

Netcool® TMN Management Functions Fault Management Conformance

The International Standard for Fault Management



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Introduction

For more than 100 years the International Telecommunication Union (ITU) has served as an impartial, international organization where governments and the private sector organizations work together to coordinate the operations of telecommunication networks and services and advance the development of communications technology. ITU's work since 1885 has helped create a global communications network. This network now integrates a diverse set of technologies, yet remains one of the most reliable man-made systems ever developed.

The Telecommunications Management Network (TMN) Principles and Architecture is an overall framework for the management of a telecommunications infrastructure. This framework developed by the ITU, details requirements for network and service management solutions. The ITU Recommendation M.3400, TMN Management Functions, was approved in February 2000. The management functions defined in the TMN Architecture provide an ideal framework for designing enterprise management systems.

This paper focuses on the TMN's Fault Management Function, and how the Micromuse Netcool suite of products complies with these recommendations. The TMN recommendation provides both generic and specialized management function sets. These recommendations describe the interaction between application processes to manage computing resources.

The TMN Fault Management Function

Fault Management is a set of functions which enables the detection, isolation and correction of abnormal operation of the telecommunication network and its environment. Though the ITU initially defined this framework for telecommunications networks, the same concepts may be applied to data networks, applications and operating systems. The Fault Management Function deals most commonly with events and traps as they occur on the network.

The Fault Management Function includes the following function set groups:

- Reliability, Availability and Survivability (RAS) Quality Assurance
- Alarm Surveillance
- Fault Localization
- Fault Correction
- Testing
- Trouble Administration

These functional areas are summarized below. The complete Fault Management Function recommendations may be found in the ITU's *M.3400 TMN Management Functions* document.

RAS Quality Assurance

RAS quality assurance provides access to metrics that will be used to monitor the frequency and duration of network outages. These metrics should be used to develop quantitative goals.

This functional area also requires that reports are available to determine the reliability, availability and survivability of network components, and how these results compare to service level goals. The reports may show the impact of outages on services, devices and customers.

Alarm Surveillance

This functional area recommends that the management system have the capability to monitor system failures in near-real time. When such a failure occurs, an indication is made available by the monitored system. Based on this notification, the management systems determine the nature and severity of the fault. These notifications should be logged to a database for future reporting.

This functional area also recommends that event analysis through correlation and filtering is included as a feature of the management system. The management system should allow a user to revise alarm status (major, minor, etc.) through a set of rule based or manual methods. Additionally, the management system should provide a mechanism to validate the persistence of an alarm.

Fault Localization

This set of recommendations specifies that the management system provide access to information to allow for fault localization. This fault localization information may include information such as lists of circuits, paths, facilities and network elements. The management system should also provide procedures for escalation if an alarm is not resolved in an allowed time period.

Fault Correction

The Fault Correction function provides a set of recommendations to allow for the management of the repair process. This function also recommends how a management system may facilitate the automatic restoration of system.

Testing

The Testing function details how the management system should provide a means to run remote testing of managed devices and initiate a managed element's internal testing. Each testing method should provide feedback to the management system.

Trouble Administration

Recommendations for the generation of trouble reports by the management system are detailed in the Trouble Administration function.

Netcool® Compliance

The Netcool® Suite

- The Netcool/OMNIbus™ application
- The Netcool/Service Monitors™ suite
- The Netcool/Impact™ application
- The Netcool/Visionary™ application
- The Netcool/Precision™ application
- The Netcool/Reporter™ application

RAS Quality Assurance

Reliability, Availability and Survivability Quality Assurance monitoring is implemented through Netcool/Reporter and Netcool/Service Monitor. These products are seamlessly integrated as part of the Micromuse Netcool suite of products.

Netcool/Reporter allows a system administrator to understand a network's behavior over varying time periods. With Netcool/Reporter as part of the management system, a user is able to view and analyze long-term managed device behavior at device, system, and service levels. Netcool/Reporter utilizes data captured by Netcool/OMNIbus.

Netcool/Service Monitors use Discrete Measurement Classifications to allow administrators to apply service level metrics for each managed element. The results of each Netcool/Service Monitor poll can be combined in a calculation that classifies the service status, as failed, marginal, or good. Improved response time against defined service levels can be achieved by using data generated by the Netcool/Service Monitor.

Alarm Surveillance

Netcool/OMNIbus collects and consolidates alarms from more than 300 types of managed elements in real-time. Probes collect data in real-time and forward the alarm data to the Netcool/OMNIbus. The data is stored in the Netcool/OMNIbus ObjectServer™, a fast memory resident database, and displayed in an alarm list. Alarms in the event list may be filtered and sorted in real-time using a meaningful and user friendly format.

Fault Localization

Netcool/Precision's *Network Slice Technology* provides Fault Localization to correlate events, suppress related events and determine the faults that are at the root of the problem. Netcool/Precision automatically identifies the actual physical path of communication between each end-node attached to an IT infrastructure. Netcool/Impact can use Precision's physical path information to perform Fault Localization. Netcool/Impact may also collect circuits, paths, facilities and network elements information from an asset management database to perform Fault Localization.

Netcool/Impact can automatically escalate unresolved alarms events based on business rules developed by an organization.

Fault Correction

Netcool/Visionary's MicroCorrelation Engine utilizes an Advanced MicroCorrelation Analysis Engine to consolidate, correlate and analyze alarms. Identified problems are forwarded to the Netcool ObjectServer as Smart Events. These Smart Events contain correlated MIB objects and their values. The Smart Event also refers to a recommended resolution. Smart Events help an administrator reduce down time by identifying the root cause of a problem.

The Netcool/Impact product takes advantage of Netcool/Visionary Smart Events to execute corrective actions to automatically restore a system. When an alarm is received, Netcool/Impact can also notify appropriate staff via email, paging, etc, to begin corrective actions.

Testing

Netcool/Impact policies may be used to facilitate remote testing of managed devices and to initiate a managed element's internal testing. These policies may be as simple as pinging a device and updating a journal field. Policies may also be combined with external programs for complex testing scenarios defined by administrators.

Diagnostic tools may be integrated into the Netcool/OMNIBus Event List. These context sensitive menu options provide an administrator with the right set of tools to respond to an alarm and to test a managed system.

Trouble Administration

Netcool help desk gateways offer integration with several industry leading help desk systems. These systems include Remedy ARS, Clarify Clear, Peregrine Service Center, HP OpenView IT Service Manager and Vantive Enterprise. Using the help desk gateway, Netcool/OMNIBus is able to generate trouble tickets. Changes to alarms are reflected in help desk trouble tickets.

About generationE Technologies

generationE focuses on the consolidation of business strategy, process and IT to deliver scalable value to our clients. Our practices deliver complete end-to-end solutions in business process re-engineering, enterprise network and systems management, application management, data warehousing, data center automation and IT services management.

We have successfully delivered solutions to more than 25% of the Fortune 500 including companies like Agilent, Aon, Ameritrade, General Mills, Pepsi, Time Warner and W.W. Grainger and employs a 24x7 service center to manage successful outcomes for our clients any time – day or night.

About Micromuse

Micromuse (NASDAQ: MUSE) is the leading provider of service and business assurance software. The Netcool® Suite is used by Telecommunication, Internet, Broadband and Wireless service providers, and corporate enterprises worldwide. The company is headquarter in San Francisco, with regional offices across the Americas, Europe and Asia-Pacific.