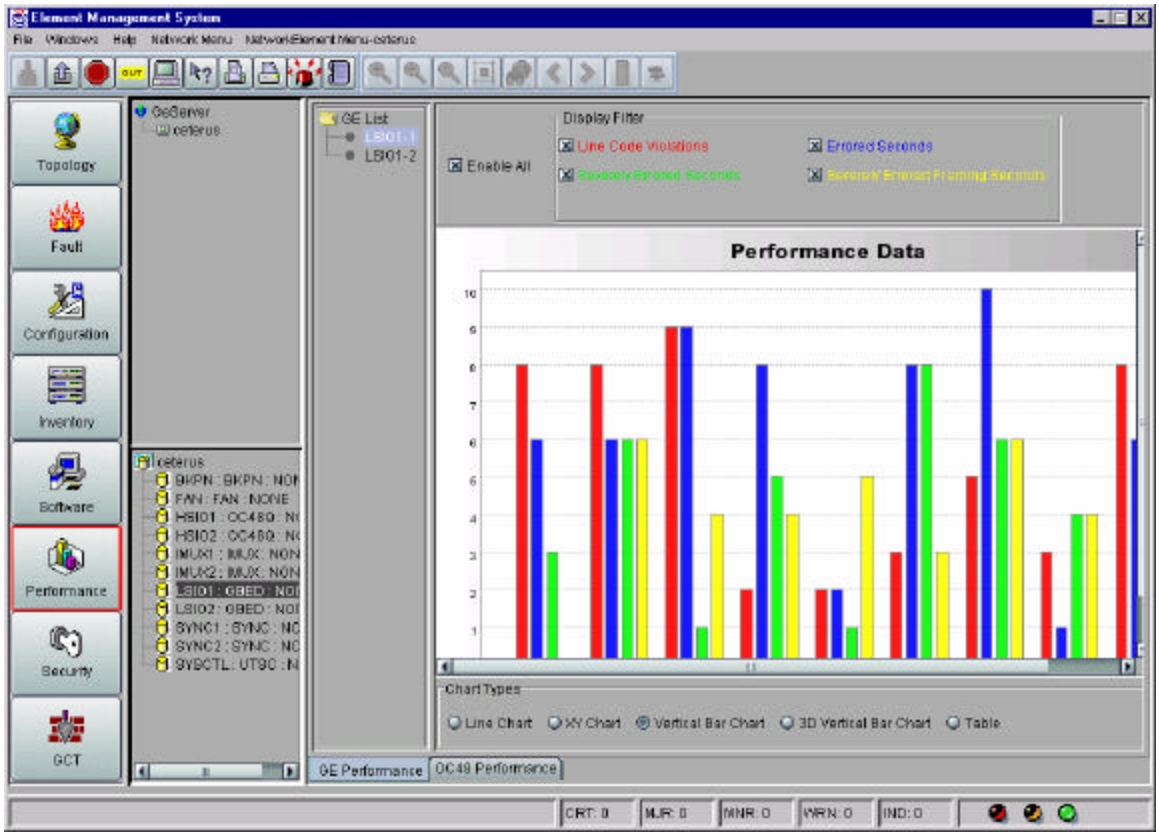


Figure 7. M*Ware Convergent Management System Performance Management

Software Management

The Software Management M*Ware service is based on ITU-T X.744 and provides a well defined set of APIs that perform flexible and standards based management of various software using both executable and non-executable (like database images, configuration files, etc).

The service offers functions like delivery, installation, backup, restore, revert and validation. It also offers built-in TFTP functionality and can be extended to use any other file transfer protocols.

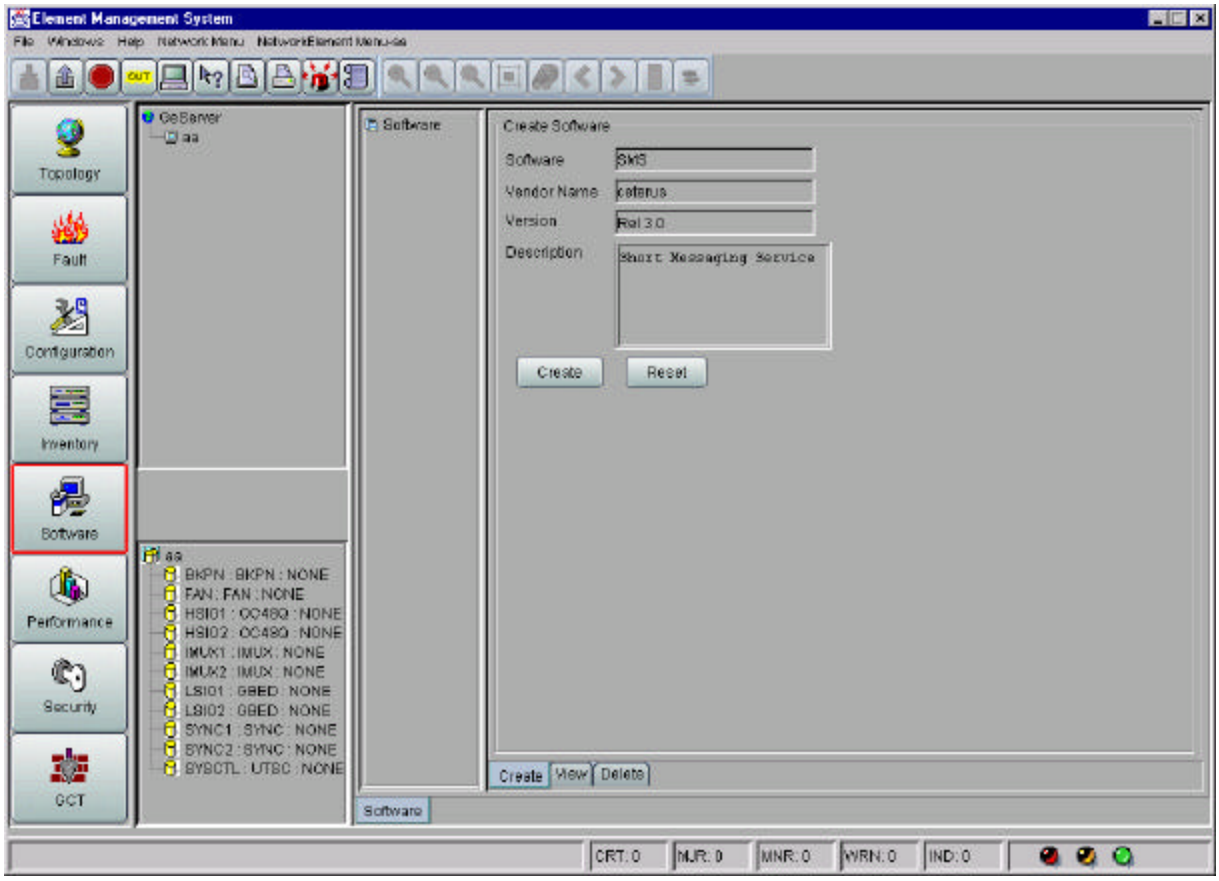


Figure 8. M*Ware Convergent Management System Software Management

Security

The M*Ware Security/Profile service is based on standards such as Telcordia/Bellcore GR2153.

The Management GUI allows you to manage users, applications, roles and privilege profiles associated with various users and roles.

The M*Ware concept, allowing deployment of Convergent managers on every layer and the use of common services by multiple systems, can be a powerful enabler of consistent authorization and security spanning across all the deployed networks and domains.

The CIM based network information modeling, extended with the security service features, can easy interface to LDAP security directories.

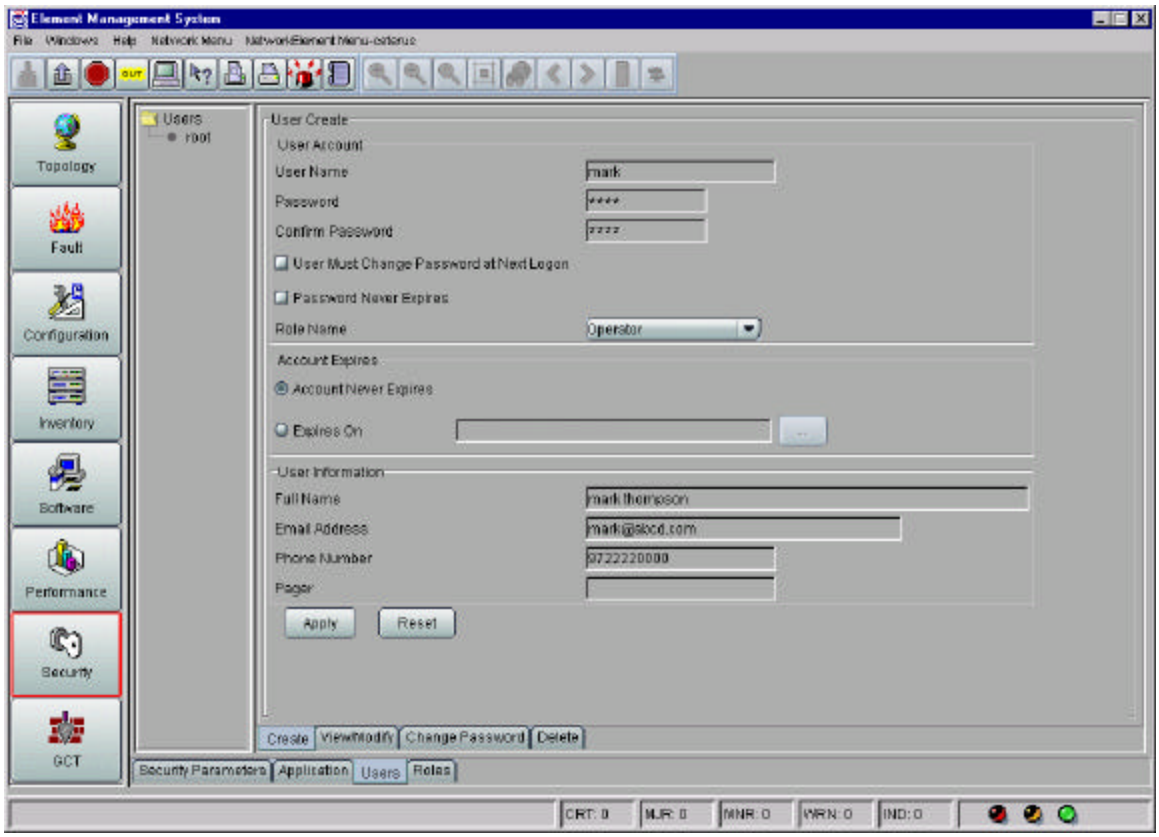


Figure 9. M*Ware Convergent Management System Security Management

GUI Cut Through

The M*Ware Convergent Manager has a highly customizable GUI Front End.

This enables easy plug-in of a custom GUI Cut Through Interface to perform technology specific functions directly on target systems or network elements.

M*Ware Convergent Management System offers 100% Java Based Communication Management Modules for protocols like TL1, CORBA and SNMP for easy communication with the systems and Network Elements directly from the GUI Client Applications.

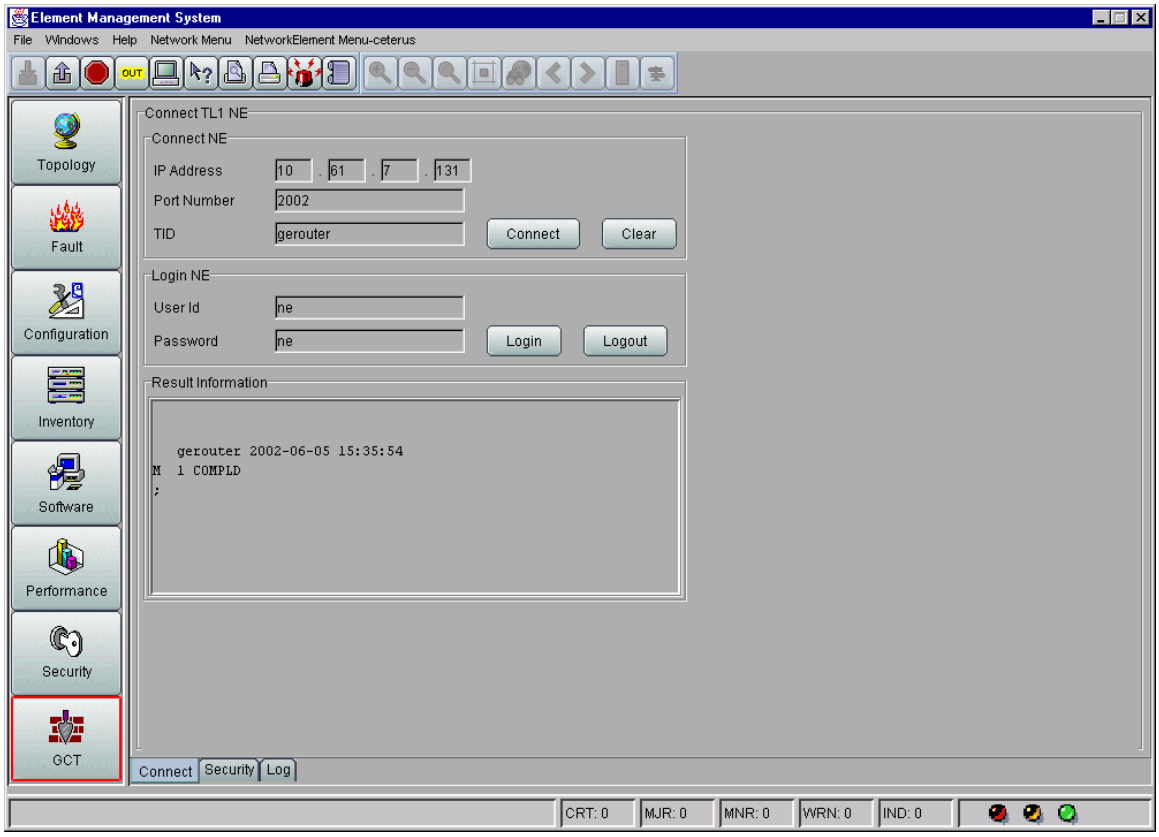


Figure 10. M*Ware Convergent Management System GUI Cut Through

About Vertel

Vertel is a leading provider of Mediation, Network Integration and Management and B2B Exchange Solutions.

Since 1995, Vertel has provided solutions to over 300 companies, including telecom infrastructure vendors, operators and service providers such as Alcatel, Nokia, Siemens, Motorola, Lucent, Nortel, NTT, Samsung, AT&T, BT, Deutsche Telekom, Cingular and Williams Communications.

Vertel's in-depth knowledge and commitment to industry standards, combined with experience of working with many different equipment types, allows the creation of high performance solutions that enable customers to quickly overcome technological barriers.

Vertel's mission is to make its customers successful by enabling them to reduce operational costs and introduce new services, networks and OSSs whilst maximizing existing investments.

Vertel's Professional Services organization in USA, Europe and Asia develops communications software solutions tailored to individual customer requirements and offers project management, systems analysis and other technical services.

For more information on Vertel or our M*Ware products, contact us at 21300 Victory Boulevard, Suite 700, Woodland Hills, Ca. 91367; telephone: + 1818 227 1400; fax: +1 818 598 0047 or visit www.vertel.com