Network Traffic Management

8920 Network Traffic Management software

System Overview
Release 17.2

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1 About This Document Set

Purpose

The purpose of the 8920 Network Traffic Management software documentation set is to describe the 8920 NTM software.

Reason for reissue

These documents are reissued periodically in response to technical and editorial revisions.

- Technical revisions are made to document changes to or provide more information on the system hardware, software, or operation.
- Editorial changes, including changes to trademarks and references, are generally minor in nature. For this reason, they are not listed.

Release 17.2 User Documentation Issue 1.0

The NTM Release 17.2 documentation has been modified to include:

- The *Installation Guide* has been updated with the Linux Standards procedures..
- The *System Overview*, *Input Commands Guide*, and *System Administration Guide* have been updated with the description of two features:
  1. Feature 460, "Periodic Data Aggregation"
  2. Feature 461, "Statistical Thresholds"

Intended audience

These documents contain procedural and reference information.

We assume that the users of these books are experienced with the *Linux* operating system and have completed NTM product training courses as appropriate.

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The CAUTION admonishment indicates a hazard that may adversely affect data, software, and/or hardware.

DANGER

The DANGER admonishment indicates a hazard that may cause irreparable damage to data, software, and/or hardware.

WARNING

The WARNING admonishment indicates a hazard may cause serious risk of damage to data, software, and/or hardware.

Important! Emphasizes an important step or special instruction, or provides important information about a topic.

Conventions used

Typography

Three font types are used in this document. These are:

- *TrademarkTerm* type is used to:
  - Refer to another document
  - Emphasize trademarks.
- `Input` type is used on any commands that need to be entered in an exact format.

Example:

Enter `cd /home/user`

- `Output` type is used in programming examples.

Example:

```
#include <DSgdi.h>
gdi_state GDI_getstate()
```

References

When possible, all pertinent information about a topic can be found in the text. When this cannot be done, there are references to other sections of this IP or to other documents.

Trademarks

The legal page provides information about trademarks. In text, trademarks appear in *trademark-term format*.

Acronyms

The first time an acronym is used in a chapter, it is followed by its expansion in parentheses, for example, NMS (Network Management System). Subsequent uses of the acronym in the same chapter do not include the expansion.

Scope

This document set provides the following:

- *Data Tables Guide* — Tables listing types of network management data maintained by the database and calculations used by the exception system. Tables listing data type information used to create or modify user-defined reports and/or SQL (Structured Query Language) files.
- *Input Commands Guide* — Description of the syntax and usage of all input commands in Network Traffic Management.
- *Installation Guide* — Information and procedures required to set up the NTM system. It contains software loading, configuring web servers, and installing report writer procedures.
- *Record Base Administration Guide* — Information and procedures required to define and maintain the user-built text files that make up the NTM record base.
- *Report Writer Guide* — Information and procedures required to create and run reports using the *BrioQuery* package.
- *System Administration Guide* — Information and procedures required to set up and maintain the NTM system. It contains information on installation procedures and routine, preventive, and corrective maintenance procedures.
- *System Overview* — High-level description of the NTM system and how it works.

- *System Responses Guide* — A list of error messages generated by NTM, indicating software-detected errors or changes in system status.
- *User Guide* — Information and procedures required to use the browser-based graphical user interface (GUI).

These documents describe how to use the NTM product but are not intended to explain how to manage a network.

Terminology

All NTM documents use the common terminology described below.

Step/Procedure/Process

Steps, procedures and processes tell you how to operate the system.

- A ***step*** is an instruction to perform an individual specific action.
- A ***procedure*** is a set of directions. A procedure usually consists of a series of numbered steps.
- A ***process*** is a continuous series of events with an identifiable purpose or result. A process usually consists of a series of procedures.

Sample/Example/Template

Samples, examples, and templates provide illustration.

- *Samples* and *examples* include data or text. This data or text is the same as or similar to that which the system produces or to what you must enter on a display, report, etc.
- A *template* is used to illustrate a blank page or display without any user or system information entered. Templates do not include data or text.

Synonyms

The following terms are used interchangeably throughout this document set:

- exchange, office, xchnge, xchange, switch, network element, cmt
- clli, exchange_identifier, entity
- alarm, discrete

Entering commands

When you are instructed to enter a command (for example, “Enter `nmhelp` at the CMD: prompt of any menu”), it is implied that you follow that command with a **RETURN**.

> **Reference:** Chapter 1, “Introduction to Input Commands” in the *Input Commands Guide*

How to obtain NTM documentation

To obtain additional copies of NTM documentation, contact your local Alcatel-Lucent representative. Refer to the following list of titles and publication numbers:

- *System Responses Guide*, 190-406-005
- *Report Writer Guide*, 190-406-006
- *Data Tables Guide* 190-406-810
- *Input Commands Guide* 190-406-811
- *Installation Guide*, 190-406-812
- *Record Base Administration Guide* 190-406-813
- *System Administration Guide*, 190-406-814
- *System Overview* 190-406-815
- *User Guide* 190-406-816
- *Front-End Processor (FEP) Administration Guide* 190-406-737

NTM Product Training

You made an investment, now make the most of your Alcatel-Lucent product!

Course	Description
OS3119	This course provides a detailed functional overview of the NTM. It is designed to enable the student to: • Describe the system hardware and software • Identify procedures and commands used for database management • Describe data flow
OS3189	This course prepares students for duties as a system administrator for a NTM System. It is course is designed to enable the student to: • Add and delete network elements • Perform general administration tasks, such as managing system security, using administrative commands, and administering and managing databases, adding and deleting users • Perform NTM computer operations (backup and restore, etc.)
OS3190	This course covers the topics needed to maintain the NTM record base and database. The record base files and audits are explained, along with the procedures for adding, deleting, and modifying record base information. This course is designed to enable the student to: • Identify record base files related to reference data • Perform database tests and creates • Identify the location and format requirements of record base files
OS3192	This course prepares network managers for duties as NTM network managers. Students learn to use the graphical user interface to view network data and apply controls. This course is designed to enable students to: • Retrieve and view data using the NTM GUI • Perform network management operations through the GUI

Maximize your purchase. Schedule training to increase your job performance. Courses can be taught at your location.

Enrollment: https://www.alcatel-lucent.com

2 System Functions

Overview

Purpose

This chapter provides a high-level description of the NTM system. Additional functionalities are available as purchasable features. Please contact your Alcatel-Lucent Account Representative for more information.

Contents

This chapter contains the following topics:

NTM system functions

Overview

NTM is a computer-based operations support system that facilitates management of network traffic congestion for public and private office telephone networks. Network managers use the NTM system to:

- View network conditions
- Identify traffic congestion in the network
- Apply controls to switches and trunk groups to manage network traffic

Thresholding

The NTM system monitors offices and the communications channels (trunks or circuits) between them and collects near-real-time network traffic data. As part of a process known as thresholding, NTM compares this data to reference values in its database to calculate levels of congestion within the network. Manual and automatic audits from NTM ensure that the NTM database stays in sync with the offices it monitors.

Exceptions

A set of specially-constructed data displays highlights abnormal network conditions or exceptions and identifies where they occur. An exception is a calculation that has exceeded its threshold.

Controls

NTM provides for the application of both manual and automatic switch controls to relieve congestion in the network or to keep delays at reasonable levels. NTM enhances the ability of the network manager to maintain the integrity of the network during overloads and failures by quickly analyzing office performance problems, applying controls, and evaluating the effectiveness of those controls.

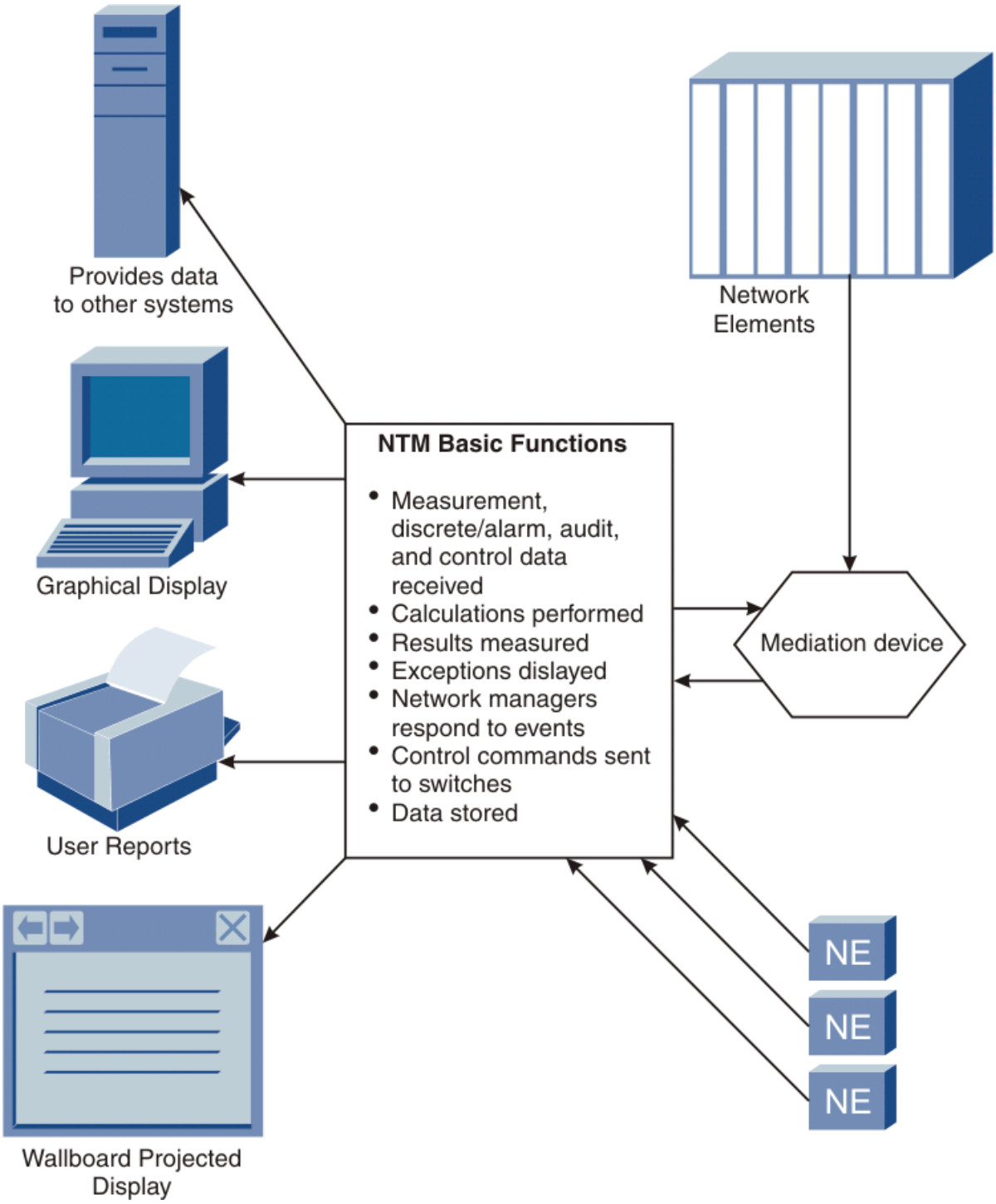
Reference database

NTM maintains a reference database of trunk groups and offices. It provides additional functions that administer the network traffic management operating system and support efficient operation of the network management center. NTM also provides reporting functions to make network information available for later study and analysis.

Figure

Figure 1 shows the basic functions of NTM and the interfaces it uses to collect, display, and store data.

Figure 1 Basic functions of NTM



NTM inputs and outputs

Inputs to the system are data requested from various offices by NTM. The types of data requested and received are:

- Discrete/alarm data
- Periodic data
- Returned data from audit requests
- Control responses from offices

Outputs from the system are:

- Requests to offices for data
- Control commands sent to offices
- Audit requests sent to offices

NTM polls surveyed offices for the following:

- Requests for Event Indicators (Discretes or Alarms) and Measurement Data
- Audit Requests
- Active Controls

Using the thresholds in its database for comparison with discrete and measurement data, NTM calculates trunk group and office data exceptions. Graphic and page displays highlight abnormal network conditions (exceptions) and identify where they occur.

Data collection and reporting

Overview

The database contains surveillance, reference, control and suspect data, as well as different methods for reporting on that data.

Surveillance data

NTM collects surveillance data automatically at 30-second and 5-minute intervals.

Discretes

Every 30-seconds, NTM polls the switching system for discretes. Discretes are event indicators that may be used by the network manager to determine network conditions; for instance, serious problems, such as switching system congestion, may be identified by the status of the discretes.

Measurement data

Every 5 minutes, NTM collects measurement data. This data includes the number of calls entering a switching system or waiting for service from common switching equipment, and trunk usage data.

Large data collection values.

Data counts received by NTM exceeding 2,000,000, are divided and stored in the NTM database and then recalculated when being displayed, this may result in truncating of very large numbers.

NTM limits data count to values of 4,000,000,000 and under. Numbers larger than this will be displayed as suspect.

Reference data

The NTM record base contains information about the structure of the entire network and additional information about that portion of the network for which it is directly responsible. Reference data is input into the database manually by creation and installation of record base files or it is updated in the database automatically as the result of an audit. This information, known as reference data, includes:

- the locations and capabilities of switching systems
- the routes and capacities of trunk groups
- normal traffic overflow patterns

Some reference data is input manually into the record base files and some is supplied by the office through audits.

Control data

The NTM database contains information about controls that are currently active in the network. Audits collect this information from the network to update the database. A control log in the database provides a detailed history of controls that are applied to and removed from the network.

Suspect data

The NTM database contains information that may be considered unusual or suspect. This data often is inconsistent data counts received from the office. It is considered invalid and will be displayed with a question mark (?) on the workstation. This information can be excluded/included with Feature 74, "Improved Filtering and Reporting of Data".

Only those fields that are thresholdable may appear as suspect data. Refer to Chapter 1, "All Data Fields" in the *Data Tables Guide* to determine which fields are thresholdable.

Performance and troubleshooting reports feature (PATR)

The Performance and Troubleshooting Reports Feature (PATR) enables NTM personnel to collect various application performance data upon request. Depending upon the report type selected, the data may be real-time or hourly. The hourly data may be for a 24-hour period or less. Seven days of data are collected and stored for report access.

One NTM command is either input manually or scheduled by cron action to output the desired PATR report types. This commands is:

- `perfrep` — Use this command to output performance reports based on historical (not real-time) data saved in daily log files for a maximum of 7 days of data.

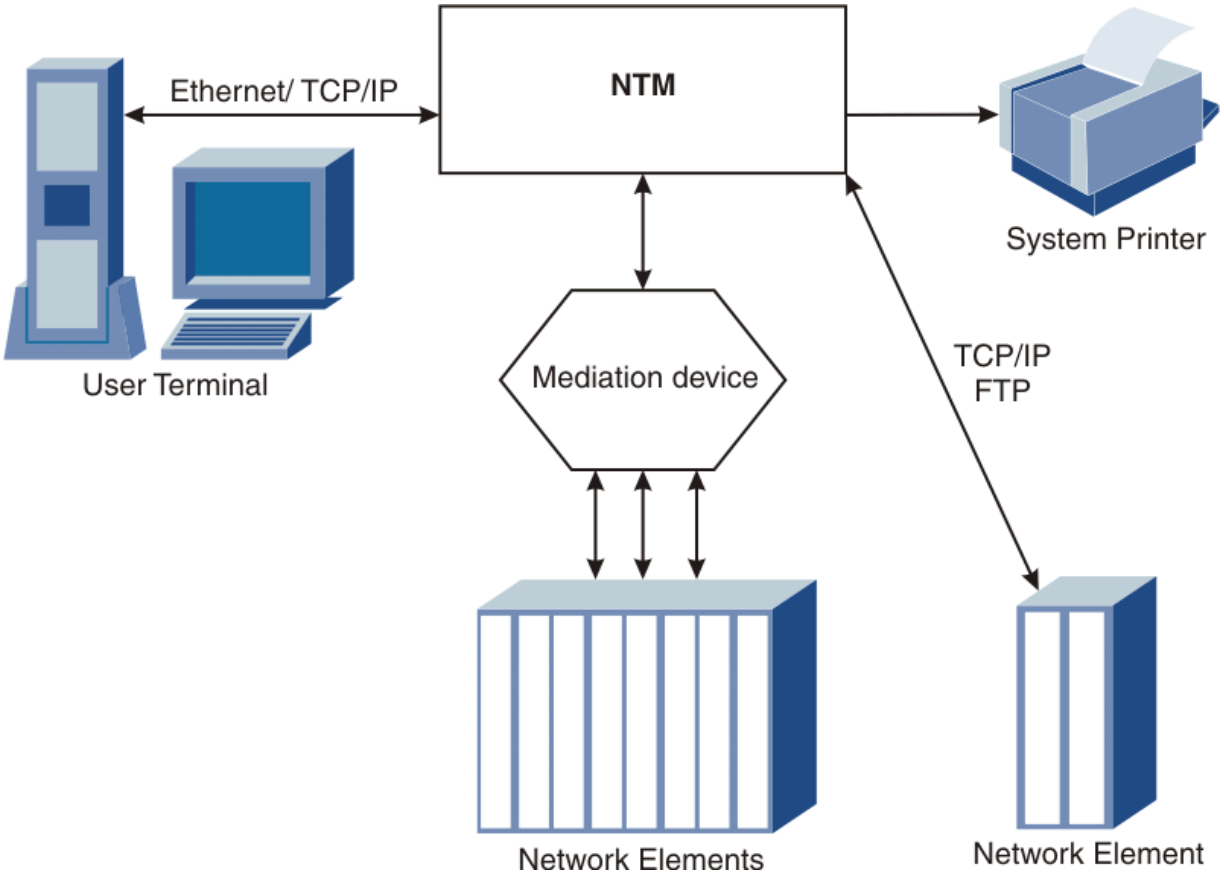
  Reference: Chapter 7, "Administrative Performance Reports" in the *System Administration Guide*

□

Figure

Figure 2 shows the different NTM interfaces.

Figure 2 NTM Interfaces



Network elements

NTM supports various switches in the network that are equipped with the generics shown in Table 1.

Table 1 NTM supported switch GENERIC

Switch Type	Standard Generics Supported	Optional (Purchasable Feature) Generics Supported
1A *ESS*	1ae8, 1ae9, 1ae10	1ae11, 1ae12, 1ae13_0
4ESS	4e12, 4e13	4e14, 4e15, 4e16, 4e17, 4e18, 4e19, 4e20, 4e21, 4e22, 4e23, 4e27, 4e28
5ESS	5e4, 5e5, 5e6	5e7, 5e8, 5e9, 5e9_2, 5e10, 5e11, 5e12, 5e13, 5e14, 5e15, 5e16, 5e16_1, 5e16_1h, 5e16_2
DMS 100/200	dms24, dms25, dms26, dms27, dms28	na007, na009, na010, na012, na013, na014, na016, na017, sn05_100
DMS 250		ucs07, ucs08, ucs09, ucs12, ucs13, ucs14, ucs16, sn04tdm, sn05_250
DMS 500		ncs06, ncs07, ncs10, ncs12, ncs13, ncs14, ncs16, ncs17, sn05_500
EWSD		ewsd10, ewsd11, ewsd12, ewsd13, ewsd13a, ewsd16
GSP		gsp07+
LSSGR		lssgr87
nextone		rsm5_0, rsm5_1
SCSNSN (*Succession*)		sn02, sn03, sn04, sn05, sn06, sn07, sn08
GTD-5		gtd1641, gtd1711, gtd1721, gtd1722, gtd1732, gtd4003
Sonus GSX		gsx5_1, gsx5_2
Sonus PSX		psx5_1, psx5_2
DCC		fepr1, tdms1, tdms2, tdms3, npm6.0
NMS		

Reference: Chapter 10, "Time Synchronization" in the *System Administration Guide*

Managing the network element interface

The data collector manages the interface to the network entity in NTM. The 5-minute data provides you with time for analysis after seeing the data. The `act` (activate) and `deact` (deactivate) commands allow you, on a per-entity basis, to activate or deactivate the collection of 5-minute data from a network entity. You may or may not want to see the data for all network entities. If, for example, there is a network entity that is overloaded, you might not want to continue collecting data from that entity until the network is back to normal.

Important! The `linkstat` (link status) command determines the per-entity data collection status for all office and data types at any time.

Reference: See the "act" (p. 4), "deact" (p. 11), and "linkstat" (p. 9) commands in the *Input Commands Guide*.

Data collection concentrators

DCC (Data Collection Concentrator) is the generic term for a network element that collects and concentrates data from multiple network elements. This information is then passed on to NTM. DCC systems include EADAS (Engineering and Administrative Data Acquisition System), FEP (Front-End Processor), NPM and TDMS (Traffic Data Management System). With this interface, the switch polling order and the data volume for each switch is detected automatically, and the user does not have to determine any switch-to-DCC mapping. Also, the switch status can be displayed with the `linkstat` command.

Important! NTM also supports DCOS (Data Collection Operations System) as an EADAS.

EADAS interface

NTM no longer provides an EADAS interface via *Datakit*; customers must update from DCOS to a Telecordia NPM (Network Performance Monitor), which utilizes TCP/IP to implement the EADAS interface.

Data collection for 1A *ESS*, *5ESS*, *DMS*, *EWSD*, and LSSGR switches is accomplished via an EADAS interface, which is used as a data concentrator for these switches. Many switch types can also be connected directly to NTM via TCP/IP.

Front-end processor (FEP)

The FEP (Front-End Processor) is one type of data collection concentrator that collects and concentrates data from the *5ESS*, *DMS*, and *GTD-5* switch types. This information is then passed on to NTM. This data can be collected via Ethernet. If support for *GTD-5* switches is needed, then the FEP is the data concentrator.

Traffic data management system

The TDMS system is a type of data collection-concentrator that collects and concentrates data from the 1A *ESS*, *5ESS*, and *DMS* 250 switches types. NTM supports two types (classes) of TDMS generics:

- TDMS1 is treated as an EADAS
- TDMS2 is treated as a FEP

Data collection operations system

The DCOS system is a type of data collection-concentrator. It is treated by NTM as a 1BED6 EADAS.

Office connectivity

The preferred method of connectivity between network elements and the NTM host is through TCP/IP direct connections. Some switches may not have the capability to connect through TCP/IP and may still be mediated through various types of DCC's or FTP links. DCC's are connected to the NTM host through a TCP/IP connection.

Purchasable features may need to be installed before TCP/IP direct connectivity is available.

Reference: "List of purchasable features" (p. 2)

Connecting Network elements to the NTM host via TCP/IP has many benefits including:

- Improved switch to NTM host communications.

  The use of TCP/IP over an Ethernet network will significantly speed up the transfer of data, control, and audit messages between an office and the NTM host.

  TCP provides reliable, error free data exchange.
- Increased effectiveness of the NTM Feature Set Data Collection.

  Increasing the speed and throughput of the data collection network may result in fewer switches reporting late data.
- Increased Reliability of the NTM Feature Set Data Collection.

  Providing a reliable data network may result in fewer errors in the data reported.
- Reduce maintenance cost by eliminating network DCC's.

Reference: For a description of the NTM protocol stack for *4ESS* switches, see Chapter 10, "Time Synchronization" in the *System Administration Guide*

Network Element Type	DCC Connection	TCP/IP Connection
DCC Mediated Offices		
4ESS	Prior to NTM Release 13, 4ESS offices were connect through BX.25 links. Beginning with Release 13 there is either a Datatek DT-4180 interface device or AISwitch interface between the 4ESS office and the NTM host.	Not Applicable
1A *ESS*	1ae11 and later	Not Applicable
EWSD	ewsd10 and later	Not Applicable
LSSGR	lssgr87	Not Applicable
DCC Mediated or TCP/IP Connected Offices		
5ESS	5e4 to 5e15	5e15+
NTM does not support Phase 1 *DMS* switches. See special considerations for dealing with these switches in Chapter 2, "Commands for Auditing Network Elements" in the *Input Commands Guide*.		
DMS 100/200	dms24+, na007 to na013	na013+, sn05_100+
DMS 250	ucs07 to ucs13	ucs13+, sn04tdm+, sn05_250+
DMS 500	ncs06 to ncs13	ncs13+, sn05_500+
GTD-5	gtd1641+ (Data collect via a FEP)	gtd4003+
TCP/IP Only Connected Offices		
SCSNSN (*Succession*)	Not Applicable	sn02+ sn06+ uses FTP links
Sonus GSX	Not Applicable	gsx5_1+
Sonus PSX	Not Applicable	psx5_1+
DCC		fepr1+, tdms1+, npm6_0+
NMS		

TCP/IP ports used by NTM

Table 2 shows the ports reserved by NTM and official ports used by NTM. These are defined in the "/etc/services" file. As a general rule, check with your system administrator to confirm ports before proceeding with any configuration changes. Table 3 shows other ports that may be required by NTM.

Important! Ports that may be used by HP-UX are not listed in this document

Table 2 Ports reserved by NTM and official ports used by NTM

Official Service Name	Port/ Protocol	Description
http	80/tcp	HTTP server
https	443/tcp	Secure http server
ldap	389/tcp	LDAP server
ldaps	636/tcp	Secure LDAP server
dcolnms	50022/tcp	NTM BDR DCOLNMS
nmsrcv	50023/tcp	NTM BDR NMSRCV
auappletserv	8085/tcp	NTM GUI Auto Update Server
ssh	40000-46143	Local SSH ports for Succession secure interface
ErrorLogServer	4400/tcp	NTM GUI Error Log Server
	3800/tcp	NTM Network overview server
	18085/tcp	NTM Historical clock server
	10724/tcp	GTD-5
	9553/tcp	SCSN SDN
	9554/tcp	SCSN SDN
	9555/tcp	SCSN SDN

Table 3 Other Ports that may be required by NTM

Official Service Name	Port/Protocol	Description
exec	512/tcp	Remote execution, password required
login	513/tcp	Remote login
shell	514/tcp	Remote command
ntp	123/udp	Network Time protocol
syslog	514/udp	Remote system logging
printer	515/tcp	Remote print spooling
ftp	20/tcp	File Transfer Protocol (Data)

Table 3 Other Ports that may be required by NTM

ftp	21/tcp	File Transfer Protocol (Control)
ftp	>1024/tcp	Succession offices File Transfer Protocol - passive mode (Data)
ssh	22/tcp	Secure logins, file transfers (scp, sftp) and port forwarding
telnet	23/tcp	Virtual Terminal Protocol
smtp	25/tcp	Simple Mail Transfer Protocol

Important! NTM uses port numbers that are already registered in */etc/services* for other applications (e.g. port 4400). NTM is using alias functionality.

Graphic workstations and PCs

Graphic workstations or PCs are used with NTM to show network view displays. They provide a high-level view of the network, intended to alert network managers to potential problems. The server workstation is connected to the client workstations or PCs, through TCP/IP over an Ethernet network in a server/client configuration. The server and client workstations or PCs are connected to the host computer through the Ethernet network. These can be optionally configured to project the displays onto a wallboard.

User terminals

User terminals for NTM are connected to the host computer through the Ethernet network. NTM also supports terminals that implement the X-windows standard and interface over the Ethernet.

System printers

The system printer is under the control of the print spooler; it is available for any user to print files. The *HP*Jet printer or an equivalent model is recommended. Use of multiple printers is possible.

□

Software architecture

Overview

The basic software for NTM consists of:

- The *Linux* Operating System
  - The *Red Hat Enterprise Linux*
- Oracle (With partitioning) License (Release 15 and later)
- The NTM application, which is a collection of application programs that perform network management tasks.

  The major NTM application programs include data collection, audits, controls, data processing, user interfaces, and displays. The system also generates network element and trunk group summary reports as necessary.

NTM data displays

Overview

NTM provides an interactive data display system that allows you to input and view data related to the following aspects of network management: analysis, controls, exceptions, and database storage.

This system includes projected graphic displays or wallboards, printer(s), terminals, and graphic workstations. When an indicator is activated, the network manager uses a terminal or a workstation to access the NTM data displays and investigate the problem.

The browser-based graphical user interface is used to view and analyze data and implement controls. The web browser uses standard web technology such as dynamic Hypertext Markup Language (HTML) and Java applets to present the web pages and allows you to move around the pages through the use of hypertext links.

Graphical user interface

There are many benefits using the graphical user interface:

- Through the use of hypertext links, the GUI provides integration of data and displays — which provides quick and easy access of information to the network manager to diagnose network activity.
- The user interface is available from any location providing network managers with remote access when the user cannot be located at the network management center.
- The browser software is available on multiple personal computer and workstation hardware platforms, resulting in capital equipment cost savings.
- The ability to choose the data to show on a page helps the network manager to quickly define the data/controls of interest.
- Broadcast messages let the network manager notify others of important information.
- The use of user-defined parameter sets saves time in implementing controls.
- Integration between maps and the rest of the user interface results in a consistent way to move from viewing information to analyzing data.

Web pages

The NTM web pages consist of a “Home” page displaying the “Objects of Greatest Interest to Users”. This home page contains an icon and text for each of the following objects:

- Network Elements (circuit switches)
- Network Connections

- Network Views (maps)
- Controls
  - Code Controls
  - Protective TG Controls
  - Expansive TG Controls
- Destination Codes
- Logs
  - Error Log
  - Control Log search page
- Link Status
  - Link Status Table
  - Link Status Schematic

Each object on the NTM home page (Figure 3) is linked to a web page allowing the user to search for information about the object.

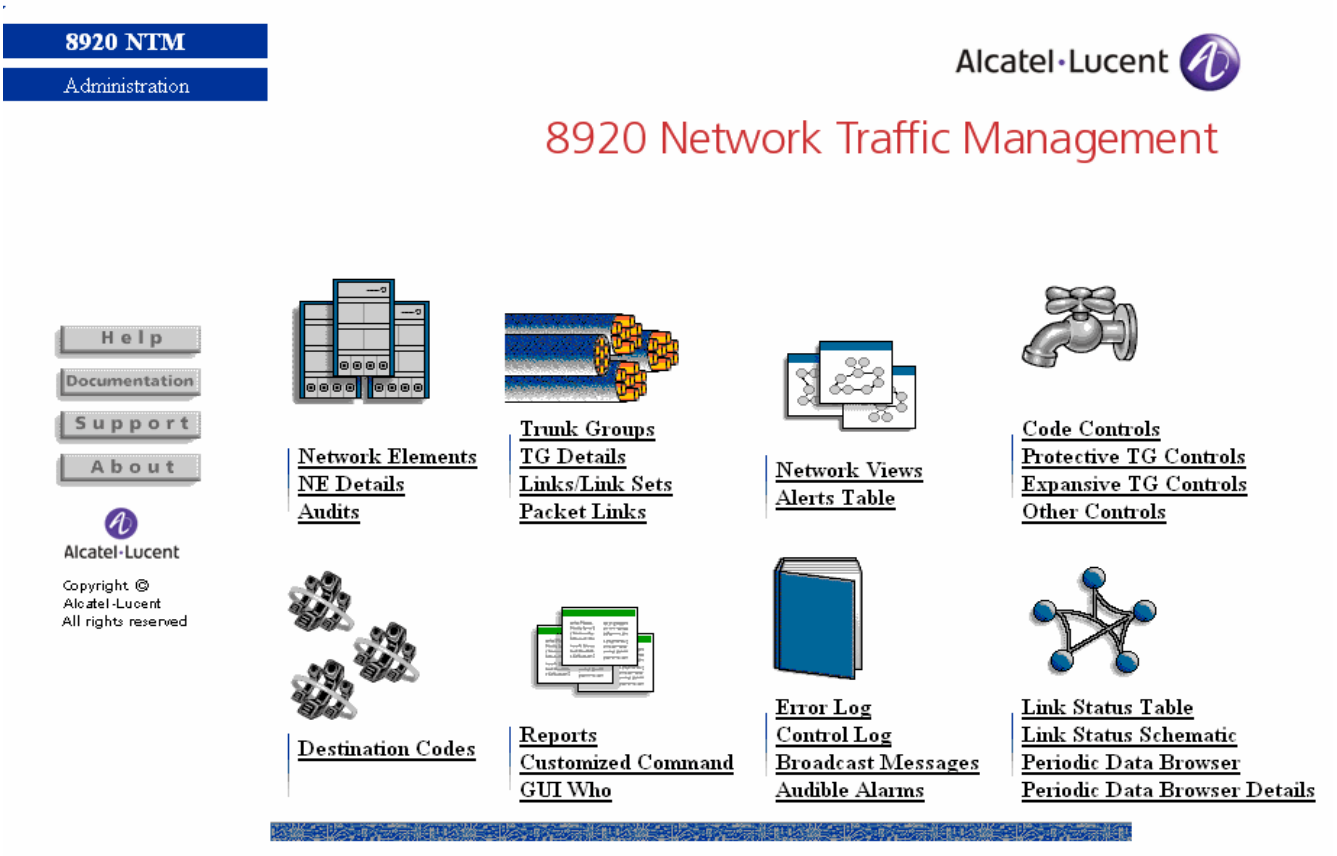
Important! You can access NetMinder STM data via the NTM GUI with Feature 415, "Browser-based Access to NetMinder Signaling Traffic Management (STM) data".

Each web page is divided into the following areas: Navigation area, Common Area and Viewer area. The left side of the page contains the Navigation area (at the top) and the Common area (at the Bottom). The rest of the page is the Viewer area.

Figure

Figure 3 provides an example of the NTM Home Page in the browser-based user interface.

Figure 3 NTM Home Page



Browser-based online documentation

All of the user documentation is now available online from the Documentation button in the common area. Documentation can be viewed in either HTML or PDF formats. PDF is provided for you to print extra copies. In addition, the Help button provides links to procedures (tasks) available through the Graphical User Interface.

Local (customer) information

The following links have been provided for customers to add their own information to the NTM Documentation pages. All of these files are located in "/nm/web/info/en/custfiles". There is one file per book, plus a file each for the Help button and for Customer Support.

These files are provided as placeholders so that each customer site can replace the files with their own information. Any files you choose to create should contain:

- a contact for the local information
- a disclaimer that states that information in the file(s) has not been reviewed or verified by Alcatel-Lucent or its representatives

Table 4 Local Practices files in "/nm/web/info/en/custfiles"

Filename	Local	Accessed From
locstoc.html	List of All of the Following Files	Documentation Home Page
locsupp.html	Customer Support (Comments)	Comments button Support button Library Help --> Making Comments button
lochelp.html	Tasks available from the Browser-Based GUI	Help button
locdt.html	Data Tables	Table of Contents for this Book
loccom.html	Input Commands	
locin.html	Installation	
locrb.html	Record Base Administration	
locsa.html	System Administration	
locso.html	System Overview	
locres.html	System Responses	
locgui.html	Using the Browser-Based GUI	

You will need to back up any local information files during your normal backup process.

□

Exception processing

Overview

NTM exception processing includes performing calculations and displaying exceptions.

Calculations

Using collected data from the switching system and standard traffic management rules, NTM performs calculations to produce additional “derived data” or “calculated data”. Calculation rules are specific to each supported switch type.

Reference: The field help files show the calculations performed by the system.

Displaying exceptions

Using both reference data and surveillance data, NTM measures switching system and trunk group performance against thresholds assigned by the network manager. Measurements exceeding preset thresholds warn of abnormal network conditions or ***exceptions***.

Network managers use periodic exception information to assess the state of the network, identify potential problems for further investigation, and analyze the sources and situations of trunk group overflow problems. NTM supports user-adjustable multiple exception levels that automatically prioritize network problems for more effective control. A typical threshold would be formed as follows:

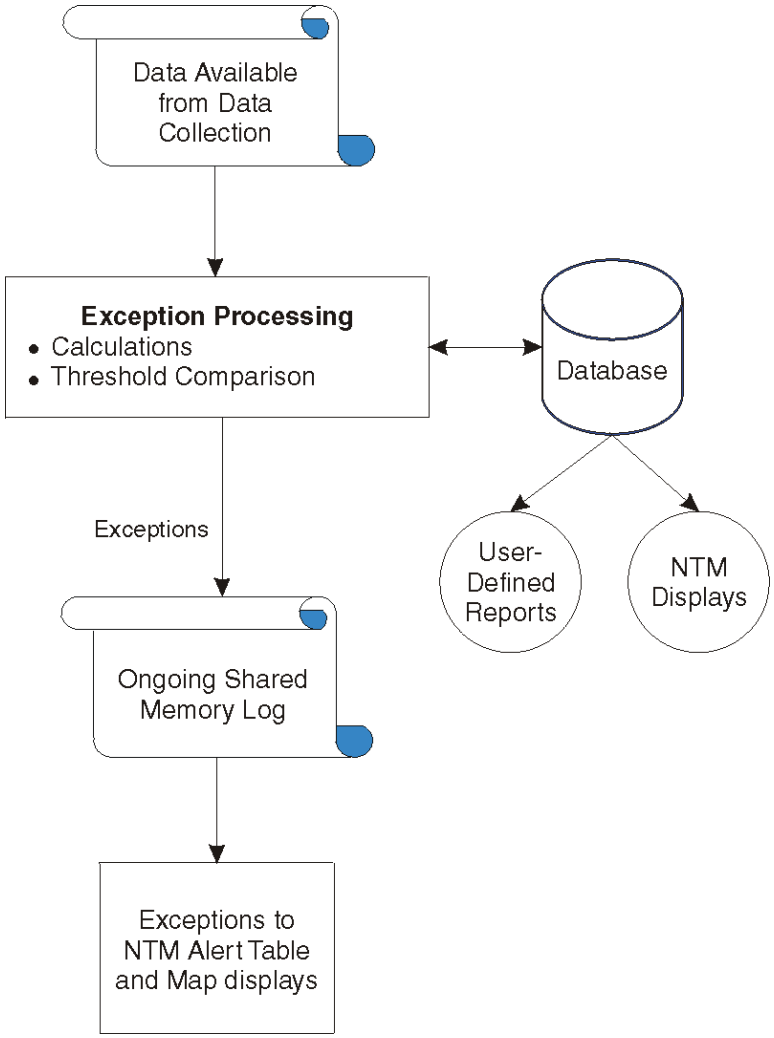
Example: calc=ach,thr=40+66+99,lvl=3+7+10;

This rule tests the value of “Service Attempts per Circuit per Hour”. If the value is less than 40, that data is not “in exception”. If the value is >= 40 and < 66, then that data is “in exception” and an exception level of 3 is assigned to it. If the value is >= 66 and < 99, then that data is “in exception” at a level of 7. If the value is >= 99, then that data is “in exception” at a level of 10.

Figure

Figure 4 illustrates the exception processing feature.

Figure 4 Exception processing



Error detection

Overview

Error messages can result from software-detected errors, changes in system status, or the failure of commands to execute.

System-generated messages

System-generated error messages can appear in several formats, which indicate either system trouble (TBL), a change in status (STATUS) of a system function, or a *Linux* operating system error. These messages normally follow the <*Error Code*> <*Error Number*> convention.

The system-generated error messages are logged in the *"/musr/log/errors"* file. When this file eventually fills up, the system moves it to *"/musr/log/errors.old"* and starts a new "errors" file. Before moving the file, the system generates a warning message in the errors file indicating that the file is reaching its capacity.

You can control whether system-generated messages are to be displayed on the system console; however, error messages generated by the operating system will always appear on the system console. Error messages can also be viewed on a workstation display.

User messages

User error messages are displayed when a user enters a command that generates an error. These messages may be preceded by an acknowledgment. They appear in one of the following formats:

NG	"Negative Acknowledgment" — the command could not fully execute because system data was either erroneous or missing.
?E	"Invalid Input" — some error was detected in the user's input, or the user was denied permission to execute the command.
RL	"Retry Later" — the command cannot be executed at present because, for example, another user entered a related command that might interfere.

These formats represent a variety of reflexive error messages that do not follow the normal error message convention. Reflexive error messages are direct responses to errors in format, data, or keywords for an input message you entered.

Reference: All error messages are documented in the *System Responses Guide*.

Internal system timers

Overview

The NTM data collection process manages internal system timers (or time boundaries) so that other system tasks are not compromised because an office is slow in responding to polls. The data collector starts a timer when it sends a request to the switch. Whenever a poll time-out occurs, the data collector aborts the appropriate connection and automatically attempts to reconnect later. The `linkstat` command displays a status of "failed" for that office until the data collector is able to reestablish the connection. When the `linkstat` command displays a status of `conn-p` (connection pending), it is trying to reconnect to the switch. The link status goes to `conn` (connected) if successful, and back to `failed` if unsuccessful.

Late discrete data

The 30-second discrete update boundary is at 10 seconds into the 30-second period. For offices that do not complete 30-second discrete data collection at 10 seconds, collection continues until completed (or until 28 seconds into the period, at which time 30-second discrete data collection is halted for that 30-second period). If an office completes 30-second discrete data collection after missing the 10-second boundary, discretes for the office will be available for database requests, but they will not appear on the network view displays.

Late exception data

The default exception system update boundary is 100 seconds into the 5-minute period. (To modify this default, see "Changing the late data timer" (p. 24).) At this update boundary, regardless of whether the periodic data collection has completed, the data for the offices reporting is made available to the rest of the system. If all offices did not report, data collection continues until completed (or until 4 minutes into the period at which point 5-minute data collection is halted for that 5-minute period). If an office has completed 5-minute data collection after missing the update boundary, its data is available to database requests, but it will not be processed by the exception system and will not appear on the network view displays.

Table

The timers in Table 5 are approximate.

Table 5 Approximate Stages of Internal Timers

Stage	Discrete Interval	5-Minute Surveillance
Data received from offices is available to NTM	0–10 seconds	0–100 seconds
Data sent to the client displays	10 seconds	100 seconds
Data collected is available to NTM (not the network view displays); late data is stored in the database	10–28 seconds	100 seconds–4 minutes
Data from the switches is no longer accepted	28–30 seconds	4–5 minutes

Changing the late data timer

Purpose

As stated, the default exception system update boundary is 100 seconds into the 5-minute period. You can vary the 100 second update time from 90 to 230 seconds.

Instructions

To change the late data timer, complete these steps:

1 Edit the "/nm/db/dcoltimer" file, using the Linux System Visual (vi) Editor

If this file does not exist, create it.

2 Enter the value you want to use in the first line of the file.

- Values between 1 and 90 seconds are invalid and will be ignored by the system.
- Valid values are from 90 to 230 seconds.

3 Stop the system, using `stopsys`

4 Start the system, using `startsys`

Result: The value change will not take effect until the system has been stopped and started.

Reference: "linkstat" (p. 9) in the *Input Commands Guide*

END OF STEPS

Additional components

Database administration and storage

NTM provides administrative functions that support efficient operations of both the system and the network management center. These functions are used to initialize, create, configure, and maintain the reference portion of the database. They provide the flexibility for actions such as threshold and monitor assignments, logical grouping, and set definition. Features include a data reporter and the ability to review historic data.

Oracle (Relational Database) Reports (New)

Beginning with NTM Release 15, Oracle sequel reports can be used to retrieve administrative and other reports similiar to earlier version of URW reports.

Historical data playback

It is possible to review previous data stored on the NTM host using Feature 342, "Historical Data Playback for the Browser-based GUI". This is done by determining the Historical session ID on pages and network views.

Feature 342, "Historical Data Playback for the Browser-based GUI" allows administrators with permission to create sessions that can be viewed by all users on many pages of the GUI. While defining these sessions, administrators can select any or all data collection periods during a 48 hour period from the current or historical databases on the host.

Reference: "Historical Session administration" (p. 19)

Customized user programming

Beyond the functions provided by the generic program writers, the network manager can use the *Linux* system shell or C-language programming procedures with the NTM database to produce customized programs.

Reference: See the *Data Tables Guide* for a description of the methods used to produce customized reports.

Event Analysis

With purchasable features, NTM can use various counts that it collects to determine the duration of major network events.

STM Data

With purchasable features, NTM can display certain Alcatel-Lucent Netminder STM data within the NTM GUI.

Software system backup strategies

Backups should be made for the internal disk and the disk array as defined in Chapter 5, “Backing Up and Restore the System” in the *System Administration Guide*.

UDDM/UDNEI

Feature 436, "UDDM/UDNEI" adds flexibility to the NTM software platform allowing users with basic programming skills extend NTM. The extensions include a Used Defined Data Modelling (UDDM) capability, thresholding of data types defined via UDDM, User Defined Network Element Interfaces (UDNEI), and transformation capability to map data collected via UDNEI to the data model established via UDDM.

Reference: See Chapter 16, “UDDM/UDNEI Administration” in in the *System Administration Guide*

□

Hardware Architecture

Overview

Beginning in Release 17.0, NTM comes in two hardware configurations:

1. Small
2. Large

These configurations limits are noted in the descriptions in Table 1 of Chapter 10, "NTM Engineering Guidelines"

Table

NTM Hardware architecture for Release 17.0 and later.

Small Host Configuration	Large Host Configuration
Server: 4x 600GB **Processors**: 2 x 6-core CPUs running at 2GHz per core **Memory**: 64 GB **Removable Disks**: DVD-ROM **Network**: 2 add-on 100 Base-T cards	**Server**: 6 x 600GB **Processors**: 4 x 6-core CPUs running at 2GHz per core **Memory**: 64 GB **Removable Disks:** DVD-ROM **Network:** 2 add-on Gigabit Ethernet cards

3 Network Management Reference Data

Overview

Purpose

This chapter provides information about the reference data component of the NTM software.

Contents

This chapter contains the following topics:

Reference data

Overview

Reference data is information that describes the network NTM is managing. Reference data is input into the NTM record base in two ways:

- Supplied by the office through audits
- Entered into the "/musr/rb" files by the record base manager

Reference data supplied by the offices in the network is used to update the NTM database to ensure that it is always in agreement with that of the offices. Reference data entered by the record base manager includes data about the:

- Network management center
- Network being monitored

Viewing data

The record base manager can divide reference information in the record base into ***areas*** and/or ***sets***. These divisions determine how the network is viewed.

Areas

Areas are hierarchical groupings of offices ranked according to which "child" offices subtend which "parent" offices. A ***rank*** is the level within this structure where an office (parent or child) resides. For example, RSPTE (Regional, Sectional, Primary, Toll, and End Office) defines a tree-like structure of the network where the "child" offices subtend "parent" offices in a 5-rank hierarchy.

Reference: "RSPTE File" (p. 67) in the *Record Base Administration Guide*

Sets

Sets are logical groupings of network elements (offices or trunk groups). You can define office set names and trunk group set names. Sets are useful for partitioning customers or services. Each office can be a member of up to 8 office sets (12 with feature 29), and each trunk group can be a member of up to 4 trunk group sets (10 with feature 32).

If a set name has the same character string as the starting characters of an office name, audits will select the office name before selecting the set name. Therefore, when defining a set name, users should use a number in the character string in order to eliminate the set name-office name conflict for audits.

Office reference data

Offices are classified as internal or external.

Internal offices are the offices from which the system collects data and to which it applies controls. The following data is stored in the database for internal offices:

- Generic
- Issue
- Office type
- Office name
- Office nickname (optional; can be up to 6 characters long)
- RSPTE Identifier
- Membership in office sets
- Membership in subnetworks
- Home NPA (Numbering Plan Area) of Office
- Packets of data scheduled for collection during the data collection period
- Threshold values and levels for machine exception calculations
- ATMMG4K reference data and threshold values
- Register addresses that define the location of machine counts in the data collected during the data collection period

An ***external office*** is an office in the network that is not under surveillance. For example, an external office could be the far-end of the trunk group of an internal office. The following data is stored in the database for external offices:

- Office name
- Office nickname (optional; can be up to 6 characters long)
- RSPTE Identifier
- Membership in office sets
- Membership in subnetworks

Trunk group reference data

NTM assigns and collects reference data from the switches. This reference data is used to describe the network topology and to determine exceptions.

The NTM database contains data describing the trunk groups of an office (see Table 1).

Table 1 Trunk group reference data

Data	Description
FROM OFFICE	An internal office that originates the trunk group.
TO_OFFICE	The destination of the trunk group. This can be an internal or external office.

Table 1 Trunk group reference data

Data	Description
SUFFIX	A user-defined string used to identify a particular trunk group. It can consist of up to 4 characters.

Table 2 shows the additional information about the trunk group that you can enter or that may be determined by an audit. The data varies according to switch type and generic.

Table 2 Additional trunk group data

Data	Description
btfn	Base traffic number of the trunk subgroup (*4ESS* and GSP only)
fgp	Feature group prefix
icprefix	Interexchange carrier prefix for IEC shared trunk group
ofl	Overflow trunk group; the “To Office” and suffix of the trunk group to which traffic overflows
options	Trunk group options
other-end suffix	Suffix of the trunk group from the “To Office” to the “From Office”
sets	Membership in trunk group sets
sfgn	1A *ESS* switch type simulator facility group number (1–4096)
sig	Trunk group signaling type (this is only required for signaling type CCIS6 [Common Channel Interoffice Signaling]; other types are supplied by audits)
subnetwork	Subnetwork to which this trunk group belongs
tgn	Trunk group number
tgsrv	Trunk group service type • hu (high usage) • fi (final) • fu (full)
thr	Trunk group threshold table index (to define values for exception processing)

The switch also receives additional data that is added to the database by the trunk group reference audit for scheduled trunk groups. Table 3 shows this type of data.

Table 3 Additional scheduled trunk group data

Data	Description
study	Indicates that the trunk group has assigned a *4ESS* switch study class (this causes a trunk group to be scheduled for data collection for the *4ESS* only)

Table 3 Additional scheduled trunk group data

Data	Description
dir	Directionality (1-way in, 1-way out, 2-way)
ckts	Number of circuits
type	Trunk group type (domestic)
register addresses	Defines the location of trunk group counts in the 5-minute data

Trunk group threshold reference data

The NTM database contains eight trunk group threshold tables. Each table contains 128 entries (or indices). Each entry (or index) contains up to three threshold values for each of the trunk group exception calculations to be performed. Each index contains a maximum of 10 calculations.

A Trunk Group Threshold Schedule allows you to activate threshold tables at different times of the day. You can assign every scheduled trunk group an index into the Trunk Group Threshold Tables. This index remains the same as the different tables become activated through the schedule.

If Feature 3, "Management of Record Base Partitions and Subnetworks" is purchased, each trunk group threshold table will contain 256 entries (or indices).

If Feature 189, "Replacement Thresholding Capability for Trunk Group Data" is purchased, each index may contain up to 20 unique measurement items and a maximum of 60 rules.

Code reference data

The NTM database also contains reference data that maps each code to the office serving that code. The country code database maps all the country codes to country names. The domestic code database maps all NPA (Numbering Plan Area) and NXX (Office) codes to the office serving the code. You can also define SSS-TTT (Action Point Numbering Plan) codes in the domestic code database. The PAS (Public Announcement Service) database defines the PAS codes and announcements for which the *4ESS* switch sends data.

ATM reference data

ATM reference data defines *DMS* succession Offices (Generic sn06 and later). The two basic types of ATM data supported are:

- ATM Passport 15K offices which use the ATM File Record Base file,
- ATMMG4K offices which use the Office File to create their reference data.

Office domain reference data

The office domain reference data defines domain acronyms for each domain (type of telephone traffic) supported by the offices. It then maps each domain identifier in each office to the corresponding domain acronym.

FHC (final handling code) reference data

The FHC reference data defines names and trap codes for each final handling code in the *4ESS* switches. You can enter these names in the FHC record base file. These names are then displayed on an NTM page when FHC data is sent by the switch.

CNI (common network interface) reference data

The CNI reference data contains all the CNI nodes for each switch, along with the CNI node type and destination *CLLI* codes for each node. The CNI reference data is provided by the `audit` command for *4ESS* switches.

Carrier prefix reference data for transmitter timeout exceptions

The carrier prefix reference data contains the exception level thresholds for TTO data.

Discrete and exception reference data

A ***discrete*** is an on-occurrence indication that a specific condition (for example, a machine congestion) has just been detected by an office. You define the record base that classifies each discrete and exception to an exception type and level (alarm/alert). This determines how discretes and exceptions are displayed on the browser-based graphical user interface displays.

NTM databases

Overview

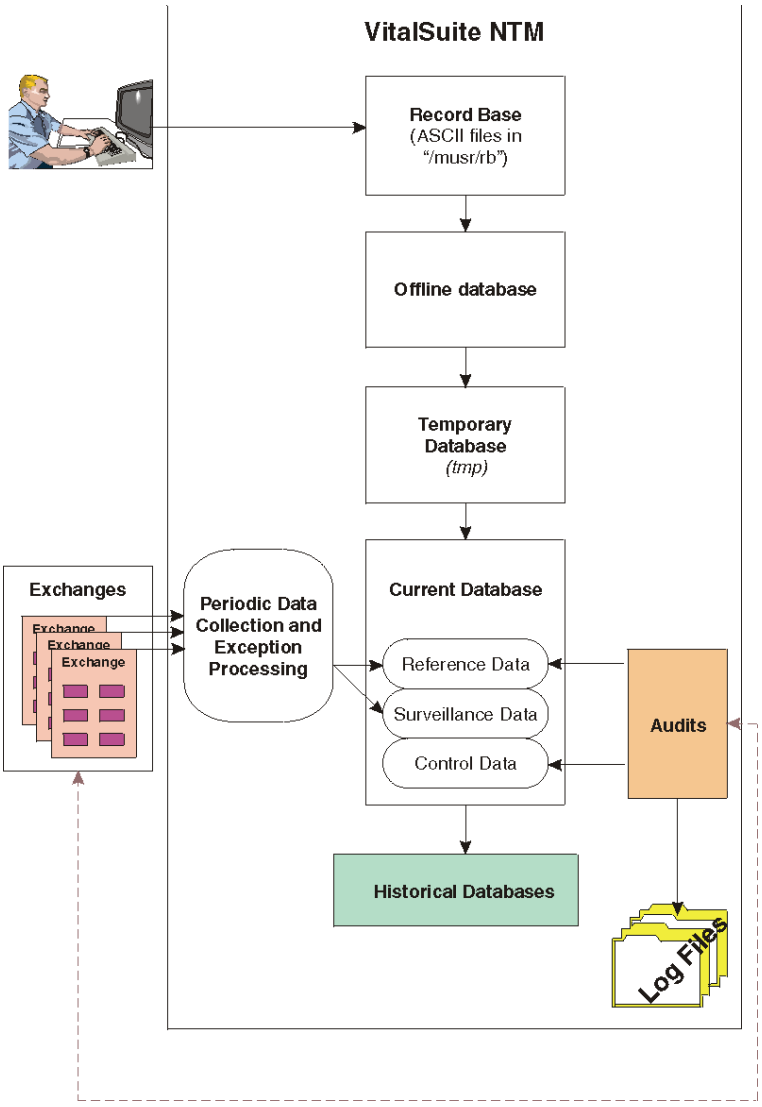
NTM contains several database types with different functions. These include:

- Current database
- Offline database
- Temporary database
- Historical databases

Figure

Figure 1 shows the interrelationships of the NTM databases.

Figure 1 NTM Databases



Current database

The system runs on the current database, which contains reference data, surveillance data, and control data. The current database is configured to contain 24 hours of data. Information in the current database is updated by audits.

Record base

The record base is not a database, but a set of standard *Linux* directories of ASCII files. However, it is included in this discussion because it is used for making changes to reference data in the NTM current database.

The record base is an ASCII version of certain items of reference data required in the current database for network definition and for determination of exceptions and alarm levels. It does not contain either surveillance or control data, and it is not updated by audits.

Changes to reference data are first made manually in the record base files with a standard *Linux* editor (usually vi). The changes are then moved to the current database with a series of commands that test, compile, and install the changes.

The most common activities involving the record base are adding and deleting trunk groups and changing thresholds on calculations associated with trunk group measurements. Record base files are located in the "/musr/rb and musr/rb/snw" directories.

The record base has the following functions:

- Exception processing control — The raw and calculated data to be used and the thresholds to be applied to that data are defined in record base files. The files are compiled when the `create` command is run. The compiled versions are then copied to the current database when the `installdb` command is run. Incoming office data is compared to thresholds set in the record base; an exception occurs when a threshold is exceeded.
- Network element definition — All network elements (offices, trunk groups) to be surveyed are first defined in the record base. This allows NTM to associate surveillance data with network element names, characteristics, locations, and hierarchical relationships. It also ensures that the proper data will actually be sent from the surveyed network elements to NTM.
- Reference database review — Because the record base is in ASCII format and is readable, users can refer to it to determine which offices are in the surveyed network, which measurements are being considered for thresholding on which trunk groups, what thresholds have been set, and so forth.

  Reference: See the *Record Base Administration Guide* for more information on maintaining NTM record base files.

Offline database

The offline database is used as a testing location to ensure that changes made to record base files will not cause database errors. After an editor is used to build or modify the necessary record base files, the files are validated with the `dbtest` command. This command tests the record base files for errors, compiles the files to binary, and moves these files to the offline database. If testing indicates that a record base file contains errors, the user must manually correct the errors and retest the file. When all errors have been corrected, the user runs the `create` command, which retests the file and moves the twice-tested file to the temporary database.

Temporary database

The modified files remain in the temporary database area until the `installdb` command copies them into the current database. No changes take effect on the NTM system until the contents of the temporary database area have been installed into the current database.

There are exceptions to this sequence of commands to move changes from the record base to the current database, depending on the record base files that were changed. Also, the installation may be performed by a multipurpose program called `dayend` that is usually scheduled to run late at night, once a day. The `dayend` process triggers a `create` and `installdb` for any record base files that have been changed but not created or installed, or that have only had a single office create run against them.

Historical databases

Eight days of historical data is maintained on the system. Each day's surveillance and reference data can be archived to removable media or to a designated archive area from where it can be restored on demand. New with Release 15 is the capability to store historical data in smaller user defined segments in the system to the archive area.

Reference: See Chapter 8, “Accessing Historical Data” for more information on accessing a historical database.

Reference: See Chapter 5, “Backing Up and Restore the System” for more information on storing historical data.

□

4 Surveillance Data

Overview

Purpose

This chapter provides information about the surveillance data component of the NTM software.

Contents

This chapter contains the following topics:

Data flow

Overview

Surveillance data is data collected periodically by NTM from the network offices. The network manager analyzes surveillance data to determine the status of offices, trunk groups, and transit traffic in the network.

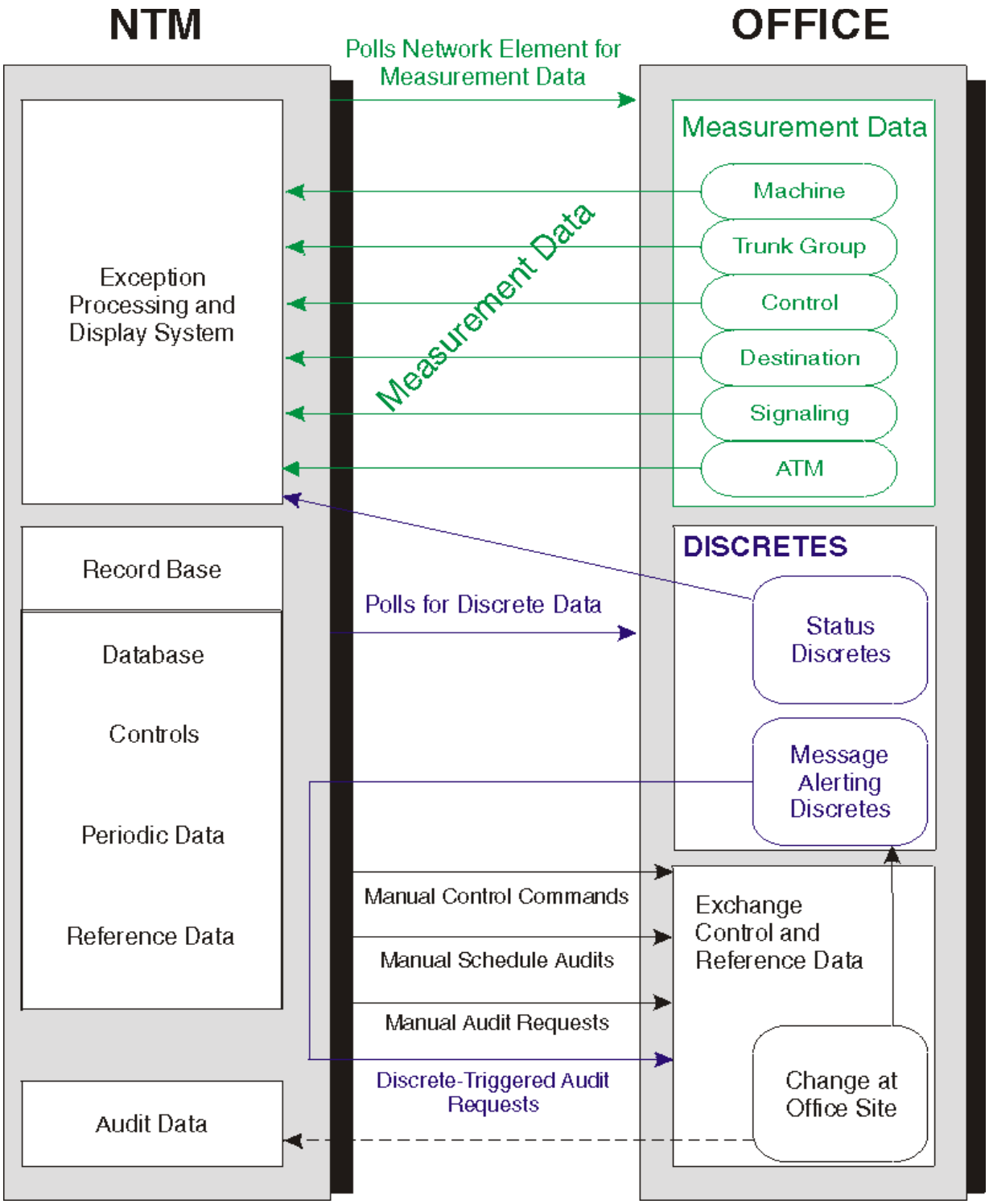
NTM polls (requests data from) offices in the supervised network for two types of data:

- Event indicators (discretes)
- Register/measurement data

Figure

Figure 1 illustrates the overall data flow between NTM and the network elements.

Figure 1 Overall NTM network element data flow



Event indicators (discretes)

Overview

Discretes are on–off indicators representing the status of a network element. Each office sends its discretes to NTM as a discrete data block. NTM collects discretes every 30 seconds for discrete information.

There are two types of discretes.

1. Status Discretes — show the existence of a significant event that has occurred at the office (such as a machine congestion condition) within the previous 30-second interval.
2. Message-Alerting Discretes (Alerts) — show the existence of a change condition to the status of the office that is not as critical as a status discrete. They usually do not indicate an office problem. Thirty-second alerting discretes are transmitted along with the 30-second status discretes. Alerting discretes also trigger a corresponding audit, unless the audit has been previously inhibited by the network manager.

Register/measurement data

Overview

NTM register data is organized into blocks of related counts. The 5-minute register data consists of counts of events over the previous 5-minute interval. At regular intervals, NTM polls for register data from all offices in the supervised network. This data includes overall office measurements and measurements on specified individual trunk groups.

Data types

The following types of measurement data may be forwarded to NTM from the offices:

- Machine or entity data

  Machine or entity data categories vary from one office type to another. They include a variety of office-wide counts, for example:

  – Total traffic at the office

  – Total processor load

  – Counts related to special services such as “Free Phone” service or signaling system activity

- Trunk group data

  Trunk group data consists of trunk group measurements on assigned trunk groups.

- Control data

  Control data consists of information about controls at the office, for example:

  – Total number of controls in an office by control type

  – Attempts and successes on call gaps and reroutes

- Destination data

  Destination data consists of information about hard-to-reach codes.

- Signaling system data

  Signaling system data consists of information about the status of links and linksets and other elements.

- ATM, IP, PVG data

  Various counts from Nortel Succession network elements.

Thresholding and exceptions

When measurement data and discretes have been collected by NTM, they are compared to thresholds previously defined in the NTM record base. If a threshold is exceeded, an exception is recorded and displayed to network managers.

Network Event Data

Overview

NTM Release 16.0 introduced a new concept of monitoring certain network data and combing it to form a larger network view. This allows network managers to monitor the impact of controls and watch network events. This new functionality can be beneficial to determine when network-wide events have started and actions can be taken accordingly. From this higher level view, managers can make better assessments to see where actual network limitations exist. Currently NTM provides these network level features:

- Feature 437, "Enhanced Thresholding and Analysis"

5 Thresholds

Overview

Purpose

The NTM exception system measures trunk group and office performance. Network management calculations and data values (also referred to as ***raw counts***), collected from the offices during every data collection period, are compared with reference data that is defined in the record base files. This process is known as ***thresholding***. Measurements exceeding preset thresholds warn of abnormal conditions or ***exceptions***.

Contents

This chapter contains the following topics:

Defining thresholds

Overview

You can define threshold values for the following:

- Trunk group raw counts and calculations
- Machine raw counts and calculations
- Signaling link threshold raw counts and calculations
- ATM Links raw counts and calculations

If you do not define any threshold values, calculations are not performed on the data.

Counts not thresholdable

Not all counts are thresholdable. Information about fields by type of thresholdability can be found by using the Search NTM page.

Reference: HTML search in the online Library.

Table

The following table shows the record base files used for defining these values:

WHEN you want to …	THEN use the …
define threshold values for a TG raw counts or calculation	Trunk Group Threshold File
assign a threshold index for a TG	Trunk Group File
define threshold values for a machine raw count or calculation	Office File
schedule threshold tables to become active	Threshold Table Schedule File
define threshold values for signaling link raw counts and calculations	Signaling Link Threshold File
define threshold values for ATM Passport 15k link raw counts and calculations	ATM Threshold File
define threshold values for a Succession IP raw counts or calculation	Packet Threshold File
define threshold values for a network wide code control events.	Code Event File
define threshold values for a network wide Mass Call events.	Mass Call Threshold File
define threshold values for a 24-hours 24-Hour Final Trunk Group Overflow events.	TG24HourOfl File
define threshold values for job statuses.	Job Status File
define threshold values for ATM MG4k link raw counts and calculations	Office File
define descretes	Discrete File

Exception levels

Overview

An ***exception*** occurs whenever a threshold has been exceeded.

There are 10 possible levels of exceptions, with 10 being the most severe. You can select 3 of these 10 levels to threshold. The following table describes how the data appears on the displays when it is marked with these levels. The tables show default colors.

DATA marked with level from …	IS shown on displays as …
1-3	cyan
4-7	yellow
8-10	red

If viewing VitalSTM data through NTM with Feature 415, "Browser-based Access to NetMinder Signaling Traffic Management (STM) data"signaling link data, the following exception indicators may be used:

DATA marked with level from …	IS shown on displays as …
low	cyan
medium	yellow
high	red

Exception types

Trunk group exceptions

Calculations are performed on trunk groups each data collection period.

Hard-to-reach exceptions

HTR exceptions are derived during the exception processing. Comparisons are performed on office destination data during each data collection period.

A destination code for an office is calculated to be HTR based on several calculations, depending on switch type.

Machine exceptions

The exception processor performs machine calculations every data collection period.

ATM Link exceptions

The exception processor performs ATM Link calculations every data collection period.

Automatic system exception display regulation

NTM incorporates a self-regulating exception presentation limiter that is based on Table 5, "Exception record limits with GTD-5 switches (Large NTM configuration)" (p. 38) and Table 6, "Exception record limits without GTD-5 switches (Large NTM configuration)" (p. 39) in the *Input Commands Guide*. If the sum of all exception records detected by the system during a 5-minute measurement period exceeds the system's "Heavy Load Upper Limit," the system automatically sets the minimum exception level for each data type that will be displayed in the next 5-minute period. This limited presentation mode continues until the sum of all exception records during a subsequent 5-minute period falls at least 10% below the current system-wide limit. This value is known as the "hysteresis limit." (Hysteresis refers to the minimum amount of change required to make a difference.)

The "throttle" mechanism that limits the number of exceptions to be displayed turns on when the system-wide limit is reached and turns off when the number of exception records returns to or below the hysteresis limit.

For each data type, exceptions are handled as follows:

- Exception records above the minimum level are sent to ongoing shared memory.
- Exception records at the minimum level are sent to ongoing shared memory until the number of exception records for the data type exceeds the limit.
- Exception records below the minimum level are not sent to ongoing shared memory.

Once it is activated, the “throttle” mechanism assumes that the total number of entities, by datatype, identified in the current period as having an exception level above the minimum will be the same as those identified in the last period. If this assumption is correct, then the total number of displayed entities in exception will be at or close to the system-wide limit and the performance of the system will be maintained.

If more entities are in exception above the minimum level, the system will make them available for display, but system performance may suffer until the system readjusts the minimum level upward in the next period. If fewer entities are in exception above the minimum level, more entities at the minimum level will be displayed, system performance will be maintained, and the system will automatically determine if it can lower the minimum exception level to display more entities in exception in the next 5-minute period.

Sustaining an acceptable level of performance

Sustaining an acceptable level of performance on the NTM host is predicated on the assumption that the exception process will identify the normal load of exception records every 5 minutes during normal operations. ***Normal*** and ***Heavy Loads*** of exception records are listed in “Exceptions” (p. 8). When there are extreme problems in the network under surveillance or an NTM host is in the Backup and Disaster Recovery takeover mode, the number of exception records detected by the system would be expected to be greater than normal. The Heavy Load Upper Limit is, however, just that. To protect the performance of the system so that the Network Traffic Management function can still be performed, the system will limit the number of exception records that can be displayed.

Reference: See “Data flow” (p. 2) for a description of how calculations are derived for trunk groups. See “limitthr” (p. 37) in the *Input Commands Guide*.

Inhibiting trunk group thresholds

You may inhibit exception processing on a trunk group by setting the Exception Processing option to “Inhibit” on the Trunk Group Exception Status and Mark Assignments page.

Reference: “Exception Status and Marked Assignments” (p. 21) in the *User Guide*

To find trunk groups on which exception processing has been inhibited, set the Exception Processing option to “Inhibit” on the Trunk Group Advanced Search page.

Reference: “Trunk Groups search page” (p. 4) in the *User Guide*

□

Network management calculations

Overview

Network management calculations are used to signify changing network conditions and, when thresholded, they alert network managers to events indicating that action should be taken to prevent excessive network congestion. The NTM system collects data to support the following types of calculated counts:

- Trunk Group
- Machine

Reference: Calculations are available from field help files linked from Chapter 1, "All Data Fields" in the *Data Tables Guide*.

How calculations are derived

Calculations are derived differently, depending on what type of data is involved.

Trunk group calculations are derived from the raw trunk group data collected from the switch every 5 minutes and from the following reference data:

- N2W
- N1WI
- N1WO
- Num_P
- P_sec
- scan_N, Scan_D — the scan rate of the office for usage counts; they are in the form of a numerator and a denominator:

Example: scan rate = scan_N/scan_D

Machine

Machine calculations are derived the same way as regular trunk group calculations. However, the collected raw data consists of machine data only.

□

6 Audits and Controls

Overview

Purpose

This chapter provides information about the audit and control components of the NTM software.

Contents

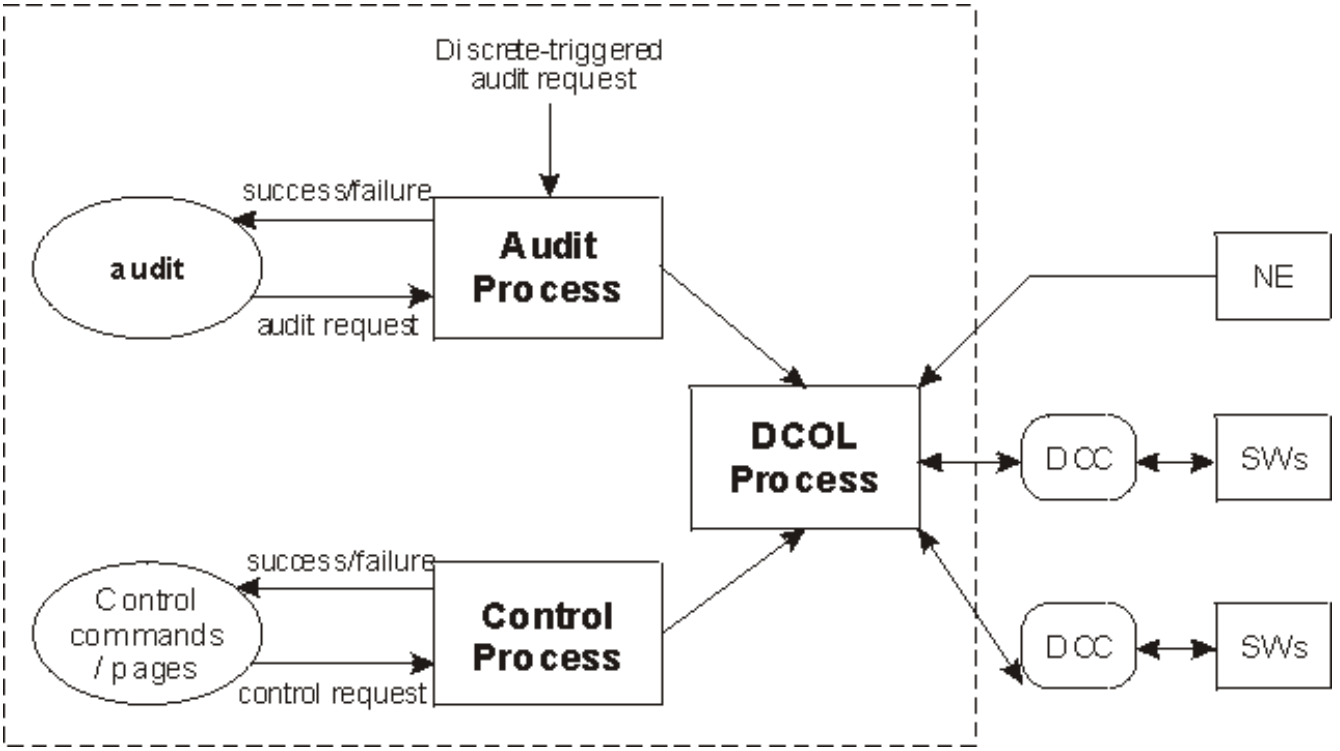
This chapter contains the following topics:

Network data flow

Diagram

Figure 1 illustrates network data flow in relationship to NTM's Audit and Control functionalities.

Figure 1 Audit/control network data flow



Audits

Overview

NTM maintains a database in which all the offices of the supervised network are defined, as well as specification of the data to be collected from each office and the status of any controls at the office. The offices each have their own records of data to be sent to NTM and records of their control status. These records must always be in agreement or network management errors can occur.

Purpose

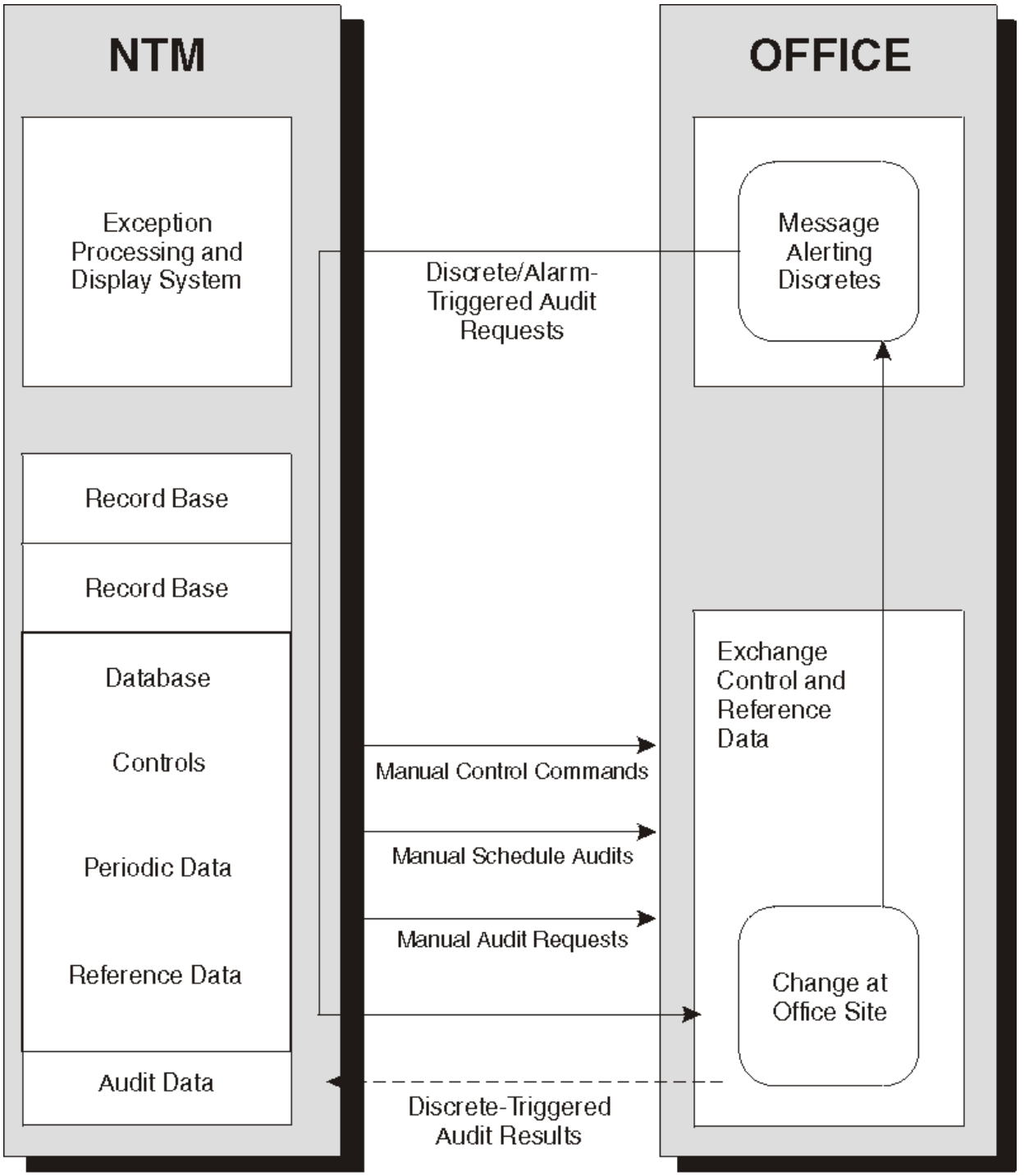
NTM uses audits to check for differences between the switch database and the NTM database. If differences are detected, the NTM database is automatically updated (except in the case of schedule-type audits, where the switch database is updated).

Reference: See Chapter 2, "Commands for Auditing Network Elements" in the *Input Commands Guide* for a listing of all available audits for each office type.

Diagram

Figure 2 shows the requests made by NTM to the office for control and reference data to update current database information and perform audits.

Figure 2 NTM control and audit flow



Types of audits

Overview

There are 2 general categories of audits:

- Regular audit
- Schedule audit

Within those 2 categories of audits, there are 2 types of audits:

- Manually-triggered (demand) audits
- Discrete-triggered (change or automatic) audits

All audits can be run manually, and some can also be triggered by message-alerting discretes received from offices.

Regular audit

A regular audit brings the appropriate data to NTM from the office. NTM then compares the data in its current database with the office database. If differences are found, the office data overwrites the NTM data in the current database.

The primary intent of regular audits is to update the current database, but audit output may be directed to regular and/or log files. The specific files will depend on the audit that was run. Some of these files provide information essential to maintaining the database.

Schedule audit

A schedule audit works in the opposite direction. NTM sends updated schedule data to the office. The office compares the data in its database with the NTM data. If differences are found, the NTM data overwrites the office data in the office database.

A schedule audit is actually a command that forces changes in an office database so that the information in it agrees with the information in the NTM database. Some discretes can automatically trigger audits to be run from NTM.

Initiating audits

Overview

You have the option of allowing manually-triggered audits whenever necessary. Any differences detected by a manual audit are output to your screen or to a file. All manually-triggered audits are executed from the *Linux* system shell with the `audit` command.

There are specific discretes in the discrete message that reflect recent changes in the switch database. When these discretes are set, information in the NTM database is not consistent with that of the switch database. To make the two databases consistent, an audit is required. NTM runs the correct audit automatically, based on the type of discrete that is allowed.

Important! The tglist and cni audits do not run automatically.

Output

Output from discrete-triggered audits is directed to the *"/musr/log/aud_disc"* file. If you have purchased the "Disaster Recovery" feature, the *"/musr/log/aud_inms"* file will also be available. (You can view these files with standard *Linux* system commands such as `cat` or `pg`.) For more information on purchasable features, see your account representative.

Disabling discrete-triggered audits

You can use the `audinh` command to disable the discrete triggering capability. Once a discrete is inhibited in NTM, the audit will not run automatically even if the discrete is set. You can still run the audit manually, however. To re-enable the audit, use the `audallow` command. To check the status of the discretes for a given office, use the `audstat` command.

□

Controls

Overview

Network managers, and occasionally personnel located at an office, apply controls to offices. Controls:

- Are messages sent to the switch instructing it on how to route calls
- Keep the network near maximum efficiency when unusual traffic patterns or equipment failures would otherwise force inefficiencies because of congestion
- Are reported to NTM by an audit

The NTM database contains information about the controls that are currently active in the network. It also contains a Control log, a log of the controls that have been applied to or removed from the network.

Manual controls

Because an automated system cannot respond optimally to all network disturbances, NTM supports manual controls. Manual network management controls are either ***protective*** or ***expansive***. Protective controls can, for example, be used to inhibit the spread of congestion in the network by restricting normal trunk group access to and overflow from 1-way outgoing and 2-way trunk groups. Expansive controls are used to expand routing beyond the normal routing chain. They are applied when the normal routing chain trunk groups are busy or have failed and idle capacity exists in routes that are not part of the normal routing chain.

Interactive control pages permit manual controls to be activated simultaneously in more than one switching system.

Control commands are communicated back to the switching systems by NTM over the same interface used for data collection.

Automatic controls

Preassigned automatic controls within an office respond quickly to conditions detected internally by the office or to status signals from other offices. They are removed promptly when no longer required.

Interactive control pages in the NTM permit automatic controls to be activated simultaneously in more than one switching system.

Control log

Overview

The Control Log consists of a history of the controls applied to and removed from the network. Use the ctrlog command to obtain a list of the controls. Entries in this log can be used to produce control preplans for events likely to reoccur.

Each entry in the Control Log consists of the:

- Control type
- Control-specific parameters
- ADD or DELETE
- Login ID (Identification) of the person adding or deleting the control or indication that it was audit-initiated
- Time and date the control was applied and removed

Reference: "ctrlog" (p. 59) in the *Input Commands Guide*.

Control pages and commands

NTM controls are applied to or removed from the network by way of the NTM control pages and commands.

Reference: Chapter 5, "Controls" in the *User Guide*; Chapter 4, "Control Commands" in the *Input Commands Guide*

Active controls

The NTM database contains information about controls that are currently active in the network. System audits collect this information from the network and update the NTM database. This database also contains a control log that provides a detailed history of controls that are applied to and removed from the network. Entries in this log can be used to produce control preplans for events likely to recur.

Preplans

Overview

To facilitate the use of controls, NTM features control ***preplans***. A control preplan is a shorthand method for activating a list of controls. Control preplans, which are invoked from the terminal by the network manager, are prepared in the *Linux* system shell. They consist of a collection of individual network controls applicable to a particular network situation, such as office failure, major facility failure, or office overloads.

Reference: "preplan" (p. 72) in the *Input Commands Guide*

7 Hard-To-Reach (HTR)

Overview

Purpose

This chapter provides information about the audit and control components of the NTM software.

Contents

This chapter contains the following topics:

Using hard-to-reach

Overview

The HTR (Hard-To-Reach) function enables network managers to monitor the easy-to-reach or hard-to-reach status of destination codes (telephone numbers). Network managers can then apply controls in order to reduce the number of unsuccessful attempts to connect calls to these codes.

Reference: Chapter 6, “Destinations” in the *User Guide*

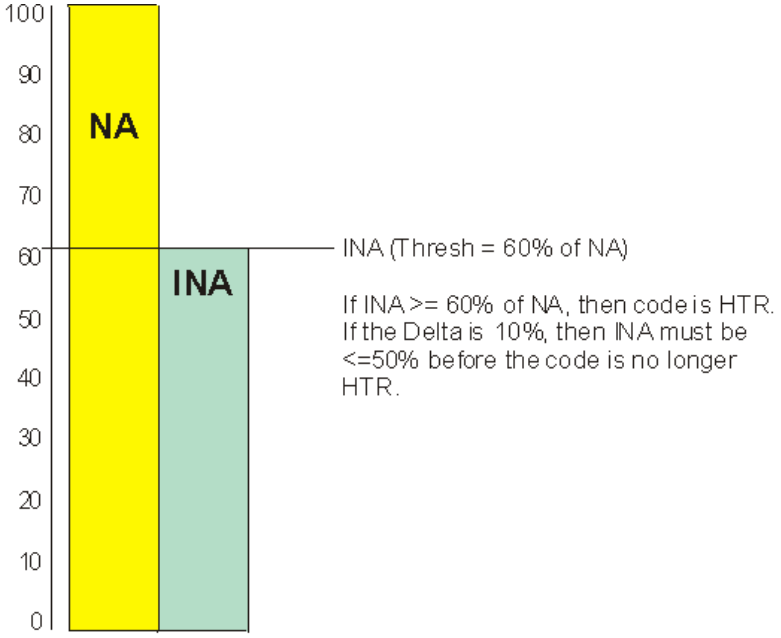
How HTR status is determined — *4ESS* offices

Overview

HTR status can be detected automatically by the *4ESS* switches, or can be applied manually via NTM. Automatic HTR status is calculated by comparing the values of HTR_INA to HTR_NA, as illustrated in Figure 1.

The *4ESS* switches have three parameter sets (0, 1, and 2) that are used to determine whether or not an office is hard-to-reach. Parameter set 0 is the default; NTM users can specify a different parameter set, if desired.

Figure 1 Calculating HTR Status



Parameter set in use = 0

Values in parameter set 0:
Attempts Threshold:
All NPA = 100
Home (HNPA) = 75
Designated (DNPA) = 50
Failure Thresholds:
All NPA = 60
Home (HNPA) = 50
Designated (DNPA) = 40
Attempts and Failure Threshold Hysteresis by Parameter Set:
AT Delta = .1
FT Delta = 1

How destination codes are defined

Overview

Destination codes are defined in the *"/musr/rb/codes/domestic"* and/or *"/musr/rb/codes/intl"* file. In the domestic codes file, each defined code is associated with a destination, normally an office name, that serves the code. In the international codes file, each country code is mapped to a country name.

Reference: "Domestic Code File" (p. 21) and "International Code File" (p. 33) in the *Record Base Administration Guide*

Actions related to HTR

Overview

The following actions are related to the HTR function:

- Populating Record Base files
  - Defining destination codes (Domestic Code File or International Code File)
- Using GUI pages
  - Destination Codes
  - Destination Assignments
- Using HTR commands
  - `audit` (Hard-to-reach audit (htr) type) — Audits the switch for HTR controls
  - `dhtr` — Applies or removes domestic HTR codes
  - `htr_codes` — Searches codes files for codes that belong to an office
  - `htr_ref` — Searches codes files for the reference office that belongs to a code
  - `ihtr` — Applies or removes international HTR codes

8 Accessing Historical Data

Overview

Purpose

This chapter describes how to access historical data for analysis of network situations via Historical Data Playback features, as well as how to save that data to magnetic tape for later access.

Contents

This chapter contains the following topics:

Historical data playback

Overview

Historical data playback can be done through the Graphical User Interface (GUI). Users with Historical Playback Permissions will be able to add, delete or modify historical sessions. Those without permission will only be able to view currently defined historical sessions. The Historical Session Administration is accessed through the Historical Session icon from the Administration Launch page.

Reference: "Historical Session administration" (p. 19) in the *User Guide*

Historical tapes

Overview

Historical data relevant to past network situations can be recorded on magnetic tape for later access.

NTM can have up to eight historical databases. The exact number of databases in a system depends on the configuration purchased by the customer. These databases and portions of historical data can be stored in the archive area. This data can be stored to and restored from tape.

Making historical tapes

Reference: Chapter 5, “Backing Up and Restore the System” in the *System Administration Guide*

Restoring data from historical tapes

Reference: Chapter 5, “Backing Up and Restore the System” in the *System Administration Guide*

9 NTM Network Management

Overview

Purpose

This chapter explains what some basic discretes and measurement data indicate about network conditions. Information about discretes and other data types can be found by using the Search NTM page.

Reference: HTML search in the Library Help file.

Contents

This chapter contains the following topics:

Four principles of network management

Overview

Network management is the process of using data collected periodically by NTM to determine the status of offices, trunk groups, and transit traffic in the network.

Previous chapters have described how NTM polls (requests data from) offices in the supervised network for two types of data:

- Event indicators (discretes)
- Measurement data

Principles

The four principles of network management are:

1. Inhibit switching congestion.
2. Keep all trunks filled with good calls.
3. Utilize all available trunks.
4. Give priority to single-link connections when all available trunks are exhausted.

Event indicators (discretes)

Overview

As we have seen in Chapter 4, “Surveillance Data”, discretes are on–off indicators representing the status of a network element. Each office sends its discretes to NTM as a discrete data block. NTM collects discretes every 30 seconds.

Chapter 4, “Surveillance Data” explained that discretes are classed as:

- message-alerting discretes (those reporting trunk group list changes, active controls, etc.)
- status discretes (those reporting machine congestion, etc.)

Discrete types

Message-alerting discretes trigger audits from NTM that update the reference part of the current or online database (but do not update the record base.)

Status discretes report events of interest to network managers.

Important status discretes include those that warn of machine congestion conditions or a service compromise.

Data collection failures may be seen on the Alerts table. The Alerts Table can also provide meaningful information about adverse network conditions.

Measurement data

Overview

Purpose

The following types of measurement data may be forwarded to NTM from the offices:

- Trunk group data
- Machine or entity data
- Control data
- Hard-to-Reach data
- Signaling system data

Measurement data and discretes provide valuable information about network conditions on a near-real-time basis (near real time because the data received by NTM relates to the 5-minute period just ended.)

Contents

This section contains the following topics:

Trunk group performance indicators

Overview

Multiple indicators exist to track trunk group performance. These include:

- Peg count (PC)
- Overflow (Ofl) and percent overflow (%Ofl)
- Attempts per circuit per hour (ACH)
- Outgoing connections per circuit per hour (OCCH)
- Incoming connections per circuit per hour (ICCH)
- %Occupancy (%Occ)
- Holding time (HT)
- Maintenance busy (MB) and %Maintenance busy (%MB)

Peg count (PC)

Peg Count records the number of attempts to seize an idle circuit on a trunk group. It is not an indication of a completed call; it only indicates a call was offered to a trunk group. Peg Count is also known as attempts or bids.

Peg Count and Overflow are also used as counts associated with switching system common control equipment i.e. receivers and transmitters.

Overflow (Ofl) and percent overflow (%Ofl)

The count of calls offered to a TG that fail to find an idle trunk/circuit. Peg Count and Overflow are received as raw data from each switch reporting to NTM.

(Peg Count - Overflow) is the number of offered calls that are actually carried on a trunk group.

Percent Overflow measures the percentage of offered calls unable to find an idle circuit.

The formula used to calculate Percent Overflow is:

```
%Overflow = (Overflow / Peg Count) * 100
```

%OFL by itself can be misleading. The size and type of the TG and the quantity of calls must also be considered. For example, a meaningful set of PC and Overflow counts might be:

```
PC = 4500, OFL = 1500, %Ofl  = 33%
```

A less meaningful set of counts might be:

```
PC = 45, OFL = 15, %Ofl   = 33%
```

In both cases, %Ofl is 33%, but in the first case 1500 calls were affected; in the second case ony 15 calls were affected. Overflow on high-usage trunk groups is not normally a problem, while overflow on a final route indicates lost calls.

No-circuit counts on the Network Element Detail page can also indicate whether significant numbers of calls are being lost.

Attempts per circuit per hour (ACH)

ACH measures attempts to seize a circuit. ACH is a measure of the traffic volume (or "pressure") on a TG.

The formula used to calculate ACH is:

```
ACH = ((5-Min Peg Count) * 12) / # Circuits (in service)
```

When the calculation is for a period other than one hour, PC should be multiplied by the appropriate factor, i.e. 15 minute data * 3, 5 minute data * 12. This rule also applies to OCCH and ICCH.

High ACH and short Holding Time may indicate problems with call completion.

Outgoing connections per circuit per hour (OCCH)

OCCH measures the number of connections (seizures) to a circuit.

One of the more important measurements, can provide indications of network congestion or calls failing.

The formula used to calculate OCCH is:

```
OCCH = ((Peg Count - Overflow) * 12) / # Circuits (in service)
```

Incoming connections per circuit per hour (ICCH)

ICCH measures the number of connections to a circuit from the distant end of a 2W (or 1WI) trunk group.

One of the ways to interpret the effectiveness of traffic is to use ICCH in conjunction with OCCH. Under normal conditions it is expected each end of a 2W TG has approximately equal usage. An unbalance can be an indication of abnormal traffic patterns.

The formula used to calculate ICCH is:

```
ICCH = (Incoming Peg Count * 12) / # circuits (in service)
```

%Occupancy (%Occ)

%Occ is used to show how much of a TG is being utilized during the measurement period.

Represents the fraction of time that the circuit group was occupied compared to the amount of time that was available. (This is the ratio of "carried CCS" to "Maximum available CCS".)

The formula for %Occupancy for 1 hour is:

```
%Occ = ((Carried Usage (CCS)) / (Total Circuits * 36 CCS))*
   100
```

Note that some switch technologies combine Usage and Maintenance Busy counts in %Occupancy; other report these separately.

Holding time (HT)

Holding Time measures the average length of time that a trunk is in use for a call.

The formula used to calculate Holding time is:

```
HT (in minutes) = ((Usage * 100 (sec.)) / ((PC - Ofl) +IPC)) /
   60 (sec.)
```

Holding Time Considerations:

- Short HT results in higher OCCH; long HT results in lower OCCH.
- Short HT calls can be masked by long HT calls.
- Short HT calls may not be bad; this could be data, credit card validation, pager, or fax traffic.

Average Holding Times for Typical Traffic Types:

- Voice: 1.5 - 3.0 HT
- Cellular: 1.5 HT
- Page/Credit card calls: .5 HT
- Internet: 10-15 HT

Since all networks are different, you must know what is normal in your network.

Maintenance busy (MB) and %Maintenance busy (%MB)

These counts reflect circuits in a trunk group that are in a maintenance state and not available to carry calls.

MB is the number of circuits in a trunk group unavailable for call completion; %MB is the MB count reported as a percentage of the total.

Thresholding for trunk group measurements

Overview

All the data fields discussed previously may be thresholded in the Trunk Group Threshold files (/musr/rb/thresh/thresh[1-8]).

Considerations

The thresholds you set depend on conditions in your network. General considerations include:

- Know what is normal in your network.
- Set threshold so that NTM informs you when conditions are outside normal parameters.
- Periodically (once or twice yearly), compare the thresholds you are using to network conditions. If the thresholds no longer accurately reflect normal conditions in your network, they should be adjusted accordingly.

□

Examples

Overview

The following examples are provided to depict expected relationships between some trunk group performance indicators.

OCCH and %OFL

OCCH = 10 to 15; %OFL = 15% to 20% (on a high-usage trunk group)

This pattern indicates good network performance; calls are completing.

OCCH = 0 to 5; %OFL - 0% (on a high-usage trunk group)

OCCH is very low here; if overflow occurs some trunks may be OOS.

OCCH = 15 to 20; %OFL = 15% to 20%

This is still normal, but if %OFL drops there may be an indication of bad trunks or far-end office trouble. Take Holding Time into consideration also.

ACH, OCCH, and HT

ACH = 60; OCCH = 60; HT = 1.0

The ACH and OCCH counts here are both high; holding time is low for voice traffic. There may be a bad first choice trunk (“killer trunk”) on this route. Note that this condition is unlikely in a digital network.

ACH = 36; OCCH = 36; HT = .4

Here, ACH and OCCH are quite high while HT is very low. This set of data characterizes a possible mass call situation.

ACH = 15 to 20; OCCH = 6 to 8; HT = 7 to 8

In this set of data, ACH is slightly above average while OCCH is normal and HT is high. This is characteristic of peak day calling.

ACH = 10 to 15; OCCH = 10 to 15; HT = 2.5

ACH, OCCH, and HT counts are average. This may be expected from a normal high-usage trunk group with 15% to 20% OFL, ICCH of 8 to 10 and 90% occupancy.

Machine performance data

What can go wrong?

Machine performance data provides network managers with information on the integrity of call processing network elements. Even though most network problems show up first as trunk group problems, a clear picture of switch performance is critical to good network management. Machine performance data can show occurrences of:

- Routing errors
- Equipment failures
- Loss of signaling capabilities
- Machine Congestion due to heavy traffic
- Machine Congestion due to mass calling
- Maintenance performed at the wrong time

Call completion analysis

Major steps within the call completion process include:

- Verification of the receipt of all digits and the successful translation of digits. A problem here can result in Ineffective Machine AttemptS (IMAs) such as VCT or Partial Dial Abandon.
- Verification of the selection of an idle outgoing trunk and successful outpulsing of the required digits or an Initial Address Message (IAM) sent to an SS7 STP. IMAs caused by problems in this stage include TOT_NC, O_ONC, and TAND_NC.
- Verification of the receipt of “Answer Supervision” (off-hook signal) from the distant end (or receipt of an ACM from the STP). Lack of response to an IAM may result in an SSTO IMA.

Categories

Machine Attempts and Network Attempts may be categorized as follows:

- Ineffective Machine Attempt (IMA) - The call failed in the switch
- Network Attempt (NA) - The call made it out of the switch.
- Ineffective Network Attempt (INA) - The call failed to receive answer supervision
- Machine attempts (MA) = IMA + NA
- Ineffective attempts (IA) = IMA+ INA

Note that each switch type processes calls differently. It is important to develop a knowledge of the switch types in your network.

NA, INA, IMA — descriptions

A Network Attempt (NA) is a call that has been received by a switching machine and has successfully completed the “digit reception”, “digit translation”, “trunk selection” and “outpulsing” stages. This “Network Attempt” now awaits “answer supervision”.

An Ineffective Network Attempt (INA) is a “count” of Network Attempts that do not result in the receipt of “answer supervision” (start of billing). The primary causes of INA are “Busy” and “Ring-no-answer”. Additional causes are “far end” failures, no-circuit (NC) conditions, and the customer hanging up before answer has occurred.

High counts of INA will normally result in a “Hard-to-Reach” condition or automatic HTR declaration. The Network Manager should be aware of these conditions as high INA counts or HTR conditions can be an indication of a “far end” problem.

An Ineffective Machine Attempt (IMA) is exactly that. The incoming attempt (bid) could not transverse the switching machine and be successfully outpulsed. The call failed internally at the switching machine. Examples of this failure are: Vacant Code (non-existent code), False Starts (FS), Partial Digit Abandon (PDA), No Circuit (NC) condition outgoing, restrictive Network Management controls, and internal switching machine faults.

Although the Network Manager may not be able to obtain this data directly, this data exists in scheduled maintenance reports normally available to the centralized switching maintenance forces. Poor trunk group performance may be the result of ongoing or chronic IMA failures associated with a specific trunk group.

Switch measurements

Overview

Switch measurement data that is important for network management includes the items discussed below. To make sense of these counts it is important to know what is normal for a given switch in your network.

Delayed readiness

This can indicate possible overload. Delayed readiness occurs if subscribers aren't getting dial tone within 3 seconds of going off-hook.

Overload (MC1, MC2)

These are actual overload states. The count indicates the percentage of time the switch is in an overload condition.

Call direction

Counts Indicating Call Direction (ORIG, TERM, INC, OUTG, TAND, INTRA):

- Originating calls begin at the reporting switch; terminating calls end at the reporting switch.
- TAND should equal INC + OUTG. INTRA traffic begins and ends at the reporting switch (i.e. a subscriber calls another subscriber served by the same end office.)
- The Total Load measurement, TOTLD, is a count of the total number of calls processed by the switch in the last five minutes.

No circuit conditions

These are conditions in which a call on an inbound trunk fails to find an outbound trunk, or an outbound call cannot find an idle circuit on which to complete.

Critical service circuits — HLSC, TDEC, (4ESS-CCS, DS, DT, MFT)

Unavailability of tone decoders and other switch peripheral devices can also indicate the an overload is developing. These counts are dependent on the switch technology you are using.

Additional ineffective machine attempts — IMA, VCT

Some Vacant Code (VCA) attempts are expected due to misdials or other user errors. A high number of Vacant Codes may indicate a translations problem.

Network management controls — OFC

What controls are currently active on the switch? Is traffic overcontrolled or undercontrolled?

CCS and 800 service — CCS

These categories show Common Channel (SS7) signaling activity such as IAMs sent and received.

Service switching point — SSP

This category provides data including Number Service attempts and various failure categories.

AIN Toll Free Service — AIN

ASP and Tollfree Service data includes:

- Total ASP calls completed: TOT_AIN_COMP:
- Toll free attempts: AINTF_ATT
- Total Completed Tollfree Calls: AINTF_COMP
- TF Queries Blocked by SCP ACG AINTF_SCP_BLK
- SCP-Overload ACG List Overflows: AINTF_SCPOFL
- TF Queries Blocked by SMS ACG: AINTF_SMS_BLK
- SMS-Initiated ACG Overflows: AINTF_SMSOFL

These counts report queries to the SS7 network, not actual call completions. To quickly gauge effectiveness of ASP/Tollfree network services, compare attempts (AINTF_ATT) to completions (TOT_AIN_COMP and AINTF_COMP). Although there may be some failures, the two should be fairly close.

Local number portability — LNP (*5ESS*)

The important data in this category are LNP attempts (LNP_ATT) and LNP failures.

Subcategories of LNP attempts include:

- LNP queries launched to an SCP (LNP_QRY)
- successful queries launched to an SCP (LNPQRY_SUC)
- intra-switch LNP calls (LNP_INTRA)
- tandem LNP calls (LNP_TAND)
- queries that successfully returned a local routing number (LNPQRY_LRN)

LNP failures are categorized as:

- blocked by manual call gap or SCP/SMS automatic callgap controls (LNP_MCG_BLK), (LNP_SCP_BLK), (LNP_SMS_BLK)
- those blocked by signaling network problems (LNPQRY_FAIL)
- queries that failed at the donor switch (LNPDNR_UA) or destination switch (LNPDEST_UA) due to an unallocated number. These counts indicate numbers have not been ported correctly.

To get a snapshot of network LNP performance, compare LNP_ATT to LNPQRY_FAIL.

For the AIN/Tollfree and LNP counts to be reported accurately, those features must be enabled at the switch as well as in NTM.

10 NTM Engineering Guidelines

Overview

Purpose

Capacity constraints for NTM fall into three categories. These capacity constraints are subject to change with new releases or features.

Contents

This chapter contains the following topics:

Hardware and software constraints

Overview

Beginning in Release 14.0, NTM comes in three purchasable hardware configurations:

1. Small
2. Large

These configurations limits are noted in the descriptions in Table 1.

Hardware and software constraints fall into two categories:

1. Those that the system will not allow you to exceed Table 1, Table 2
2. Those that may result in errors if you exceed them Table 3

Table

Table 1 lists the hardware and software constraints for NTM.

Table 1 Hardware and software constraints (Sheet 1 of 4)

Limit Type	Maximum number of …	Limit
Network Element Database Limits	**Internal entities (Includes *4ESS offices,* non-*4ESS offices,* DCCs and NMS entities)** • Small configuration • Large configuration	 243 2139
	4ESS offices • Small configuration • Large configuration	 10 16
	Non-*4ESS* offices with standard trunk group collection capacities • Small configuration • Large configuration	 200 2000
	Non-4ESS offices with large trunk group collection capacities • Small configuration with default TG collection Small configuration with expanded TG collection feature • Large configuration with default TG collection Large configuration with expanded TG collection feature	 25 100 100 400
	DCCs (Data Collection Concentrators) • Small configuration • Large configuration	 30 120
	TCP/IP direct connect network elements • Small configuration • Large configuration	 200 2000
	Maximum number of NMS entities for customers with Feature 8, “Disaster Recovery (Duplex)”	3
Network Element Database Limits	**External entities**	21,000

Table 1 Hardware and software constraints (Sheet 2 of 4)

Limit Type	Maximum number of …	Limit
Maximum Number of Switches Connected to a FEP	*GTD-5* and small switches	150
	DMS or *5ESS* switches with 1024 or more trunk groups.	50

	Total switches = number of large switches + *other switches*
	`150 = (3 * number of large switches) + other switches`
	For example, if you have 20 large *DMS* switches:
	`150 = (3 * 20 large switches) + 90 other switches`	

Maximum Number of Switches Connected to a NPM (NPM 6.0 and later)	offices connected	200
Maximum Number of Switches assigned to a DCOL	offices assigned to each of the NTM DCOLs including those mediated through a DCC. Each of the Large TG Data switches count as 3 normal offices and the number must be reduced accordingly. `200 = (3 * 40 large switches) + 80 other switches` Offices are assigned to a DCOL during installation of the NTM. Care should be taken when provisioning additional offices not to exceed the 200 element limit. Although it is possible to surpass the limit the system will suffer a reduction in performance.	200
Thresholding Limits	**Threshold tables**	8
	Threshold table indices	
	• Without Feature 3, “Management of Record Base Partitions and Subnetworks”	128
	• With Feature 3	256
	Threshold levels in a threshold rule	
	• Without Feature 189, “Replacement Thresholding Capability for Trunk Group Data”	3
	• With Feature 189	10
Exception Level Limits	Exception levels	10
	Exception level groupings uniquely displayed with color codes	3

Table 1 Hardware and software constraints (Sheet 3 of 4)

Limit Type	Maximum number of …	Limit
Subnetwork Limits (optional feature)	**Subnetworks (including the main subnetwork)**	
	• Base System	3
	• Feature 3, “Management of Record Base Partitions and Subnetworks”	15
	• Feature 8, “Disaster Recovery (Duplex)”and Feature 40, “Enhanced Disaster Recovery”	4
	Partitions	
	• Base System	1
	• Feature 3, “Management of Record Base Partitions and Subnetworks”	6
	• Feature 8, “Disaster Recovery (Duplex)”and Feature 40, “Enhanced Disaster Recovery”	2
Set Limits	Trunk group sets • Small configuration • Large configuration	 2000 4000
	Office sets • Small configuration • Large configuration	 2000 4000
	Sets in which a single office can be included: • Base System	8
	• Feature 29, “Increased Set Membership for Offices”	12
	Sets in which a single trunk group can be included: • Base System • Feature 32, “Increased Set Membership for Trunk Groups”	 4 10
	Characters in set names	12
Historical Database Limits	Historical databases	8
Trunk Groups	**Trunk groups defined in the record base** • Small configuration • Large configuration	 100,000 200,000

Table 1 Hardware and software constraints (Sheet 4 of 4)

Limit Type	Maximum number of …	Limit
Database Limits on Trunk Group Scheduling	**Trunk groups scheduled:**	
	• *4ESS* switch	1023
	• *5ESS* switch (5E15 or earlier)	500
	• *DMS* (pre NA007 generic), *EWSD*, GSP, or *LSSGR* switch	250
	• *DMS* switch (NA007 and later generics) or Succession switch (IC02, SN02 and later generics) with appropriate optional feature with the 1024 trunk groups	1024
	• *5ESS* switch (5E15 or later) with appropriate optional feature	2000
	• *GTD-5* switch	256
	• Sonus (GSX only)	250
Limits on User Processes	Simultaneous audits **Notes: No single office** `create/dbtest` **can be run if a single-file or full** `create` **or** `dbtest` **is being run.**	3
	Single-office `create/dbtest`	3
	Single-file or full `create/dbtest`	1

Table

Table 2 lists the hardware and software constraints for NTM.

Table 2 Reports and miscellaneous constraints

Limit Type	Category	Limit
Reports	NTM exception reports per 5-minutes	1
	Individual data items from the database for ad-hoc user reports using retrievals that do not filter the data, spread over multiple requests, per hour	220,000
Miscellaneous	Maximum office name length	12
	Maximum nickname length	6
	Maximum suffix length	4
	Maximum set name length	12
	Maximum subnetwork name length	4
	Maximum manual call gapping control digits:	
	• Base System	12
	• Feature 136, "*5ESS* Switch 5E10 Generic Support"	15
	Maximum prefix code digits	3
	Maximum carrier identification code digits	4
	Maximum defined IC prefixes per office (not including the default)	100

Performance-based constraints

Caution

Exceeding these constraints may result in slower response time or some other performance problem. While it may be possible to exceed one constraint by reducing another, we recommend that the constraints detailed here be considered the maximum for normal operations.

NTM often provides a warning message if a performance limit is exceeded. This message serves as a reminder of the system limits but does not prevent the limits from being exceeded.

Table

Table 3 lists the hardware and software constraints for NTM.

Table 3 Performance-based constraints (Sheet 1 of 2)

Category	Limit
Network Element Limitations for Data Collection	
Maximum number of trunk groups scheduled for simultaneous trunk group data collection (normal operations) • Small configuration • Large configuration	 10,000 75,000
Maximum number of trunk groups scheduled for simultaneous trunk group data collection (BDR takeover operations) with Feature 8, “Disaster Recovery (Duplex)”and Feature 40, “Enhanced Disaster Recovery” • Small configuration • Large configuration	 20,000 150,000
Notes: 1. This is the maximum number of trunk groups from which NTM should be expected to collect data at one time. 2. The number of trunk groups is from an NTM database and data collection perspective. Therefore, a 2-way trunk group between two internal offices would be counted as two trunk groups.	
Exceptions	
Exceptions per 5-minute period — Normal Load • Small configuration • Large configuration	 1,000 2,000

Table 3 Performance-based constraints (Sheet 2 of 2)

Category	Limit
Exceptions per 5-minute period — Heavy Load • Small configuration • Large configuration	 2,000 4,000
All limits, especially the user limits, should be considered guidelines. Some pages or large queries on pages have a much larger impact on the system. Very few pages, perhaps only one, of that type could be run. Other pages and small queries have a much smaller impact. Other user activities, such as an audit or a single office `create`, could be substituted for an active page. Pages which are inactive or windows with no activity have minimal performance impact.	
User Processes	
Maximum number of simultaneous static web pages per site	Limited only by server resources
Maximum number of simultaneous automatically updating map web pages per site	12
Maximum number of simultaneous automatically updating non-map web pages per site	20
Maximum number of simultaneous automatically updating web pages per site, both map and non-map	32
Maximum number of simultaneous automatic and manual updates of web pages per site, both map and non-map	40
Maximum number of network view displays per site	40
Maximum number of code parameter sets per site	100
Maximum number of protective control parameter sets per site	100
Maximum number of data streams per site	3
On-Line Control Log Constraints	
Controls stored in the on-line control log • Small configuration • Large configuration	 5,000 40,000

11 Purchasable Features

Overview

Purpose

Throughout this guide, optional features that must be purchased separately are mentioned. Table 1, “Purchasable Feature List” (p. 2) provides a list of some of these optional features for your convenience. However, for a current catalog of purchasable features or to purchase any of the optional features, contact your Account Representative.

Contents

This appendix contains the following topics:

List of purchasable features

Table

When new features are introduced for new office generics it is assumed that fields supported with previous generics will be brought forward.

If a feature in Release 12 or Release 13 of the NTM has caused a new field to be added to the database, the field notes the feature relationship. Select Feature = <Feature number and name> on the Search NTM page to see fields specific to a feature

Reference: See "HTML search" (p. 15).

Table 1 provides a list of the currently available purchasable features in NTM.

Table 1 Purchasable Feature List (Sheet 1 of 11)

Feature Number and Name	Description
Feature 3, "Management of Record Base Partitions and Subnetworks"	Provides additional numbers of record base partitions, subnetworks, exception threshold indices, and user groups.
Feature 8, "Disaster Recovery (Duplex)" (see Feature 8, "Disaster Recovery (Duplex)"and Feature 40, "Enhanced Disaster Recovery")	Provides a backup to mitigate the impact of failures and disasters that might be experienced by an NMC and/or host computer.
Feature 22, "NMADM Login Accountability"	Provides the ability to restrict and verify the NTM commands run by the NTM users.
Feature 23, "Switch Type Specification Enhancement"	Allows the user to accurately reflect in the NTM record base the various switch types and generics present in a customer's network.
Feature 29, "Increased Set Membership for Offices"	Provides the capability of allowing an office to be a member of a maximum of 8 office sets.
Feature 32, "Increased Set Membership for Trunk Groups"	Allows a trunk group to be a member of up to 10 trunk group sets.
Feature 37, "Siemens' EWSD Interface"	Supports all capabilities of Siemens *EWSD* Release 10.0 switch.
Feature 40, "Enhanced Disaster Recovery" (see Feature 8, "Disaster Recovery (Duplex)"and Feature 40, "Enhanced Disaster Recovery")	Provides a virtual Network Traffic Management function that lessens the impact of failures and disasters.

Table 1 Purchasable Feature List (Sheet 2 of 11)

Feature Number and Name	Description
Feature 41, "Install RSPTE Without Stopsys"	Allows Record Base Administrators to update the database without stopping the system.
Feature 42, "NetMinder System NTM Function FEP"	Provides a new data collection system, FEP, which collects NTM data from *5ESS*, *DMS* 100/200, and (optionally) *GTD-5*.
Feature 45, "GTD-5 Switch Interface"	Provides an interface to the *GTD-5* switch system administration, and database administration interfaces.
Feature 55, "1A ESS Generic 12.0 Feature Support"	Provides support for 1A *ESS* Generic 12.0 Feature Group D Carrier Identification Code Expansion (CICE).
Feature 71, "4ESS Switch Generics 4E14(R4) - 4E18(R1) Support"	Allows NTM managers to take advantage of the increased network management capabilities provided in the *4ESS* 4E14(R4)–4E18(R1) switches.
Feature 74, "Improved Filtering and Reporting of Data"	Provides the ability to view/not view various types of "bad" or suspect data.
Feature 86, "Local Audit Data Restoration"	Allows rapid restoration of NTM audit data into the database without re-auditing the switches.
Feature 106, "Active Request Controller"	Adds ARC service to the NTM host platform.
Feature 122, "EWSD Release 13.0 Support"	Supports capabilities added to *EWSD* switch Release 13.
Feature 123, "Historical Data Across Releases"	Allows for use of historical databases created with earlier NTM generics.
Feature 124, "TCP/IP Interface to FEP"	Provides TCP/IP interface between NTM and FEP.
Feature 130, "Capacity and Usage Reporting"	Provides usage and capacity planning information on the NTM host.
Feature 131, "FEP Backup and Disaster Recovery"	Provides backup and disaster recovery feature for FEP.
Feature 160, "Increased Number of Characters in Set Names"	Extends the limit of the number of characters that can be used in the set names for both office and Trunk Group Sets from 1-4 characters to 1-8 characters.
Feature 185, "EWSD Release 12.1 Support"	Supports capabilities added to *EWSD* switch Release 12.1.
Feature 187, "5ESS Switch 5E11 Generic Features Support"	Incorporates new data for the *5ESS* switch 5E11 generic.

Table 1 Purchasable Feature List (Sheet 3 of 11)

Feature Number and Name	Description
Feature 189, “Replacement Thresholding Capability for Trunk Group Data”	Provides a user-definable thresholding capability to better isolate critical data.
Feature 195, “System Hardware HP Platform and Performance Upgrade”	Provides a new high-performance HP hardware platform for the NTM system.
Feature 214, “FEP Release 4”	Provides Front End Processor (FEP) release 4. This release contains upgrades of the FEP’s Sun operating system to the current Solaris version with Operations, Administration, and Maintenance enhancements.
Feature 215, “DMS 250 Switch Support”	Provides support for the *DMS* 250 switch.
Feature 218, “5ESS Switch 5E12 Generic Feature Support”	Provides support for the *5ESS* switch 5E12 generic.
Feature 219, "4ESS Switch NTM Support Through 4e22(R1)"	Provides support for the *4ESS* switch up to the 4E22R(i) generic.
Feature 227, “User-Definable Default Domains for Controls”	Provides user-definable default domains for controls.
Feature 229, “1A ESS Switch LNP Support”	Provides Local Number Portability (LNP) measurement support for the ESS1A switch.
Feature 236, “Browser-Based Extended Regional Alerting Display”	Provides for the ability to have a single display portray their network and indicates the presence of all the exceptions that have been detected.
Feature 239, “DMS 500 Switch Support”	Provides support for the *DMS* 500 switch.
Feature 244, “Enhanced Switch Support for 4ESS Generic 4E23(R3)”	Provides support for the 4e24 generic of the *4ESS* switch.
Feature 245, “TCP/IP Interface to TDM”	Provides a new interface option that uses a TCP/IP network over an Ethernet network for communication to a Traffic Data Management System (TDMS).
Feature 257, “FEP Release 5”	Supports the introduction of an LSSGR-like interface on the *GTD-5* switch.
Feature 258, “LSSGR Support for the GTD-5 Switch Generic 4003”	Provides support for LSSGR-like features of the gtd4003 generic of the *GTD-5* switch.

Table 1 Purchasable Feature List (Sheet 4 of 11)

Feature Number and Name	Description
Feature 263, "DMS 100/200 Switch Surveillance of 1024 Trunk Groups Via FEP"	Provides network managers with the ability to collect 5-minute surveillance data on 1024 trunk groups from *DMS* 100/200 switches.
Feature 264, "DMS 100/200 Switch Surveillance of 1024 Trunk Groups Via TDM"	Provides network managers with the ability to gather surveillance data on up to 1024 trunk groups from *DMS* 100/200 switches with the NA007 generic via TDMS.
Feature 265, "DMS 100/200 Surveillance of 1024 Trunk Groups Via DCOS-2000"	Supports 5-minute surveillance data for 1024 trunk groups in *DMS* 100/200 switches via DCOS-2000
Feature 266, " 1024 Trunk Group surveillance for FEP"	Allows surveillance for 1024 trunk groups via a FEP.
Feature 267, "1024 Trunk Group surveillance for TDM"	Allows surveillance for 1024 trunk groups via a TDM.
Feature 272, "NTM Report Writer"	Collects a subset of the data available on the NTM host and stores the data in the Oracle relational database for long term analysis
Feature 277, "TCP/IP Interface to DMS 100/200 Switches"	Supports the use of TCP/IP interface to the *DMS* 100/200 Switch
Feature 282, "TCP/IP Interface to 5ESS 5E15 Generic switches"	Provides a TCP/IP communications capability over an ethernet LAN or WAN to *5ESS* switches with the 5e15 generic.
Feature 283, "Surveillance of 2000 Trunk Groups in a 5ESS Switch"	Provides for the ability to gather surveillance data on up to 2000 trunk groups from 5E15, and later, generic *5ESS* switch that upgrade to this extended capacity.
Feature 284, "Surveillance of 1024 Trunk Groups in a DMS 100/200 Switch"	Provides a means to collect data on 1024 trunk groups from a "direct-connect" *DMS* 100/200 switch loaded with generics NA013.
Feature 285, "Surveillance of 1024 Trunk Groups in a DMS 250 Switch"	Provides a means to collect data on 1024 trunk groups from a "direct-connect" *DMS* 250 switch loaded with generics UCS13.
Feature 286, "Surveillance of 1024 Trunk Groups in a DMS 500 Switch"	Provides a means to collect data on 1024 trunk groups from a "direct-connect" *DMS* 500 switch loaded with generics NCS13.
Feature 288, "NTM Report Writer for 50 Switches"	Provides the capability for the NTM host computer to copy selected data to a new reporting database as that data is available on the host.
Feature 289, "NTM Report Writer for 100 Switches"	Increases the number of network elements supported by Feature 288, "NTM Report Writer for 50 Switches" to 100.

Table 1 Purchasable Feature List (Sheet 5 of 11)

Feature Number and Name	Description
Feature 290, "NTM Report Writer for 250 Switches"	Increases the number of network elements supported by Feature 289, "NTM Report Writer for 100 Switches" to 250.
Feature 293, "TCP/IP Interface to DMS 250 Switches"	Provides an efficient means of collecting data from up to 800 switches directly connected to the NTM Feature Set via TCP/IP interfaces.
Feature 293, "TCP/IP Interface to DMS 250 Switches"	Provides for the certification of the *DMS* 250 switch's generic UCS13 and provides TCP/IP support.
Feature 296, "TCP/IP Interface to DMS 500 Switches"	Provides a Transmission Control Protocol/Internet Protocol (TCP/IP) and Ethernet 3 interface, over a Local Area Network LLAN) or Wide Area Network (WAN), between the NTM Feature Set and the *DMS* 500 switches.
Feature 301, "Enhanced Switch Support for DMS 100/200 Generic NA014"	Provides for the certification of the *DMS* 100/200 switch's generic NA014 and for the collection of MB counts for TGs scheduled for 5-minute data collection.
Feature 303, "Enhanced Switch Support for DMS 250 Generic UCS14"	Provides for the certification of the *DMS* 250 switch's generic UCS14 and for the collection of MB counts for TGs scheduled for 5-minute data collection.
Feature 305, "Enhanced Switch Support for DMS 500 Generic NCS14"	Provides support to the collection and inclusion of maintenance busy (MB) counts for *DMS* 500 Generic NCS14.
Feature 311, "Enhanced Switch Support for 5ESS Generic 5e15"	Provides for the certification of support for the *5ESS* switch's generic 5E15 and provides control enhancements and the transparent support of accurate 5-minute measurements from the "mega" *5ESS* switch.
Feature 314, "Enhanced Switch Support for DMS 250 Generic UCS12"	Provides for the certification of the *DMS* 250 switch's generic UCS12 and for the support of the new UCS12 Generic Network Traffic Management capabilities.
Feature 316, "Marked Alarms for the Browser-based GUI"	Enables the customer to effectively address problems when confronted with a significant number of exceptions that may result from a major network event or heavy traffic loads.
Feature 318, "Browser-based GUI Dual Host Support"	Provides an integrated view of alerting information (exceptions) from two NTM hosts, allowing a wide area to be monitored from a single Network Traffic Management Center.
Feature 319, "Enhanced Switch Support for DMS 100/200 Generic NA009 Switches"	Provides for the certification of the *DMS* 100/200 switch's generic NA009 and for surveillance and control capabilities for GETS traffic.

Table 1 Purchasable Feature List (Sheet 6 of 11)

Feature Number and Name	Description
Feature 320, "Enhanced Switch Support for DMS 100/200 Generic NA012"	Provides for the certification of the *DMS* 100/200 switch's generic NA012 and for support of the new NA012 Generic Network Traffic Management capabilities.
Feature 321, "Enhanced Switch Support for DMS 500 Generic NCS12"	Provides support to the new switch capability OAM00004: 4-digit Carrier Identification Code (CIC) Operational Measurements (OM) on Engineering and Administrative Data Acquisition System (EADAS).
Feature 326, "Support of GETS in 5ESS Switches"	Provides for surveillance and control capabilities for Government Emergency Telecommunications Service (GETS) traffic in the 5E13 generic of the *5ESS* switch and the NA009 generic of the *DMS* 100/200 switch
Feature 327, "Enhanced Switch Support for EWSD Release 16"	Provides for the certification of the *EWSD* switch's Release 16 and for surveillance and control capabilities for GETS traffic.
Feature 328, "Enhanced Switch Support for GTD-5 Generic 1732"	Provides for the certification of the *GTD-5* switch's generic 1732 and for surveillance and control capabilities for GETS traffic.
Feature 330, "Audible Alarms for the Browser-based GUI"	Provides the network traffic managers and their management with a tool to ensure all exceptions are noticed by having audible alarms alert them to their critical exceptions as defined by their thresholding scheme.
Feature 335, "Browser-based Enhanced Discrete Trending"	Provides for the support of enhanced discrete trending with the browser-based GUI.
Feature 341, "Map Alert Restrictions for the Browser-based GUI"	Allows a network traffic manager to choose which alerts will be displayed on a given browser-based GUI map.
Feature 342, "Historical Data Playback for the Browser-based GUI"	Enhances the network traffic manager's ability to perform "off-line" reviews and analysis of previous traffic events in the network.
Feature 346, "Support of Exception Thresholding for Additional Managed Objects"	Provides thresholding capabilities for additional managed objects (raw and derived measurements).
Feature 349, "Enhanced Switch Support for 5ESS Generic 5E16"	Provides for the ability to specify a larger range of domains in a 5E16 Generic *5ESS* switch that upgrades to this extended capacity.
Feature 351, "Enhanced Switch Support for DMS 100/200 Generic NA017"	Accommodates data collection, processing and storage of expanded trunk group data for the *DMS* Switches.

Table 1 Purchasable Feature List (Sheet 7 of 11)

Feature Number and Name	Description
Feature 352, "Enhanced Switch Support for DMS 250 Generic SN04TDM"	Accommodates data collection, processing and storage of expanded trunk group data for the *DMS* Switches.
Feature 353, "Enhanced Switch Support for DMS 500 Generic NCS17"	Accommodates data collection, processing and storage of expanded trunk group data for the *DMS* Switches.
Feature 354, "Switch Support for Succession Network Switch Generic SN02"	Provides for the certification of Nortel Networks' Succession Network Switch, Generic SN02.
Feature 355, "Surveillance of 1024 Trunk Groups in a Succession Network Switch Generic SN02"	Provides a means to collect data on 1024 trunk groups from a succession network switch loaded with generic SN02.
Feature 356, "Enhanced Switch Support for Succession Network Switch Generic SN03"	Provides support for switch Generic SN03, along with the following capability, Manual HTR functionality, code-specific reroute, CANT with HTR option, reroute with HTR option and increase in range of control amounts for cancel-to and reroute control.
Feature 359, Support for 200 Large Switches"	Provides for support of 200 "large" switches. A "large" switch can be a *DMS* switch or Succession Network Switch sending data on up to 1024 trunk groups (TGs), or a *5ESS* sending data on up to 2000 TGs.
Feature 364, "5ESS Generic 5E16.1"	Provides Enhanced Switch Support for *5ESS* Generic 5E16.1" including; Manual Hard-To-Reach, Code Specific reroute and High speed signaling link data
Feature 365, "Bandwidth Directionalization & Prioritization control support in Succession Network Switch Generic SN04"	Accommodates data collection, processing and storage of expanded trunk group data for the *DMS* Switches,
Feature 369, "TCP/IP Interface to NPM"	Provides capability for NTM to use a TCP/IP interface for communication with a Telecordia Technologies' NPM.
Feature 374, "Enhanced Password Aging"	Adds password aging (PWA) capabilities to the Web GUI interface.
Feature 375, "Enhanced Switch Support for DMS 250 Generic SN05-TDM"	Provides Enhanced Switch Support for *DMS* 250 SN05-tdm support of GETS data.

Table 1 Purchasable Feature List (Sheet 8 of 11)

Feature Number and Name	Description
Feature 376, “Sonus GSX9000 5.1 Support”	Provides support for Sonus GSX9000 via Sonus Insight for PSX 5.1 and GSX 5.1.
Feature 379, “Marked Alarm Persistence on BDR”	Makes the BDR feature more seamless by providing a mechanism to create and delete Machine Data Marks, Trunk Group Marks, and the inhibition status of Trunk Group Exception processing
Feature 380, “Browser-based GUI TG Number Search Option”	Provides a new search type based on “TG Number” for searches associated with the browser-based GUI's “Trunk Groups” and “Trunk Group Details” displays.
Feature 381, “TCP/IP Interface to GTD-5 Switches”	Provides capability for NTM to use a TCP/IP interface for communication with a directly-connected *GTD-5* switch.
Feature 382, “Trunk Group Comment”	Allows a network traffic manager to enter details (a comment) about a trunk group in the Trunk Group record base file.
Feature 383, “Enhanced Support for 5ESS Generic 5e16.2”	Provides support for the *5ESS* generic 5e16_2, as well as: Support of the Optical Interface Unit (OIU); Collection of Reroute on Release counts for BICC trunk groups.
Feature 385, “Trend Analysis”	Provides a means to graph certain data over a period of time, thus providing a better view of the behavior of the network. This allows the network manager to graphically see measurements for a specific set of controls, network elements, or trunk groups, and how they varied during a particular time interval.
Feature 391, “SSL Support for the Browser-based GUI”	Allows for Secure Socket Layer (SSL) connectivity to the NTM system.
Feature 394, "TCP/IP Interface to 4ESS Switches via Datatek DT-4180"	Provides TCP/IP communications capability over an Ethernet LAN or WAN to the *4ESS* Switch and its LSSGR-like interface.
Feature 399, "Common Sign On"	This feature allow the customer site System Administrator to configure the NTM web configuration file to accept CSO authentication.
Feature 400, "System Hardware HP Platform and Performance Upgrade"	Transfers the appropriate NTM software Release 14 capabilities and functionalities to a new high performance HP hardware platform. Three distinct configurations are available: • large • medium • small

Table 1 Purchasable Feature List (Sheet 9 of 11)

Feature Number and Name	Description
Feature 403, "Nortel DMS GSP Network Element Support"	Provides support for Nortel Networks GSP Switch. This feature provides for the accurate storage, processing, collection, thresholding, and display of counts available from the Switch as well as controls and audits capabilities.
Feature 404, "Additional Data Support for Nortel Networks Sucession Switch"	Provides NTM software with the capability to collect additional ATM measurements from the Nortel Networks Succession switch generic sn06 and later. The Multi-media Gateway 4000 (MG4000) and the Passport 15000 (PP15K) generated measurements. This connection is made via an FTP link.
Feature 407, "Single Sign On for NTM"	Provides extension of Feature 399, "Common Sign On". Single Sign-On (SSO) reduces the number of logins required to access participating web applications.
Feature 409, "TCP/IP Interface to 5ESS Switches via AI"	Provides TCP/IP communications capability over an Ethernet LAN or WAN to the *5ESS* Switch using an Applied Innovation Inc. switch.
Feature 410, "TCP/IP Interface to DMS Switches via AI"	Provides TCP/IP communications capability over an Ethernet LAN or WAN to the *Nortel Networks DMS* family of switches using an Applied Innovation Inc. switch.
Feature 414, "Additional OM Data Support for Nortel Networks Succession Switch"	Provides an interface between the Nortel Succession Super DataNode Manager (SDM), and the Network Traffic Management software for collecting OM TRK, OM OFZ, and OM ISUPERRS measurements required to perform critical network management, as made available by the SDM.
Feature 415, "Browser-based Access to NetMinder Signaling Traffic Management (STM) data"	Provides access to VitalSTM data through the NTM software's Browser-based Graphical User Interface (GUI). Links will be provided on the NTM software user interface that will display signaling data collected by VitalSTM.
Feature 416, "Support of Nortel Succession IP Solution"	Provides an interface between the Nortel Succession Network Manager (SNM), and the NTM software for collecting packet related measurements required to perform critical network management, as made available by the SNM. These measurements will then be accessible to alerting and analysis tools that are part of the NTM software, for monitoring packet networks and will be available to assist the network manager in detection of abnormal events, evaluation of the scope of those events and determination of a possible cause.

Table 1 Purchasable Feature List (Sheet 10 of 11)

Feature Number and Name	Description
Feature 420, "Support of IWBM OM for Nortel Networks Succession"	IWBM (Inter-working Bridge Measurements) will be collected, processed, stored, and displayed. The IWBM measurements provide counts from the IW SPM (Inter-working Spectrum Peripheral Module) that provides a mechanism to bridge between the legacy and the packet networks. These measurements are reported on an office-wide bridge pool basis. There will be an entry for each bearer network in the Call Server. For the purposes of this feature, only a bridge pool for the ATM fabric or a bridge pool for the IP fabric will be reported. However, when a TriModal Call server is available, both bridge pools will be reported.
Feature 422, "Enhanced Security for Nortel Networks TR-746 Interface"	Provides enhanced security for the Nortel Networks Succession Switch SN08 for the Telcordia Technologies' Technical Reference (TR) – TSY – 000740, "Stored Program Control System/Operations System – Network Data Collection Operating System (NDC OS) Interface (A Module of LSSGR, FR-64 and OTGR, FR-439)", Issue 4, March, 2000 interface.
Feature 431, "TCP/IP Interface to 4ESS Switches via AI Switch"	Provides NTM software with a Transmission Control Protocol/Internet Protocol (TCP/IP) communications capability over an Ethernet Local Area Network (LAN) or Wide Area Network (WAN) to the *4ESS* office.
Feature 432, "Enhanced Security for Nortel Networks Using sftp"	Provides support for Nortel Networks Succession Switch SN08 with security enhancements to the file acquisition methods used to pull performance management CSV files from the SuperNode Data Manager (SDM). Releases of Nortel Networks Succession Switch prior to SN08 allowed ftp of CSV files from well known directories. This feature allows for the use of the sftp utility for file transfer, providing a more secure channel for this process.
Feature 433, "Support of Nortel Networks Succession SN08 Interface from SDM/CBM"	Provides support for Nortel Networks Succession Switch SN08 with enhancements to the interface that allows for the collection of a Performance Management (PM) file from a new machine called the Core and Billing Manager (CBM). This machine can be used in the network as the PM data repository, instead of the existing repository – the SuperNode Data Manager (SDM).
Feature 436, "UDDM/UDNEI"	The feature provides a User Defined Data Modeling (UDDM) capability, thresholding of data types defined via UDDM, User Defined Network Element Interfaces (UDNEI), and a transformation capability to map data collected via UDNEI to the data model established via UDDM.
Feature 437, "Enhanced Thresholding and Analysis"	This feature is intended to help the user in enhanced data analysis. For each object for each period of data collection, the data is subjected to threshold tests and failed threshold tests are reported as alerts on various GUI screens.

Table 1 Purchasable Feature List (Sheet 11 of 11)

Feature Number and Name	Description
Feature 438, "Support for NexTone Session Border Controller"	With this feature the 8920 Network Traffic Management software software system supports the S/BC available from NexTone.
Feature 439, "NTM Support for BroadSoft BroadWorks"	This feature supports 5-minute data collection and thresholding for the following 3 parts of the BroadWorks architecture: Application Server, Media Server, and Network Server.
Feature 440, "UDNEI SSH Support"	Provides SSH communication capability to existing UDNEI Normalizer functionality.
Feature 455, "Support for NexTone Session Border Controller Outbound Call Limiting"	The feature provides support for the new Outbound Call Limiting control.
Feature 460, "Periodic Data Aggregation"	The feature provides support for the Periodic Data Aggregation.
Feature 461, "Statistical Thresholds"	The feature provides support for the Statistical Thresholds.

NTM System Software Feature descriptions

Overview

Purpose

The following sections describes the NTM system software features. For additional information on purchasing any of these features, or implementing them in your network, contact your Alcatel-Lucent sales or support staff.

Feature 3, “Management of Record Base Partitions and Subnetworks”

Purpose

This optional feature allows appropriate divisions of responsibility among users on one system. Two subnetworks in addition to the main subnetwork can be defined. Other optional NTM features increase the number of subnetworks that can be defined.

Subnetworks

A subnetwork is a group of offices and trunk groups specified in the record base. A user's access to network surveillance capabilities or the ability to audit and put controls on the network can be defined on a subnetwork basis. This makes it possible to set up user groups that have limited NTM functionality for a particular subnetwork. A user group can also have surveillance capabilities for the whole network but be able to put controls on a smaller subnetwork. Subnetworks and user groups can be configured in a variety of ways to meet the needs of the users of the system.

Partitions

Partitions are a type of subnetwork in which groups of offices can reside in separate sections of the record base. Partitions are used to restrict a user’s ability to modify database files for entities in the partition.

Reference: Chapter 2, “Managing Record Base Partitions” in the *Record Base Administration Guide*

Permissions

Subnetwork permissions are defined for each user group on a subnetwork basis. There are three levels of permission:

- Full network management functions, which include surveillance, control, and auditing of offices and trunk groups in the subnetwork
- Surveillance capability, which includes looking at all network management data about the subnetwork, but not executing controls or audits
- Database modification, which includes running `create` and `dbtest` on offices in a partition. Database modification permission can be assigned only for a partition, not for any other type of subnetwork.

  Reference: Chapter 11, “Subnetwork Administration” and Chapter 3, “System Security, User Groups, and Group Permissions” in the *System Administration Guide*

Administration

Subnetworks are set up and administered by the System Administrator, who can use the `snw_admin` command to create or delete subnetworks, add or delete user groups, and define permissions.

Reference: `snw_admin` in the *Input Commands Guide* and Chapter 11, "Subnetwork Administration" and Chapter 3, "System Security, User Groups, and Group Permissions" in the *System Administration Guide*

□

Feature 8, “Disaster Recovery (Duplex)”and Feature 40, “Enhanced Disaster Recovery”

Feature 8

Feature 8, “Disaster Recovery (Duplex)” (BDR) allows two NTM host computers, each supporting one or more Network Traffic Management (NTM) centers, to provide backup and disaster recovery for each other as well as for each other's NTM centers. In other words, this feature allows an NTM host to take over the operations of another host and for an NTM center to take over the operations of another NTM center.

Feature 40

Feature 40, “Enhanced Disaster Recovery” allows more than two hosts in the configuration for disaster recovery.

Capacity

For the disaster recovery features, each host must have sufficient capacity to manage its individual offices as well as the offices of those hosts for which it is designated as backup host. The connections between hosts must be over high-speed Ethernet TCP/IP lines. Figure 1 shows a simplified example of an NTM architecture that would support these features.

Scenarios

The disaster recovery features support a backup capability for the following failure scenarios:

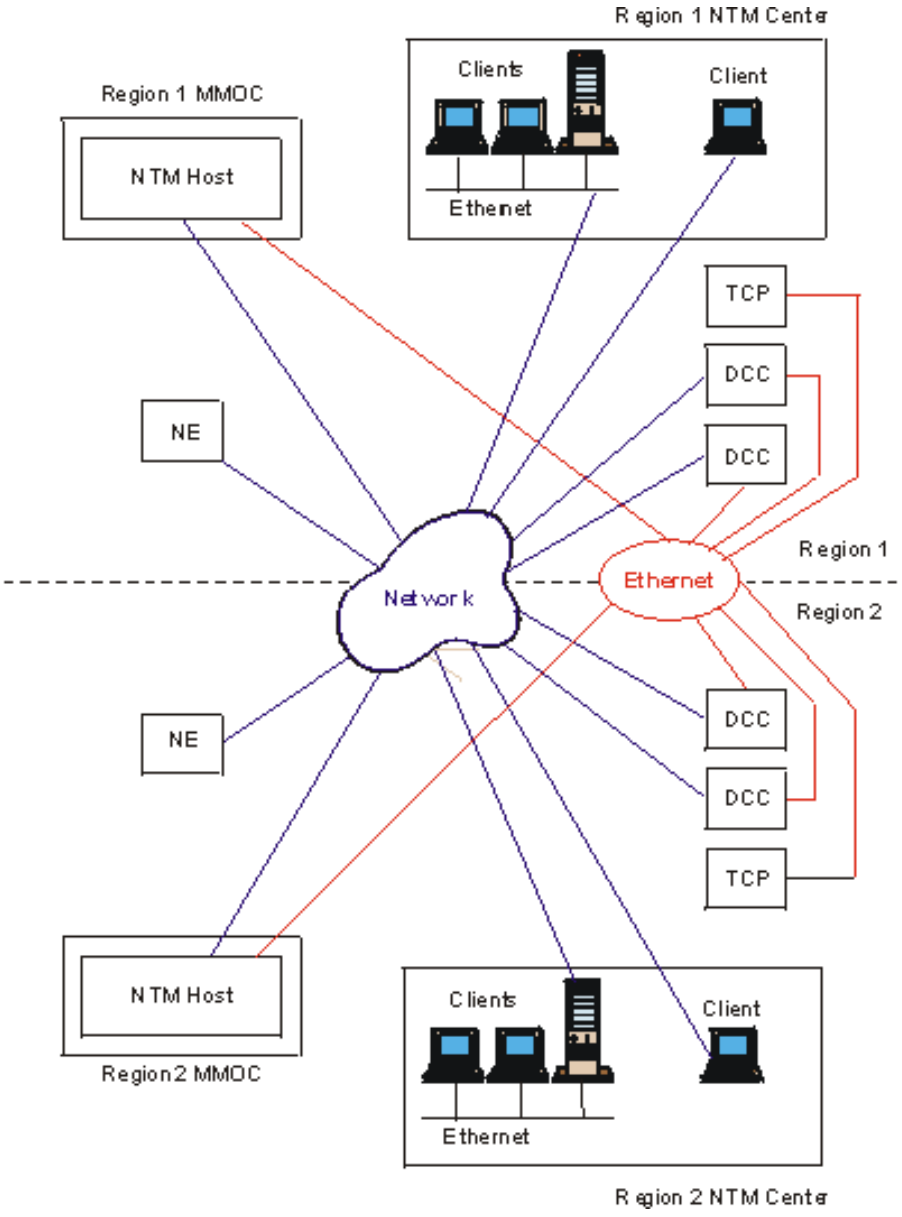
- An NTM center “fails”, that is, becomes unusable, and the center's operations are transferred to another NTM center.
- An NTM host “fails” and the operations of the NTM center supported by that host are supported by another NTM host.
- An NTM host and one or more of the NTM centers it supports “fail.” The operations of the failed NTM centers are transferred to the working NTM centers that are supported by another NTM host.

With more than two hosts in the configuration, multiple backup scenarios are possible. For instance, in a three-host configuration, if one host cannot be sized to handle the traffic for the entire network (cannot serve as backup for both of the other hosts), a configuration may be implemented that shares responsibilities across hosts. This configuration allows each host to be the backup for one other host. For example, with host names Host A, Host

B, and Host C, Host B backs up Host A, Host C backs up Host B, and Host A backs up Host C. Many other configurations are possible. For example, one partition may be backed up to two partitions, or it may not be backed up at all.

Reference: Chapter 12, "BDR Administration on a Host" in the *System Administration Guide*

Figure 1 NTM Architecture for Feature 8, "Disaster Recovery (Duplex)"



Feature 22, “NMADM Login Accountability”

Purpose

This feature expands the existing security capabilities to encompass all NTM users and all of the NTM command line actions. This feature consists of three new capabilities:

1. Increased command coverage
2. Command use logging
3. Command logging selection

Increased command coverage

The user group based command restrictions in the “/nm/etc/permissions” file is expanded to cover a majority of the NTM commands, including the NMADM type administrative commands and shell-based NTM commands.

The commands, normally restricted to the general NMADM user ID, now have the potential to be run by Super Network Management, “snm”, and other user IDs, if the permissions are set accordingly. Which users have access to these administrative commands is controlled by the user group entries, in the “/nm/etc/permission” file, associated with these commands (and a user's inclusion or exclusion in a particular user group). The NTM application restricts the use of NMADM type commands to users with “snm” group permission.

Examples of NMADM commands: `stopsys`, `startsys`, and `dbadmin`.

The standard NTM only contains entries in “/nm/etc/permissions” for executable binary based user commands. The NTM application also contains executable shell-based commands and, with this feature, these types of commands are now included in the “/nm/etc/permissions” file.

Command use logging

A new “Cmd_Log” file is added to the NTM. The “Cmd_Log” file contains a listing of NTM commands (tagged in “/nm/etc/permissions”) run by users. Each entry in the listing contains the date and time (when the command was started), user ID (who started the command), and the command name (along with its command line options).

The “Cmd_Log” file (similar to the handling of the Error Log, “Err_Log”) follows the standard NTM capabilities concerning viewing, rollover, archiving, and unarchiving log files. The “Cmd_Log” file is accessible (viewing and editing) only to users with “root” permissions.

Command logging selection

With this feature, the “/nm/etc/permissions” file has one new field that determines if the use of this command will be logged. The system administrator can modify the entries in this file to customize the file to their particular installation of the NTM.

The “/nm/etc/permissions” file is delivered with logging of the NTM administrative commands the default NTM application action and the administrative commands marked as requiring “snm” group permission to execute.

□

Feature 23, “Switch Type Specification Enhancement”

Purpose

This feature allows the NTM database administrator to enter into the record base RSPTE File the actual switch type and generic, and to associate the entered switch type with one supported internally by the NTM. Both the switch type field and generic field are limited to not more than 7 characters.

Record base file

A new record base file allows a mapping of “actual” switch types and generics which would be specified in the RSPTE file to the internally supported switch type and generic, which determines how NTM treats the switch.

If a switch type in the RSPTE file is not recognized by NTM, but is mapped in the switch type/generic mapping file to a switch type and generic which is supported by NTM, then the switch — other than when displaying the switch name and generic — is treated as the internally supported switch and generic.

If the switch in question is a *5ESS*, *4ESS*, 1A *ESS*, *DMS*, Succession Network, or other switch type for which the customer has purchased support, and a generic is specified that is not currently supported, that generic must be mapped by the user to a supported generic, which would normally be the latest generic for which the customer has support. For example, if a customer had not purchased 5E11 support, then the 5E11 generic could still be entered into the record base, but the 5E11 generic would have to be mapped by the user to 5E10.

BBGUI

Throughout the NTM record base, the NTM browser-based GUI displays, and with the `linkstat` command, wherever a switch type/generic is displayed in association with a specific Common Language Location Identifier (CLLI) the switch type and generic number established in the Record Base are displayed, as appropriate.

As a part of this feature, a new supported switch type is added to NTM. That switch type is “LSSGR87” (Local Access and Transport Area Switching System Generic Requirements, 1987). LSSGR-compliant switches for which a customer has not purchased specific support could be identified in the RSPTE file by their actual type and generic and mapped in the switch type/generic mapping file to type “LSSGR87”. The support provided for the “LSSGR87” switch type is the same as currently provided for the LSSGR-compliant *DMS* switch with the “BCS 24" generic.

□

Feature 29, “Increased Set Membership for Offices”

Purpose

With this feature, NTM provides the capability of allowing an office to be a member of a maximum of 12 office sets (8 for customers without the Browser-based Graphical User Interface). All current capabilities via “sets” remain unchanged.

Increasing the number of sets in which an office can be a member increases the operational usefulness of the office set feature. Some customers have reached the office set membership limit because of their network complexity and need to increase the set membership to get the maximum benefit from the capability of performing surveillance and control of the network via the “set” feature.

□

Feature 32, “Increased Set Membership for Trunk Groups”

Purpose

With this feature, NTM provides the capability of allowing a trunk group to be a member of 10 trunk group sets. Because of the demands that set definition places on the data storage capabilities of the system, there is a limit on the total number of trunk groups assigned to all trunk group sets. This limit is 20,000. As an example, if every set contains 10 trunk groups, and there are 250 sets, the total number of trunk groups assigned set membership is 2500.

All current capabilities via “sets” remains unchanged.

Increasing the number of sets in which a trunk group can be a member increases the operational usefulness of the trunk group set feature. Some customers have reached the trunk group set membership limit because of their network complexity and need to increase the set membership to get maximum benefit from the capability of performing surveillance and control of the network via the “set” feature.

□

Feature 37, “Siemens’ *EWSD* Interface”

Purpose

This feature provides an interface to the Siemens' *EWSD*, Release 10.0, Switch. System administration, database administration, and the user interface are modified, as appropriate, so that *EWSD* Release 10.0 switches are treated as such, separate and unique from other switch types currently supported by NTM.

Supported capabilities

NTM supports all of the capabilities of the Siemens *EWSD* Release 10.0 switch, as catalogued in the documentation described in the “Prerequisites” section of this feature description, through an electronic interface. A Data Collector Concentrator (DCC), is the intermediary system in the communications path(s) between the Siemens *EWSD* Release 10.0 switch(es) and NTM.

Switch treatment

NTM treats the Siemens *EWSD* Release 10.0 switches as a unique switch type and “generic” combination. NTM verifies that each command/message, and each option/attribute of these commands and messages, sent to the Siemens *EWSD* Release 10.0 switch is a valid request and does not generate failure messages from a properly configured and functioning Siemens *EWSD* Release 10.0 switch. In-so-far as Network Traffic Management functionality, as defined in the Local Access and Transport Area Switching System Generic Requirements (LSSGR), realized in the 1992 revision of the 1987 version of the TR-TSY-000537 interface, and documented as per the prerequisites for this feature, is supported by the Siemens *EWSD* Release 10.0 switch, NTM supports that functionality.

□

Feature 41, “Install RSPTE Without Stopsys”

Purpose

Without this feature, record base administrators make changes to the record base RSPTE File and then have to stop the system (`stopsys`) to install the changes. This feature enables the administrators to update the database and continue with their work of single office dbtests and single office creates for new offices or offices with new trunk groups without stopping the system. This feature also allows the NTM Record Base administrators to install the RSPTE record base file without stopping the system, thus eliminating unnecessary down time for other users of the system.

This capability is for the database only. Data collection recognizes new offices only after a `stopsys` and `startsys` command sequence.

Feature interaction

Using this feature in conjunction with Feature 8, “Disaster Recovery (Duplex)”and Feature 40, “Enhanced Disaster Recovery”, also enables single office database tests, i.e. “`dbtest`“, and single office creates to run successfully on the backup hosts. This allows the backup host's record base to be updated in a timely manner rather than only when global backups are made, i.e. at “`dayend`“.

□

Feature 42, "*NetMinder* System NTM Function FEP"

Purpose

The NTM FEP conforms to the data polling and interface timing guidelines found in FSD 100 regarding the collection of NTM data from a switch. The NTM FEP supports the serial activation/deactivation of controls in a given switch. The NTM FEP also duplicates the existing ability to process a single audit at a time.

The NTM FEP, optionally, collects *GTD-5* switch-specific data reports and transfigure them into a Local Access and Transport Area (LATA) Switching Systems Generic Requirements (LSSGR)-like data stream to NTM. *GTD-5* Switch controls and audits are also supported by mapping NTM commands into *GTD-5* Switch-specific input commands and vice versa.

This feature provides a new Network Data Collection Operations System (NDCOS), the NTM FEP, as an alternative means of collecting NTM data from *5ESS* and *DMS* 100/200 Switches. Additionally, an optional interface to the *GTD-5* Switch is provided.

□

Feature 45, "*GTD-5* Switch Interface"

Purpose

NTM supports all of the capabilities of the *GTD-5* Switch through an ASCII-based electronic interface. A Data Collector Concentrator (DCC), is the intermediary system in the communications path(s) between the *GTD-5* Switch(es) and NTM (unless Feature 381, "TCP/IP Interface to GTD-5 Switches" is purchased, in which case the DCC is not used).

Supported capabilities

NTM treats the *GTD-5* Switch as a unique switch type and "generic" combination. NTM verifies that each command/message and each option/attribute of these commands and messages sent to the *GTD-5* Switch is a valid request and does not generate failure messages from a properly configured and functioning *GTD-5* Switch. NTM supports the following aspects of the described functionality.

30-second discrete data

NTM supports the collection, processing, recording, storage, and display of control- and audit-related discretes.

5-minute surveillance data

NTM supports the collection, processing, recording, storage, and display of all 5-Minute Surveillance measurements. This includes the following categories of data:

- Additional Ineffective Machine Attempts (IMAs)
- Automatic Controls Trunk Group Flags
- Call Direction and Load
- Common Channel Signaling (CCS) and 800 Service
- Counts per Code Control
- Counts per Reroute Control
- Critical Service Circuits
- Delayed Readiness
- Host-Remote Link Performance
- Inter-Exchange Carrier Shared Trunk Group
- Matching Loss and No Circuits
- Network Management Control Counts
- Overload
- Peripheral Unit Performance

- System Performance
- Trunk Group (TG)

Derived data measurements

NTM supports the creation, processing, recording, storage, and display of all “derived data measurements” associated with the “raw” measurements in all 5-Minute Surveillance Data.

Data “streaming”

The *GTD-5* Switch does not support the “scheduling” of data. Rather, it sends all available data as a single “stream”. NTM supports the collection of 5-Minute Data from the *GTD-5* Switch sent in this manner.

Protective TG control management

NTM supports the management of the protective TG controls Cancel-To and Cancel-From in *GTD-5* Switches. The protective TG controls can be applied as a percentage- or rate-based control. A maximum of 500 “route” controls is supported via the interface.

Expansive TG control management

NTM supports the management of the expansive TG controls SKIP, Immediate Reroute, and Overflow Reroute in *GTD-5* Switches. The expansive TG controls can be applied as a percentage- or rate-based control. A maximum of 500 “route” controls is supported via the interface. The *GTD-5* Switch's reroute controls can be activated by specifying either via TGs or via route indices. NTM supports both methods of activating a reroute in the *GTD-5* Switch.

Automatic TG control management

NTM supports the management of the automatic TG controls Selective Trunk Reservation and Selective Incoming Load Control in *GTD-5* Switches. A maximum of 500 “route” controls is supported via the interface.

Manual call gapping control management

NTM supports the management of the Manual Call Gapping control in *GTD-5* Switches. The *GTD-5* version of the Manual Call Gapping control supports controlling on 4 Digit Carrier Identification Codes. The *GTD-5* Switch's Manual Call Gapping control can differentiate between line-to-line and trunk-to-line calls. In addition, there are parameters to control on Access Tandem Routing Codes, Prefix Digit Types, Pseudo-country Codes, Integrated Services Digital Network (ISDN) User Part (ISUP) Routing Codes, and Feature Group Type. A total of 500 Manual Call Gapping controls is supported via the interface.

Total office **control management**

NTM supports the management of the Total Office control in *GTD-5* Switches.

Hard-to-reach (HTR) list management

NTM supports the management of a HTR List in *GTD-5* Switches. Up to 500 codes can be manually added to or deleted from the list via the interface.

HTR control options

NTM supports the specification of a HTR option on route controls in the *GTD-5* Switch via the interface.

"NTM interest" TG scheduling

NTM supports the scheduling of up to 256 Trunk Groups in the switch for which 5-Minute Surveillance Data is collected.

NTM TG schedule

NTM supports managing a *GTD-5* Switch's "NTM TG Schedule" that contains up to 256 TGs.

TG list audit

NTM supports the auditing the TGs in the *GTD-5* Switch. Up to 2000 TGs can be reported on via the interface. For this interface, the maximum value for a TG ID in the *GTD-5* Switch is set at 9999.

Manual protective TG control audit

NTM supports the auditing of manual protective TG controls active in the *GTD-5* Switch.

Manual expansive TG control audit

NTM supports the auditing of manual expansive TG controls active in the *GTD-5* Switch.

Code control audit

NTM supports the auditing of Manual Call Gapping controls active in the *GTD-5* Switch.

HTR list audit

NTM supports the auditing of the HTR List in the *GTD-5* Switch.

Identification of *GTD*-5 switches with surveillance and control capability

NTM supports three new "internal" generic identifier that symbolizes the *GTD-5* Switches with Generics 1641, 1711, and 1721.

Measurement polling, undesired events handling, and data error checking for *GTD*-5 switches

NTM supports a variety of messages on the interface to *GTD-5* Switches for the management of the transmission of data, audits, and controls between NTM and the switch.

Feature 55, “1A *ESS* Generic 12.0 Feature Support”

Purpose

NTM supports the 1A *ESS* switch's “Feature Group D Carrier Identification Code Expansion” (CICE) Feature that is operational in the 1AE12 generic. This feature provides a call gapping control on FGD carriers with both the existing three-digit and the expanded four-digit CIC. While no new measurements are made in the switch, the format for identifying the various carriers has been changed.

These capabilities allow network managers to:

- Activate/Modify/Delete a Call Gap Control on a code that includes a four digit FGD CIC
- Audit a switch's active Call Gap Control list, including controls on codes containing a four digit FGD CIC.

□

Feature 71, "*4ESS* Switch Generics 4E14(R4) - 4E18(R1) Support"

Purpose

This feature allows network traffic managers to take advantage of the increased network management capabilities provided in the 4E14, Release 4, through 4E18, Release 1, generics of the *4ESS* Switch. New Common Channel Signaling No 7 (CCS7) surveillance data benefits the network traffic managers in their understanding of the signaling network. Modifications to the interface between NTM and the *4ESS* Switch provides surveillance data on the expanded 4-digit Feature Group D (FGD) Carrier Identification Code (CIC). This allows network traffic managers to track traffic being carried by FGD carriers who have been assigned the Federal Communications Commission mandated four digit CIC. New reroute and manual Trunk Subgroup (TSG) control enhancements gives the network traffic managers finer control over traffic in the network. Alerting of potential administrative errors that result in calls being "vacant coded" is provided. Enhancements in the performance of the interface were made to speed the acquisition of important data as well as providing a simplified means of selecting TSGs for surveillance purposes.

The *4ESS* Generics supported by this feature offer the following network traffic management features.

Interface and administrative enhancements

Modifications to Interface Protocol [a 4E16 feature]

NTM supports the transport of the switch's 5-minute "regular type" data in subblocks of 2046 bytes (as opposed to the current 498 byte subblocks). This new increased subblock size speeds the transfer of data and significantly improves the interface's performance.

Modifications to Data Collection [a 4E16 feature]

Currently the Service Circuit Status, Final Handling Code, and Service Degrading data are "demand type" data, i.e. available from the switch upon request from NTM but only after all the "regular type" data has been collected. Due to the potentially critical nature of this data, it is desirable to make the data available as soon as possible. Therefore, the interface has been changed to make this data "regular type" data to speed the availability of the information to the network traffic managers.

Trunk Subgroup Interest List [a 4E17 feature]

This capability provides a mechanism for assigning TSGs to Adjunct Head Cells (AHCs) without using the Study Class mechanism that is manually intensive and prone to error. NTM maintains a "TSG Interest List" of all the trunk subgroups the network traffic manager wants data collected on. This list can be updated as needed to reflect changing

surveillance needs. Once transmitted to the switch, the switch automatically assigns AHCs and begins collecting data on the specified trunk subgroups. The *4ESS* Switch's Network Management Display System (NMDS) continues to support Study Class assignments as a backup procedure.

NTM control enhancements

Numbering Plan Area (NPA) Prefix for Rerouted Calls [a 4E16 feature]

Typically, routing within an NPA requires only a 7-digit routing number. When calls are rerouted within an NPA the “reroute from” switch only needs to forward the 7-digit routing number to the “reroute to” switch for the call to be properly routed to completion. There may be instances, however, where the “reroute to” switch needs to receive the NPA along with the 7-digit intra-NPA routing number in order to properly process the call. This may happen when attempting to reroute Advanced Intelligent Network (AIN) or other “special service” calls to a switching node capable of further processing the call.

Regular, Code Specific, and Routing Data Block Index (RDBI) Specific Reroute Controls

NTM supports modifications to the Regular, Code Specific, and Routing Data Block Index (RDBI) Specific Reroute Controls so that the network traffic manager can require the *4ESS* Switch to prefix an NPA to the seven digit routing number for calls being rerouted within the same NPA. The valid digit combinations on which a *4ESS* Switch can activate a Code Specific Reroute control remain unchanged, while, for all three reroute types, if an NPA is specified, only six via trunk subgroups can be selected by the network traffic manager.

4ESS Reroute Control Capacity [a 4E16 feature]

NTM supports the new *4ESS* Switch limits on the number of reroute controls allowed per switch. The number of regular reroutes allowed per *4ESS* Switch is 128, and the total number of Code Specific or RDBI Specific reroutes, combined, is 64.

Additional Traffic Option for Manual Outgoing TSG Controls [a 4E17 feature]

NTM supports the switch capability that allows a network traffic manager to specify “direct routed traffic only” as a control option for the Cancel-To (CANT), Cancel-From (CANF), and SKIP manual TSG controls. This now allows the network traffic manager to selectively control direct routed (only), alternate routed (only), or all traffic on the TSG.

New and enhanced surveillance data

"Ten Worst" Vacant Code Occurrence Alerting [a 4E14(R4) feature]

NTM supports an alerting discrete from the switch that indicates the availability of a "Ten Worst Vacant Code Analysis Report". This report contains the following failure types, some of which may indicate possible administrative errors in the switch's database:

1. Vacant Code
2. Digit Count
3. Miscellaneous Failure
4. Miscellaneous Automatic Message Accounting (AMA)
5. Unauthorized Centralized AMA (CAMA)
6. Fraud Prevention
7. Number Substitution Failure

Once alerted, it would be the network traffic manager's responsibility to contact personnel at an appropriate work center whose job it would be to demand the report from the switch, analyze the report's contents to determine if an administrative error is causing calls to be killed, and to take corrective action. It would be the joint responsibility of the network traffic managers and the appropriate work center personnel to set the "Initial Screening Threshold" and the "Report Printout Threshold" in the switch to prevent an inordinate number of "false alarms" from being generated.

Additional *4ESS* Switch CCS7 Data [a 4E17 feature]

NTM supports the additional CCS7 discretes, TSG flag, and 5-minute measurements generated by the *4ESS* switch, to help the network traffic managers understand abnormalities in the signaling network.

Discretes

Five new 30-second discretes are provided on the Graphical User Interface (GUI) and via the discrete (DSC) command:

1. Operations — ISDN User Part (ISUP) Incoming Overload
2. Office Link Failure — ISUP signaling
3. Combined Link Set Failure — ISUP signaling
4. Common Network Interface (CNI) No Trunk Hunt
5. CNI Ring Failure

The description of five existing discretes is changed to clarify their meaning in a CCS7 environment:

1. PRO — CCS7 ISUP User Failure
2. DTP — CCS7 Signaling Failure

3. GSC — CCS7 Signaling Congestion (Transfer Controlled)
4. DSM — CCS7 Direct Signaling Message (DSM) Failure
5. LNKFL — CCS7 Declared Link Failure

New Total Office 5-minute data are provided:

1. ISUP Continuity Check (COT) Message Timeout Peg Count
2. ISUP Address Complete Message (ACM) Timeout Peg Count
3. CNI Ring Failure Peg Count
4. Duration of CNI Ring Failure (in seconds)

One new 5-minute TSG flag is added and the description of two flags are modified:

1. CCS7 ISUP User Failure flag (new)
2. CCS7 ISUP Signaling Congestion (TFC)
3. CCS7 ISUP Signaling Failure

Automatic Congestion Control (ACC) Monitoring [a 4E17 feature]

Four new 5-minute Total Office counts are introduced to monitor the operation of the ISUP ACC NTM control:

1. ISUP ACC Level 1 (CL1) Peg Count
2. ISUP ACC Level 2 (CL2) Peg Count
3. Duration Time in ISUP ACC CL1 (in seconds)
4. Duration Time in ISUP ACC CL2 (in seconds)

4-Digit Feature Group "D" Carrier Identification Code [a 4E18(R1) feature]

NTM supports the *4ESS* Switch capability to detail, on demand, the specifics of active Manual Call Gapping Controls containing a 4-digit FGD CIC. The detailed information contains the 4-digit CIC and up to 8 digits of the controlled routing number.

In addition, NTM supports the regular collection of Manual Call Gapping Control surveillance data [Attempts Count and Cut Thru (Success) Count] for those Manual Call Gapping Controls that have been placed on a 4-digit FGD CIC and up to 8 routing digits.

□

Feature 74, “Improved Filtering and Reporting of Data”

Purpose

This feature provides the network traffic managers with the ability to view/not view various types of “bad” or suspect data. An on/off mechanism is provided that enables these data to be displayed/not displayed through the user interface. These “bad” data are detected in the following manner:

- Filtering
- Suspect by DCC
- Suspect by switch
- Suspect by NTM

Filtering

Filtered through a set of rules for each switch type (4ess, lssgr, 1aess, dms, dms250, dms500, 5ess, gtd-5, ewsd, scsnsn), each rule being of a predefined format, and based on the following parameters:

- Count (on which the filtering will be based)
- Compare (<, =, >)
- Comparison value for the count

The number of rules applicable to each switch type are limited to five for trunk group (TG) counts, i.e. field identifiers classified as being part of the Demand Managed Object Type: Trunk Group Data table, and another five for machine counts, i.e. field identifiers found in the Demand Managed Object Type: Entity Data table, to minimize the impact of the filtering mechanism on the performance of the system.

Each rule has its associated tagging scope, i.e. the managed object record(s) that will be tagged as bad or suspect based on the filtering rule. If the rule is based on a TG count, then its tagging scope is all the Demand Managed Object Type: Trunk Group Data records associated with that TG. If the rule is based on a machine count, then its tagging scope is all the Demand Managed Object Type: Entity Data records associated with the office.

Suspect by DCC

As currently defined to be suspect by a Data Collector/Concentrator (DCC)

This is due to “out of sync” problems, i.e. data is not for the right period. The tagging scope is the Demand Managed Object Type: Trunk Group Data and Demand Managed Object Type: Entity Data records for the entire office(s).

Suspect by switch

As currently defined to be suspect by the switch

The tagging scope in this case is the Demand Managed Object Type: Trunk Group Data record in the office if the data category is associated with a TG, and the Demand Managed Object Type: Entity Data record for that office if the data category is associated with an office.

Suspect by NTM

As currently defined to be suspect by NTM

- If percentage calculations are over 100%.
- The tagging scope corresponds to the type of data involved, i.e. Demand Managed Object Type: Trunk Group Data record for that particular TG if the bad data is TG data, or Demand Managed Object Type: Entity Data record for that office if the bad data is machine data.

Displaying tagged data

In all cases, the data tagged may or may not be displayed on the GUI displays depending on whether the display option is turned on/off.

The tagging of the bad data allows the network traffic managers to have selective access to the tagged data from the database using the “demand” command.

This feature is implemented on the host and is applicable to all the Demand Managed Object Type: Trunk Group Data and Demand Managed Object Type: Entity Data counts (raw, derived) detected in exception. Therefore, it affects the data displayed on the GUI.

Late data

This feature provides more information on “late” data (data that has not arrived by the time out point) on the GUI displays. The network traffic managers currently see only an indication that at least one switch is reporting data late. With this feature, the network traffic managers will actually know which switches on the display have not sent their data on time for the most recent five-minute period. This new data is easily accessible to the user on the GUI displays. “Late data” is an alert type that is shown on the link status schematic page.

Additional information

In addition, this feature provides the following useful information:

- Number of exceptions processed by NTM in the last five-minutes period,

- Number of filtered Demand Managed Object Type: Trunk Group Data and Demand Managed Object Type: Entity Data exceptions (combined) in the last five-minute period.

□

Feature 86, “Local Audit Data Restoration”

Purpose

With this feature, audit data received from each switch is automatically saved in a backup area while they are being installed in the database. Whenever desired, e.g., after re-creating the database (which erases all audit information in the database), users are able to run a new command which restores the latest available audit information into the database using the audit data previously stored in the backup area.

This procedure is much faster than auditing the switches since there is no switch or transmission delay involved.

Users can still audit all switches after this procedure is completed to get the most current switch information. However, they do not have to wait for all audits to complete before their system becomes functional.

□

Feature 106, “Active Request Controller”

Purpose

This optional feature provides the same end-user functionality as the NTM demand and `fmltoasc` processes, with the additional ability to accept requests from an external, non-NTM process via a LAN (Local Area Network) TCP/IP-based connection.

ARC increases the throughput of the SQL (Structured Query Language) requests from an external, non-NTM process by eliminating the startup time normally required for each demand request. This is accomplished by having ARC act as a daemon process that is continuously up and ready to handle requests. This decreases response time and increases the volume of requests without a significant increase in the use of NTM Host resources.

□

Feature 122, "*EWSD* Release 13.0 Support"

Purpose

With this feature, the NTM-to-*EWSD* Switch interface is enhanced to support additional data, controls, and administrative scheduling capabilities listed below.

5-minute data

1. Measurements of calls attempted to reroute by a Reroute Control
2. Measurements of calls rerouted successfully
3. Service Switching Point (SSP) data
4. Counts per Reroute Control

30-second discretes

1. The "Manual Trunk Group Control(s) Active" discrete are "set" by the presence of an active reroute control in the switch.
2. The Network Management Packet Schedule Compromised" alerting discrete is supported.
3. The "Number Services SCP (Service Control Point)-Initiated Control" status discrete is supported.

NTM controls

NTM supports the *EWSD* Release 13.0 implementation of the reroute control. Both an Overflow reroute and Immediate reroute are available. Each of these reroute types supports the Non-equal Access, Equal Access, and Cancel-In-Chain-Return options. Multiple reroute vias are supported and the reroutes are direct/alternate route percentage based.

Administrative scheduling of data collection

NTM supports the scheduling of 5-Minute Data in the *EWSD* Switch.

□

Feature 123, “Historical Data Across Releases”

Purpose

With the HISTDATA feature, when a historical database tape is read onto NTM, the system determines the NTM generic in which the tape was made and starts the database server from that generic on that database. When a user goes into HISTDATA mode for that database, the system changes the user’s path to provide access only to the programs associated with that generic and database.

Reference: Chapter 8, “Accessing Historical Data”

Feature 124, “TCP/IP Interface to FEP”

Purpose

The current NTM utilizes a Datakit network for communication with the existing DCCs, including the *NetMinder* Traffic Data Management (TDM) software, the NTM FEP, and the Telcordia Technologies' NPM. This feature provides an interface option that utilizes a TCP/IP network over Ethernet for communication to an NTM FEP.

Flexibility

Incorporation of this feature provides flexibility in network design schemes that a customer may implement. These new schemes may be used to design multiple independent NTM-to-NTM FEP communication paths to increase the reliability of the network. One possibility is to use both Datakit and TCP/IP networks. This way, for example, if there is a failure in the Datakit network, the communication paths can be redirected to go over the TCP/IP network as part of disaster recovery procedures. Proper network engineering should permit either network to handle all data collection, surveillance, and control communications if the other network fails or is otherwise unavailable, i.e. for growth or maintenance.

Network design

It is also possible to design the network to use both the Datakit and TCP/IP networks simultaneously for load sharing where some NTM FEPs communicate over Datakit and others via TCP/IP. This scheme may be valuable if there are capacity or access constraints on one or both networks and/or some NTM FEP types can only communicate over one particular network.

With proper design of the network, the communication throughput between NTM and an NTM FEP may be increased relative to the current Datakit network. This may be possible because:

- Ethernet throughput is higher than that of the Datakit fiber interface boards currently on the NTM host computer.
- Additional parallel communication links can be configured when using the TCP/IP network or when both TCP/IP and Datakit networks are used simultaneously.

This feature requires that a TCP/IP interface and Ethernet hardware be deployed on both the NTM host computer and the NTM FEP hardware platform.

□

Feature 130, “Capacity and Usage Reporting”

Purpose

This optional feature enables NTM personnel to collect capacity and performance data and to obtain reports of performance data on a daily basis or upon request. With this feature, NTM personnel are able to monitor the usage of the significant application software components running on the host computer and their associated use of host computing resources. The following components make up this feature.

Data collection

The types of data collected for the reports consist of the following general categories.

- Network Elements in the Database
- User Process Data
- CPU Usage
- System Resources Usage

Reports

The reports component generates reports that can be scheduled in cron to run daily, or requested by users for a given interval within the day. Reports are run on demand only.

Users access reports by using the `perfrep` command. Three types of reports can be generated.

- Daily report
- Summary report
- Page report

References

- Chapter 14, “Capacity and Usage Reporting” in the *System Administration Guide*
- perfrep command (6-27) in the *Input Commands Guide*

Feature 131, “FEP Backup and Disaster Recovery”

Purpose

The NTM FEP Backup and Disaster Recovery (BDR) feature requires a one-to-one hardware sparing technique, i.e. one backup NTM FEP for each primary NTM FEP. The spare NTM FEP should be configured identically to its active counterpart NTM FEP. Each spare NTM FEP would be kept connected to the data transport network in a passive mode. Its reference data would be kept synchronized with the reference data on the active NTM FEP. In the event that the primary NTM FEP fails, the virtual circuits the primary NTM FEP is using for communications with the network elements must be terminated, and the backup NTM FEP activated, so that it can establish virtual circuits to the switches prior to commencing data collection. (A check on the status of the data transport connections must be done because the primary NTM FEP could be experiencing problems that do not result in the automatic release of the data transport connections.) This would be accomplished with minimal manual intervention. This entire process would require less than 30 minutes, but is dependent on the number of switches being supported by the failed NTM FEP and the time to complete all the virtual connections.

Customer responsibility

The decision on how the data transport network would be physically linked and the provisioning of the links is the responsibility of the customer.

Synchronization

This feature provides for automatically maintaining synchronization of the reference data between the primary NTM FEP and its backup NTM FEP. The backup NTM FEP would always be ready to begin the collection of data in case the primary NTM FEP becomes disabled. Activation of the backup NTM FEP would, however, require manual action.

□

Feature 160, “Increased Number of Characters in Set Names”

Purpose

Without this feature, network traffic managers can only use up to four characters while naming both Office and Trunk Group Sets. This may limit just how descriptive or meaningful the names of sets may be. This feature extends the limit of the length of set names for both Office and Trunk Group Sets to a maximum of 8 characters.

□

Feature 185, "*EWSD* Release 12.1 Support"

Purpose

The *EWSD* Release 12.1 incorporate the following new data, which — with this feature — NTM collects, store, process, and display:

30-second discretes

Five new 30-Second Discretes are set to indicate the occurrence of specific conditions in the *EWSD* Switch. These discretes are:

- Machine Congestion, Level 1 (CL1)
- Machine Congestion, Level 2 (CL2)
- Essential Service Protection Active
- Incoming Trunk Delayed Readiness
- Inter-Exchange Carrier Shared Trunk Group Data Locations Changed

5-minute surveillance data

The *EWSD* Switch supports the communication of four new categories of data to the NTM application. The data includes:

- Overload Data
- Processor Occupancy Data
- Inter-LATA Carrier Shared Trunk Group Data
- Inter-LATA Carrier Start Signal Timeouts

Manual call gapping control

The Manual Call Gapping control were enhanced to allow controlling on CICs.

audits

The *EWSD* Switch supports a new Inter-Exchange Carrier Shared Trunk Group Data Locations audit. In addition, the *EWSD* Switch's "Code Control Demand Audit" was enhanced to include Manual Call Gapping controls on CICs.

□

Feature 187, "*5ESS* Switch 5E11 Generic Features Support"

Purpose

The *5ESS* Switch's 5E11 generic incorporates the following new data, which NTM collects, stores, processes, and makes available for display:

30-second discretes

A new 30-Second Discrete is set to indicate that at least one AIN Toll Free call has been blocked by the AIN Toll Free ACG control.

5-minute surveillance data

The *5ESS* Switch supports the communication of new AIN Toll Free service data that consists of the following measurements:

- Total Successful Advanced Services Platform (ASP) Calls
- Total SCP Overload ACG List Overflows
- Total Service Management System (SMS) initiated ACG List Overflows
- Total ASP Toll Free Attempts
- Total Successful ASP Toll Free Calls
- Total ASP Toll Free Calls Blocked by SCP Overload ACGs
- Total ASP Toll Free Calls Blocked by SMS Initiated ACGs

□

Feature 189, “Replacement Thresholding Capability for Trunk Group Data”

Purpose

This optional feature incorporates a user-definable thresholding capability that can create a sophisticated exception subsystem. Users can define a thresholding scheme for use on trunk group data that combines multiple mathematical and logical comparisons to better isolate critical data from the mass of trunk group data that is collected.

Feature 189 can address cases where the existence of a problem and the corresponding alarm severity depends on evaluating the relationships among multiple data items.

Examples

If, for a given trunk group, the Attempt Count is greater than 50, the Service Holding Time is at least 2 minutes, and the Percent Occupancy is between 70 and 90 percent, then the Percent Occupancy measurement has an exception level equal to 5.

Limitations

Each set of rules that can be applied to an individual trunk group can contain logical statements and up to 60 mathematical comparisons relating up to 20 unique data items.

□

Feature 195, “System Hardware HP Platform and Performance Upgrade”

Purpose

This feature transfers the appropriate NTM Release 6 capabilities and functionalities to a new high performance HP hardware platform.

This platform and the associated NTM application provide support for the following switch types and generics:

- *5ESS* Switch through and including the 5E10 generic.
- *DMS* 100/200 Switch through and including the BCS28 Generic.
- *4ESS* Switch through and including the 4E13 Generic.
- 1A *ESS* Switch through and including the 1AE11 Generic.
- “LSSGR” Switch, any switch that exactly conforms to the 1987 version of the NTM interface specified in the Local Access and Transport (LATA) Switching Systems Generic Requirements (LSSGR).

In addition, this feature provides a browser-based Graphical User Interface (GUI), accessed via a certified version of *Netscape* browser software.

□

Feature 214, “FEP Release 4”

Purpose

Release 4 of the NTM FEP upgrades the FEP Sun hardware platform’s operating system to the latest version of *Solaris* operating system software.

The NTM system made changes to the FEP applications software, as needed, to provide uninterrupted functionality for Y2K. In addition, all imbedded third-party software were tested for Y2K compatibility.

The NTM Team worked with the appropriate vendors to accommodate changes to the switch interfaces related to Y2K.

□

Feature 215, "*DMS* 250 Switch Support"

Purpose

This optional feature provides network managers with the full range of data collection, storage, thresholding, exception processing, and data display for *DMS* 250 switches and full control capabilities for these switches, within the limitations of the chosen Local Access and Transport Area Switching System Generic Requirement (LSSGR) interface, and the system administrator with the tools to define and administer such switches in the NTM system. To accomplish this, NTM incorporates the new capabilities described below.

30-second discrete data

Supports the collection, processing, recording, storage, and display of control- and audit-related discretes.

5-minute surveillance data

Supports the collection, processing, recording, storage, and display of all 5-Minute Surveillance measurements. This includes the following categories of data:

- Additional Ineffective Machine Attempts (IMAs)
- Call Direction and Load
- Counts per Code Control
- Counts per Reroute Control
- Critical Service Circuits
- Delayed Readiness
- Inter-Exchange Carrier Start Signal Timeouts
- Matching Loss and No Circuits
- Network Management Control Counts
- Overload
- Processor Occupancy Data
- Trunk Group

Derived data measurements

Supports the creation, processing, recording, storage, and display of all "derived data measurements" associated with the "raw" measurements in all 5-Minute Surveillance Data.

Data scheduling

Supports the management of scheduling the collection of 5-Minute Data from the *DMS* 250 Switch.

Protective TG control management

Supports the management of the protective TG controls Cancel-To and Cancel-From. A total of 128 protective and expansive TG controls are supported.

Expansive TG control management

Supports the management of the expansive TG controls SKIP, Immediate Reroute, and Overflow Reroute. A total of 128 protective and expansive TG controls are supported.

Manual call gapping control management

Supports the management of the Manual Call Gapping control. The *DMS* 250 version of the Manual Call Gapping control does not, however, support 4-Digit Carrier Identification Codes. A total of 64 Manual Call Gapping controls are supported.

Total office control management

Supports the management of the Total Office control.

"NTM interest" TG scheduling

Supports the scheduling of up to 250 Trunk Groups in the switch for which 5-Minute Surveillance Data are collected.

NTM TG schedule

Supports managing a *DMS* 250 Switch's "NTM TG Schedule" that contains up to 250 TGs.

TG list audit

Supports the auditing of all of the TGs in the *DMS* 250 Switch. For this interface, the maximum number of TGs in *DMS* 250 Switch is set at 9999.

TG reference data audit

Supports the auditing of TG Reference Data for up to 250 TGs.

Manual protective TG control audit

Supports the auditing of all manual protective TG controls active in the *DMS* 250 Switch.

Manual expansive TG control audit

Supports the auditing of all manual expansive TG controls active in the *DMS* 250 Switch.

Code control audit

Supports the auditing of all Manual Call Gapping controls active in the *DMS* 250 Switch.

Identification of *DMS* 250 switches with surveillance and control capability

Supports a single new “internal” generic identifier that symbolizes the *DMS* 250 Switches that support the TR-537 interface.

Measurement polling, undesired events handling, and data error checking

Supports a variety of polls and message types on the interface to *DMS* 250 Switches for the management of the transmission of data, audits, and controls between NTM and the switch.

□

Feature 218, "*5ESS* Switch 5E12 Generic Feature Support"

Purpose

This feature provides 5-minute total office measurements specific to Local Number Portability (LNP) and Query On Release (QoR). These measurements provide a view of the load LNP places on the signaling network and track provisioning problems associated with LNP. The QoR measurements track the effectiveness of the QoR approach to LNP. In addition, the presence of Signaling System No 7 (SS7) signaling links on *5ESS* Switching Modules (SMs) modifies the way in which Automatic Congestion Control (ACC) indications are sent to adjoining switches and how overload discretes are set.

□

Feature 219, "*4ESS* Switch NTM Support Through 4e22(R1)"

Purpose

This feature allows network traffic managers to take advantage of the increased network traffic management capabilities provided in the *4ESS* Switch up to the 4E22 R(1) generic. The number of Trunk Subgroups (TSGs) that can be placed under surveillance is increased from the current limit of 1023 to 2047. New Advanced Intelligent Network (AIN) Toll Free Service surveillance data benefits the network traffic managers in their understanding of the “health” of that service’s Service Control Points (SCPs). A new means of TSG surveillance allows the tracking of service to Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI) customers.

4ESS Switch controls were enhanced to support an increase in the number of addressable domains to 255 and the number of addressable announcements to 127. Manual Call Gapping on codes up to 15 digits in length is supported. An Automatic Reservation Adjustment (ARA) capability for the Selective Trunk Reservation (STR) control is added. Service Degrading Data on Expanded Time Slot Interchanges (XTSIs) is added and deactivated discretes are removed from the user interface.

Feature 227, “User-Definable Default Domains for Controls”

Purpose

This feature allows a system-wide default domain to be defined for each separate control that uses domains. All browser-based Graphical User Interface (GUI) control displays associated with a control use that control’s defined default if no user modifications are made during control creation. This feature provides a default of “all domains”, for all controls that use domains, when initially activated in NTM.

Administration

The database and system administrators are provided a means to administratively define an application-wide default domain for each of the following controls:

- Manual Call Gapping Control
- Cancel-To Control
- Cancel-From Control
- Skip Control
- Reroute Control

Domain usage

Unless modified by a user during control creation, these controls use the user-defined default domain when activated in *5ESS* Switches with the 5E5, or later, generic. The user-defined default domain are used for the Reroute Control for all generics of the *4ESS* Switch. For Manual Call Gapping Controls in the *4ESS* Switch, the default domain are used with the 4E12, or earlier, generic.

Commands

The following command line control commands are also configured to use the user-specified default domain for that control:

- cant
- canf
- cg
- rr
- skip

□

Feature 229, “1A *ESS* Switch LNP Support”

Purpose

This feature provides 5-minute total office measurements specific to Local Number Portability (LNP). These measurements provide a view of the load LNP places on the signaling network and track provisioning problems associated with LNP.

The 1A *ESS* Switch’s 1AE13.00 generic incorporates new total office measurement data for LNP which can be administratively directed to the NTM interface. NTM has been modified to collect, store, process, and make available for display the 1A *ESS* Switch’s LNP measurements.

□

Feature 236, “Browser-Based Extended Regional Alerting Display”

Purpose

This feature provides multiple Network Traffic Management Centers a view of all of the exceptions occurring in a vast geographic region as supported by the customer’s NTM.

This feature provides a browser-based GUI display in two (2) Network Traffic Management Centers that graphically depicts all of the exceptions detected on trunk groups and in switches by up to four (4) NTM host platforms.

Representations

The Extended Regional Display shows a geographical or schematic representation of the entire network under surveillance by the (up to) four (4) NTM applications. The System Administrator of each application, in conjunction with the NTM Team, specifies the nodes and links on the Extended Regional Display. The nodes represent customer-specified groups of switches. The link between any two nodes represents a group of customer-specified trunk groups.

Facets

Each node and link has one or more facets. The customer may define which alert group each facet of the nodes and links represents. When associated with an alert group, a facet displays the color corresponding to the highest level of exception present in the collection of switches or trunk groups represented by the node or link, respectively. Three levels of exceptions — minor, major, and critical — are depicted in separate colors.

Display options

At start-up of the Extended Regional Display, the network traffic manager has the option of choosing to receive data from one, two, three, or all four NTM host platforms. While the Extended Regional Display could have access to the data for any of the network elements or trunk groups in exception in the network, it does not support the activation of NTM controls. From the Network Management User (NMU) platform, or other approved GUI desktop platform, the network traffic manager can use browser hyperlinks to access NTM control displays in order to activate controls in the network elements supported by the connected host(s).

The Extended Regional Display supports operation in the “auto-update” mode. The Extended Regional Display may be activated at a Wallboard Projection System (WPS) desktop hardware platform. Using the output of the WPS, and appropriate customer-supplied video switching devices and projection technology, a “multi-view screen” projection of the Extended Regional Display may be realized.

Feature 239, "*DMS* 500 Switch Support"

Purpose

This feature provides network traffic managers with the ability to interface to a *DMS* 500 Switch to collect the 30-Second and 5-Minute Surveillance Data available using the Telcordia Technologies' Technical Reference (TR)-TSY-000537 interface, Issue 2, July 1987, "SPCS/OS Interface SPCS - EADAS/NM Interface via EADAS". To accomplish this, NTM incorporates the new capabilities described for each of the following areas, to the extent that they are supported by the *DMS* 500 Switch.

30-second discrete data

Supports the collection, processing, recording, storage, and display of control- and audit-related discretes.

5-minute surveillance data

Supports the collection, processing, recording, storage, and display of all 5-Minute Surveillance measurements. This includes:

- Delayed Readiness
- Overload
- Call Direction and Load
- Matching Loss and No Circuits
- Critical Service Circuits
- Additional Ineffective Machine Attempts (IMAs)
- Network Management Control Counts
- Processor Occupancy Data
- Service Switching Point (SSP)
- Inter-Exchange Shared Trunk Group
- Trunk Group
- Inter-Exchange Carrier Start Signal Timeouts
- Counts per Code Control
- Counts per Reroute Control

Derived data measurements

Supports the creation, processing, recording, storage, and display of all "derived data measurements" associated with the collected 5-Minute Surveillance Data "raw" measurements.

Data scheduling

Supports the management of scheduling the collection of 5-Minute Data from the *DMS* 500 Switch.

Protective TG control management

Supports the management of the protective TG controls Cancel-To and Cancel-From. A total of 128 protective and expansive TG controls are supported.

Expansive TG control management

Supports the management of the expansive TG controls SKIP, Immediate Reroute, and Overflow Reroute. A total of 128 protective and expansive TG controls are supported.

Manual call gapping control management

Supports the management of the Manual Call Gapping control. The *DMS* 500 version of the Manual Call Gapping control, however, does not support 4-Digit Carrier Identification Codes. A total of 64 Manual Call Gapping controls are supported.

Total office control management

Supports the management of the Total Office control.

"NTM interest" TG scheduling

Supports the scheduling of up to 250 Trunk Groups in the switch for which 5-Minute Surveillance Data are collected.

NTM TG schedule

Supports managing a *DMS* 500 Switch's "NTM TG Schedule" that contains up to 250 TGs.

TG list audit

Supports the auditing of all of the TGs in the *DMS* 500 Switch. For this interface, the maximum number of TGs is set at 9999.

TG reference data audit

Supports the auditing of TG Reference Data for up to 250 TGs.

Manual protective TG control audit

Supports the auditing of all manual protective TG controls active in the *DMS* 500 Switch.

Manual expansive TG control audit

Supports the auditing of all manual expansive TG controls active in the *DMS* 500 Switch.

Code control audit

Supports the auditing of all Manual Call Gapping controls active in the *DMS* 500 Switch.

Inter-exchange carrier shared trunk group data location audit

Supports auditing for the data locations of Inter-Exchange Carrier trunk group measurements in the appropriate data structures in the *DMS* 500 Switch interface.

Identification of *DMS* 500 switches with surveillance and control capability

Supports a single new "internal" generic identifier that symbolizes the *DMS* 500 Switches that support the TR-537 interface.

Measurement polling, undesired events handling, and data error checking

Supports a variety of polls and message types on the interface to *DMS* 500 Switches for the management of the transmission of data, audits, and controls between NTM and the switch.

□

Feature 244, “Enhanced Switch Support for *4ESS* Generic 4E23(R3)”

Purpose

This feature provides for the certification of the *4ESS* Switch's generic 4E23(R3). In addition, this feature provides 5-minute total office measurements specific to Local Number Portability (LNP). These measurements provide a view of the load LNP places on the signaling network, tracks a provisioning problem associated with LNP, and provides measurements on LNP calls affected by NTM controls.

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Certification of the *4ESS* Switch's generic 4E23(R3) verifies that this version of the interface to the switch conforms to the established interface protocols.
- Sustaining the NTM application's “no break”, backward compatibility of the interface ensures that vital pre-existing NTM capabilities continue to function.
- Providing “internal support” of the generic 4E23(R3) of the *4ESS* Switch provides for accurate generic identification on the NTM application's browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with NTM.
- Improved NTM by providing new 5-Minute Surveillance data on LNP traffic.
- Sustained Call Completions and Revenue Protection related to LNP calls by providing trouble related measurements that can alert the network traffic managers to initiate maintenance and customer care activities to pro-actively address service problems.

□

Feature 245, “TCP/IP Interface to TDM”

Purpose

This feature provide the capability within NTM to use a Transmission Control Protocol/Internet Protocol (TCP/IP) interface for communication with an Alcatel-Lucent *NetMinder* Traffic Data Management (TDM) software application.

Availability of this feature on NTM, along with a corresponding feature on the *NetMinder* TDM software, removes the requirement to use BX.25 over a *Datakit* II Virtual Circuit Switch (VCS) network as the primary communication network between the *NetMinder* TDM software and NTM.

□

Feature 257, “FEP Release 5”

Purpose

This feature supports the introduction of a Local Access and Transport Area (LATA) Switching Systems Generic Requirements (LSSGR)-like interface on the *GTD-5* Switch, available with the companion Feature 258, “LSSGR Support for the GTD-5 Switch Generic 4003”.

The NTM FEP is enhanced with appropriate hardware and software to support the X.25-based interface on the *GTD-5* Switch’s General Purpose Unit (GPU) adjunct processor. An adjunct protocol converter device is added to the hardware architecture of the NTM FEP. This device transforms X.25 protocol messages from the GPU into Transmission Control Protocol/Internet Protocol (TCP/IP) messages, and vice versa, that are handled by the NTM FEP. This architecture allows the NTM FEP to build on its existing TCP/IP capabilities instead of adding native X.25 protocol software.

Feature 258, “LSSGR Support for the *GTD-5* Switch Generic 4003”

Purpose

This feature provides for the certification of the *GTD-5* Switch's Generic 4003 and its new Local Access and Transport Area (LATA) Switching Systems Generic Requirements (LSSGR)-like interface.

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Certification of the *GTD-5* Switch's Generic 4003 verifies that this version of the interface to the switch conforms to the established interface protocols.
- Sustaining the NTM application's “no break”, backward compatibility of the interface ensures that vital pre-existing NTM capabilities continue to function where supported by the switch.
- Providing “internal support” of the Generic 4003 of the *GTD-5* Switch provides for accurate generic identification on the NTM application's browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with NTM.

□

Feature 263, "*DMS* 100/200 Switch Surveillance of 1024 Trunk Groups Via FEP"

Purpose

This optional feature provides network managers with the ability to gather surveillance data on up to 1024 trunk groups from *DMS* 100/200 switches with the NA007 generic via FEP.

Customer benefits

This feature provides customer value in one or more of the following areas:

- More pervasive NTM for *DMS* 100/200 Switches that have the enhanced interface, by providing the network traffic managers with support of 5-Minute Surveillance Data for 1024 TGs, thereby facilitating comprehensive surveillance of the larger switches currently being deployed.
- Service Quality, Sustained Call Completions, and Revenue Protection by providing the network traffic managers with data on all the TGs in the *DMS* 100/200 Switches with the enhanced interface that are of NTM interest.

□

Feature 264, "*DMS* 100/200 Switch Surveillance of 1024 Trunk Groups Via TDM"

Purpose

This optional feature provides network managers with the ability to gather surveillance data on up to 1024 trunk groups from *DMS* 100/200 switches with the NA007 generic via TDMS.

This feature provides customer value in the same potential areas as Feature 263, "DMS 100/200 Switch Surveillance of 1024 Trunk Groups Via FEP".

□

Feature 265, "*DMS* 100/200 Surveillance of 1024 Trunk Groups Via DCOS-2000"

Purpose

This optional feature provides network managers with the ability to gather surveillance data on up to 1024 trunk groups from *DMS* 100/200 switches with the NA007 generic via DCOS-2000.

This feature provides customer value in the same potential areas as Feature 263, "DMS 100/200 Switch Surveillance of 1024 Trunk Groups Via FEP".

Feature 266, “ 1024 Trunk Group surveillance for FEP”

Purpose

This optional feature provides network managers with the ability to gather surveillance data on up to 1024 trunk groups for FEP.

This feature provides customer value in similar potential areas as Feature 263, “DMS 100/200 Switch Surveillance of 1024 Trunk Groups Via FEP”.

Feature 267, “1024 Trunk Group surveillance for TDM”

Purpose

This optional feature provides network managers with the ability to gather surveillance data on up to 1024 trunk groups for TDM.

This feature provides customer value in similar potential areas as Feature 263, “DMS 100/200 Switch Surveillance of 1024 Trunk Groups Via FEP”.

□

Feature 272, “NTM Report Writer”

Purpose

This optional feature collects a subset of the data available on the NTM host and stores the data in the Oracle relational database for long term data analysis. Users have access to various 5-minute/15-minute, hourly, daily and monthly views of network periodic data, reference data and control data via BrioQuery.

Data collection

The data is collected and stored in the following manner:

- The network data is collected in 5 minute/15 minute intervals and stored in the periodic table. The 5/15 minutes network data is retained for 9 consecutive days.
- At the beginning of every hour, there is a process to sum the intervals of 5-minute or 4 intervals of 15-minute data and store the result in the hourly table. The hourly network data is retained for 35 consecutive days.
- At the beginning of a day, there is a process to sum the 24 intervals of hourly data and store the result in the daily table. The daily network data is retained for 400 consecutive days.
- At the beginning of a month, there is a process to sum all the daily data of that month and store the result in the monthly table.The monthly network data is retained for 36 consecutive months.
- Reference data is retained for 9 consecutive days.
- Control data is retained for 35 consecutive days.

Database configuration

The reporting database is configured in the following manner:

- Co-Resident Report Writer: Report Writer running on the NTM host with capacities of 50, 100 or 250 network elements.
- Report Writer: running on a separate HP9000 machine with capacities 50, 100, 250 or 810 network elements.

Customers with 50, 100 or 250 network elements can either run Report Writer from the NTM host or on a separate reporting system. Customers with 251-810 network elements can only run Report Writer on a separate HP9000 machine.

Reference: *Report Writer Guide*

□

Feature 277, “TCP/IP Interface to *DMS* 100/200 Switches”

Purpose

This optional feature provides network managers with the ability to gather surveillance data from *DMS* 100/200 switches by the use of TCP/IP interface.

□

Feature 282, "TCP/IP Interface to *5ESS* 5E15 Generic switches"

Purpose

This feature provides NTM with a Transmission Control Protocol/Internet Protocol (TCP/IP) communications capability over an Ethernet Local Area Network (LAN) or Wide Area Network (WAN) to *5ESS* Switches with the 5E15 generic. This feature provides customer benefits in one or more of the following areas.

Improved switch-to-NTM communications

The use of TCP/IP over an Ethernet network, in place of the existing BX.25 network, significantly speeds up the transfer of data, control, and audit messages between the *5ESS* Switch and NTM. Additionally, TCP provides reliable, error free data exchange.

Removal of duplicate data transport infrastructure

This feature allows an enterprise to simplify its corporate data transport network architecture and lower its operating costs by eliminating BX.25 connectivity to those *5ESS* Switches that support TCP/IP and are accessible through a Central Office LAN.

Increased effectiveness of the NTM data collection

Increasing the speed and throughput of the data collection network may result in fewer switches reporting late data. Providing a reliable data network may result in fewer errors in the data reported. Communicating to all the switches in parallel, instead of today's serial communication through each Data Collector Concentrator (DCC), may reduce the total time required to collect surveillance data and perform audits and controls. Together, these improvements may result in the network traffic managers having access to the latest network data quicker, thereby speeding up the start of their analysis and control actions.

Increased reliability of the NTM data collection

Removing the DCC from the data collection transport "path" eliminates a single point of failure in the current data collection architecture. The need to maintain time synchronization with the DCC, which is required to prevent lost data, is also eliminated. Each of these improvements may result in data collection being successful more often.

Support for future growth

Providing a data network with greater capacity allows the addition of more vital data to the existing *5ESS* Switch interface. Thus, the foundation is in place to extend NTM into the new services and network capabilities arena, e.g., Advanced Intelligent Network, Local Carrier Surveillance, Government Emergency Telecommunications Service (GETS), and Long Distance Networks.

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Feature 283, "Surveillance of 2000 Trunk Groups in a *5ESS* Switch"

Purpose

NTM, over a direct TCP/IP interface, supports 5-Minute Surveillance Data for 2000 TGs in *5ESS* Switches, instead of the previous limit of 500. To accomplish this, NTM incorporates the new capabilities described below.

"NTM interest" TG scheduling

Supports the scheduling of up to 2000 TGs in the switch for which 5-Minute Surveillance Data are collected.

5-minute surveillance data

Supports a new addition to the interface for the collection of 5-Minute Surveillance Data for 2000 TGs. The new addition ensures backward compatibility and a smooth transition as the enhanced interface is deployed in switches in the field.

5-minute surveillance data scheduling

Supports an extension of the scheduling of 5-Minute Surveillance Data in switches that have deployed the enhanced interface, in addition to the existing method. The method used can be selected by the user to meet operational needs.

NTM TG schedule

Supports managing a switch's "NTM TG Schedule" that contains up to 2000 TGs.

TG reference data audit

Supports the auditing of switch TG Reference Data for up to 2000 TGs.

NTM 5-minute surveillance data schedule management

Supports the management of the switch's "NTM Data Schedule" to include collecting 5-Minute TG data for 500 or 2000 TGs, but never both simultaneously in the same switch.

NTM database sizing

The NTM database was resized to accommodate storing 5-Minute Surveillance Data for 2000 TGs for a switch equipped with the enhanced interface.

Identification of switches with 2000 TG surveillance capability

Provides a means for the network traffic managers to identify *5ESS* Switches that can report data on 2000 TGs. This allows NTM to collect and properly process the data for the additional TGs.

Feature 284, “Surveillance of 1024 Trunk Groups in a *DMS* 100/200 Switch”

Purpose

NTM supports 5-Minute Surveillance Data for 1024 TGs in *DMS* 100/200 Switches that conform to the enhanced interface, instead of the previous limit of 250. To accomplish this, NTM incorporates the new capabilities described below.

“NTM interest” TG scheduling

Supports the scheduling of up to 1024 TGs in the switch for which 5-Minute Surveillance Data are collected.

5-minute surveillance data

Supports a new addition to the interface for the collection of 5-Minute Surveillance Data for 1024 TGs. The new addition ensures backward compatibility and a smooth transition as the enhanced interface is deployed in switches in the field.

5-minute surveillance data scheduling

Supports an extension of the scheduling of 5-Minute Surveillance Data in switches that have deployed the enhanced interface, in addition to the existing method. The method used can be selected by the user to meet operational needs.

NTM TG schedule

Supports managing a switch’s “NTM TG Schedule” that contains up to 1024 TGs.

TG reference data audit

Supports the auditing of switch TG Reference Data for up to 1024 TGs.

NTM 5-minute surveillance data schedule management

Supports the management of the switch’s “NTM Data Schedule” to include collecting 5-Minute TG data for 250 or 1024 TGs, but never both simultaneously in the same switch.

NTM database sizing

The NTM database was resized to accommodate storing 5-Minute Surveillance Data for 1024 TGs for a switch equipped with the enhanced interface.

Identification of switches with 2000 TG surveillance capability

Provides a means for the network traffic managers to identify up to 50 switches that can report data on 1024 TGs. This allows NTM to collect and properly process the data for the additional TGs.

Feature 285, “Surveillance of 1024 Trunk Groups in a *DMS* 250 Switch”

Purpose

NTM supports 5-Minute Surveillance Data for 1024 TGs in *DMS* 250 Switches that conform to the enhanced interface, instead of the previous limit of 250. To accomplish this, NTM incorporates the new capabilities similarly as described for Feature 284, “Surveillance of 1024 Trunk Groups in a DMS 100/200 Switch”.

Feature 286, “Surveillance of 1024 Trunk Groups in a *DMS* 500 Switch”

Purpose

NTM supports 5-Minute Surveillance Data for 1024 TGs in *DMS* 500 Switches that conform to the enhanced interface, instead of the previous limit of 250. To accomplish this, NTM incorporates the new capabilities similarly as described for Feature 284, “Surveillance of 1024 Trunk Groups in a DMS 100/200 Switch”.

Feature 288, “NTM Report Writer for 50 Switches”

Purpose

This feature provides the capability for the NTM host computer to copy selected data to a new reporting database as that data is available on the host. The reporting data are stored in an *Oracle* database. NTM automatically aggregates the stored data, on a fixed schedule, so that reporting and trend analysis can be easily done over longer periods of time. BrioQuery is used to access the stored reporting data. BrioQuery simplifies the report writing process and increases the flexibility of report formats. The user interface for creating, modifying, and running reports is performed entirely through a point-and-click graphical user interface (GUI).

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Feature 289, “NTM Report Writer for 100 Switches”

Purpose

This feature is similar potential areas as Feature 288, “NTM Report Writer for 50 Switches”, except reporting is available for up to 100 switches.

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Feature 290, “NTM Report Writer for 250 Switches”

Purpose

This feature is similar potential areas as Feature 288, “NTM Report Writer for 50 Switches”, except reporting is available for up to 250 switches.

Feature 293, “TCP/IP Interface to *DMS* 250 Switches”

Purpose

This feature provides for the certification of the *DMS* 250 Switch's generic UCS13. In addition, it provides NTM with a TCP/IP communications capability over an Ethernet Local Area Network (LAN) or Wide Area Network (WAN) to Nortel Networks’ *DMS* 250 switches.

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Certification of the *DMS* 250 Switch's generic UCS13 verifies that this version of the interface to the switch conforms to the established interface protocols.
- Sustaining the NTM application’s “no break”, backward compatibility of the interface ensures that vital pre-existing NTM capabilities continue to function.
- Providing “internal support” of the generic UCS13 of the *DMS* 250 Switch provides for accurate generic identification on the NTM application’s browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with NTM.
- Improved Switch-to-NTM Communications. The use of TCP/IP over an Ethernet network, in place of the existing BX.25 communications links, significantly speeds up the transfer of data, control, and audit messages between a *DMS* 250 Switch and NTM. Additionally, TCP provides reliable, error-free data exchange.
- Removal of Duplicate Data Transport Infrastructure. This feature allows an enterprise to simplify its corporate data transport network architecture and lower its operating costs by eliminating BX.25 connectivity to those *DMS* 250 Switches that support TCP/IP and are accessible through a Central Office LAN.
- Increased Effectiveness of the NTM Data Collection. Increasing the speed and throughput of the data collection network may result in fewer switches reporting late data. Providing a reliable data network may result in fewer errors in the data reported. Communicating to all the switches in parallel, instead of today’s serial communication through each DCC, may reduce the total time required to collect surveillance data and perform audits and controls. Together, these improvements may result in the network traffic managers having access to the latest network data quicker, thereby speeding up the start of their analysis and control actions.

- Increased Reliability of the NTM Data Collection. Removing the DCC from the data collection transport “path” eliminates a single point of failure in the current data collection architecture. The need to maintain time synchronization with the DCC, which is required to prevent lost data, is also eliminated. Each of these improvements may result in data collection being successful more often.
- Support for Future Growth. Providing a data network with greater capacity allows the addition of more vital data to the existing *DMS* 250 Switch interface. Thus, the foundation is in place to extend NTM into the new services and network capabilities arena, e.g., Advanced Intelligent Network, Local Number Portability, and Long Distance Networks.

□

Feature 296, “TCP/IP Interface to *DMS* 500 Switches”

Purpose

This feature provides for the certification of the *DMS* 500 Switch's generic NCS13. In addition, it provides NTM with a TCP/IP communications capability over an Ethernet Local Area Network (LAN) or Wide Area Network (WAN) to Nortel Networks’ *DMS* 500 switches.

This feature provides customer value in the same potential areas as Feature 293, “TCP/IP Interface to DMS 250 Switches”.

Feature 301, “Enhanced Switch Support for *DMS* 100/200 Generic NA014”

Purpose

This feature provides for the support of the *DMS* 100/200 Switch's generic NA014. In addition, this feature provides for the collection of maintenance busy (MB) counts for trunk groups (TGs) scheduled for NTM 5-minute data collection. Availability of this measurement allows NTM to estimate the actual number of functioning circuits in a trunk group during the last five-minute data collection interval.

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Sustaining the NTM application’s “no break”, backward compatibility of the interface ensures that vital pre-existing NTM capabilities continue to function.
- Providing “internal support” of the generic NA014 of the *DMS* 100/200 Switch provides for accurate generic identification on the NTM application’s browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with NTM.
- Sustained Call Completions and Revenue Protection by providing NTM with the data needed to adjust all derived data for these trunk groups in order to portray the load on that portion of the network that can actually carry traffic, e.g., Service Attempts Per Circuit Per Hour. Network traffic managers can use the adjusted data to better understand how the available network is performing and formulate control strategies accordingly.

□

Feature 303, “Enhanced Switch Support for *DMS* 250 Generic UCS14”

Purpose

This feature provides for the support of the *DMS* 250 Switch's generic UCS14. This feature is similar to and provides customer value in the same potential areas as Feature 301, “Enhanced Switch Support for DMS 100/200 Generic NA014”.

Feature 305, “Enhanced Switch Support for *DMS* 500 Generic NCS14”

Purpose

This feature provides for the support of the *DMS* 50 Switch's generic NCS14. This feature is similar to and provides customer value in the same potential areas as Feature 301, “Enhanced Switch Support for DMS 100/200 Generic NA014”.

Feature 311, “Enhanced Switch Support for *5ESS* Generic 5e15”

Purpose

NTM supports the new capabilities available in the 5E15 generic *5ESS* Switch. To accomplish this, NTM incorporates the following.

Protective TG control management

Supports the management of the protective TG controls SKIP, Cancel-To, and Cancel-From. Percentage control increments of one percent are supported. A total of 256 protective and expansive TG controls are supported.

Expansive TG control management

Supports the management of the expansive TG Overflow and Immediate Reroute controls. Percentage control increments of one percent are supported. A total of 256 protective and expansive TG controls are supported. The number of simultaneous spray and ordered TG reroutes is increased to 32.

Automatic TG control management

Supports the management of the automatic TG controls Automatic Congestion Control (ACC) and Circuit Reservation (CR). The CR reservation level maximums are expanded to 65,534. A total of 256 automatic TG controls, either ACC or CR, are supported.

Manual protective TG control audit

Supports the auditing of all manual protective TG controls active.

Manual expansive TG control audit

Supports the auditing of all manual expansive TG controls active.

Automatic TG control audit

Supports the auditing of all automatic TG controls assigned.

Identification of 5E15 generic *5ESS* switches with surveillance and control capability

Supports a single new “internal” generic identifier that symbolizes the 5E15 generic *5ESS* Switch.

Increased maximum measurement values

Supports an increase in the number of registers allocated to each 5-minute measurement in selected measurement categories. These selected measurements are four (4) registers in length. These measurements accurately report values well beyond the current limit of 65,525.

Feature 314, “Enhanced Switch Support for *DMS* 250 Generic UCS12”

Purpose

This feature provides for the certification of the *DMS* 250 Switch's generic UCS12. In addition, this feature provides for the support of the new UCS12 Generic Network Traffic Management capabilities. This allows network traffic managers to track traffic being carried by feature Group “D” (FGD) carriers who have been assigned the new Federal Communications Commission mandated four digit Carrier Identification Code (CIC). The data transfer between the *DMS* 250 Switch and NTM is backward compatible and supports carriers who will, essentially, retain their three digit CIC for feature Group D access.

This feature provides for traffic measurements for FGD carriers with both the existing three-digit and the expanded four-digit CIC. This data consists of “InterExchange Carrier Start Signal Timeout” data. While no new measurements are made in the switch, the format for identifying the various carriers has been changed.

Manual call gapping controls

For Manual Call Gapping Controls, this feature allows network traffic managers to:

- Activate/Modify/Delete a Manual Call Gapping Control on a code that includes a four digit FGD CIC
- Audit a switch's active Manual Call Gapping Control list, including controls on codes containing a four digit FGD CIC

The expanded carrier identifiers are incorporated into the embedded Local Access and Transport Area Switching System Generic Requirements (LSSGR)-compliant interface, i.e. Technical Reference (TR) - TSY - 000537, that currently exists between the *DMS* 250 Switch and NTM.

□

Feature 316, “Marked Alarms for the Browser-based GUI”

Purpose

This optional feature provides the customer with the ability to effectively, through the browser-based Graphical User Interface (GUI).

Customer benefits

It benefits the customers in one or more of the following areas:

- Increased Productivity: By providing the ability to prioritize problems and avoid working on problems that are already being addressed.
- Service Quality, Sustained Call Completions and Revenue Protection: By allowing the network traffic manager to be more effective, more network problems may be identified and more quickly resolved, thereby improving the call completion performance of the network.

□

Feature 318, “Browser-based GUI Dual Host Support”

Purpose

This optional feature provides an integrated view of alerting information (exceptions) from two NTM feature set's host's, allowing a wide area to be monitored from a single Network Traffic Management Center.

Customer benefits

This feature benefits the customers in one or more of the following areas:

- Improved efficiency of the NTM Function by facilitating the consolidation of NTM support to a single Network Traffic Management Center.
- Improved effectiveness of network traffic managers by facilitating the pooling of a company's NTM expertise at a single location. This may facilitate the sharing of expertise among and the training of network traffic managers.
- Service Quality, Sustained Call Completions, and Revenue Protection. By providing a network picture at a single location with ready access to all of the managed objects (raw and derived measurements) in exception collected from the network under surveillance, large scale and systemic problems may be easier to identify and manage.

□

Feature 319, “Enhanced Switch Support for *DMS* 100/200 Generic NA009 Switches”

Purpose

This feature provides for the certification of the *DMS* 100/200 Switch's generic NA009. In addition, this feature provides for surveillance and control capabilities for Government Emergency Teleco. GETS (AKA High Probability of Completion [HPC]) provides enhanced routing and priority service through the Public Switched Telephone Network (PSTN) to “Emergency Managers” during times of crisis or natural disasters.

This feature provides for the collection, thresholding, exception processing, and display of per-office and per-trunk group 5-minute surveillance measurements of GETS calls and GETS related 30-second discretes.

5-minute data

The 5-minute data consists of:

- Per-trunk group measurements for each trunk group under surveillance
  - GETS Call Attempts
  - GETS Call Overflows
  - GETS Trunk Group Queue Time-Outs
  - GETS Trunk Group Queue Overflows
- Five per-office GETS traffic volume and direction measurements
  - Originating GETS Attempts
  - Incoming GETS Calls
  - Terminating GETS Calls
  - Outgoing GETS Calls
  - Outgoing GETS Calls to No Circuit

Discretes

The 30-second discretes indicate:

- One or more GETS calls exempted from trunk group controls
- One or more GETS calls given No Circuit Available final handling treatment

Controls

In the switch, the operation of selected controls was modified to exempt all GETS calls from the control except under very specific conditions. However, with the appropriate parameter settings, reroute controls apply to GETS calls.

Calculations and thresholding

NTM, having collected the GETS data, subjects the data to all appropriate derived data creation calculations, data value thresholding, and exception processing. The NTM Graphical User Interface was modified to present GETS data and control capabilities in a clear, concise, and effective manner.

□

Feature 320, “Enhanced Switch Support for *DMS* 100/200 Generic NA012”

Purpose

This feature provides for the certification of the *DMS* 100/200 Switch's generic NA012. In addition, this feature provides of the support for the new NA012 Generic Network Traffic Management capabilities. This allows network traffic managers to track traffic being carried by Feature Group “D” (FGD) carriers who have been assigned the new Federal Communications Commission mandated four digit Carrier Identification Code (CIC). The data transfer between the *DMS* 100/200 Switch and NTM is backward compatible and supports carriers who will, essentially, retain their three digit CIC for Feature Group D access.

This feature provides for traffic measurements for FGD carriers with both the existing three-digit and the expanded four-digit CIC. This data includes the “InterExchange Carrier Shared Trunk Group” and “InterExchange Carrier Start Signal Timeout” data. While no new measurements are made in the switch, the format for identifying the various carriers has been changed.

For Manual Call Gapping Controls, this feature allows network traffic managers to:

- Activate/Modify/Delete a Manual Call Gapping Control on a code that includes a four digit FGD CIC
- Audit a switch's active Manual Call Gapping Control list, including controls on codes containing a four digit FGD CIC

□

Feature 321, “Enhanced Switch Support for *DMS* 500 Generic NCS12”

Purpose

This feature provides for the certification of the *DMS* 500 Switch's generic NCS12. This feature is similar to Feature 320, “Enhanced Switch Support for DMS 100/200 Generic NA012”.

Feature 326, "Support of GETS in *5ESS* Switches"

Purpose

The following features provide for surveillance and control capabilities for Government Emergency Telecommunications Service (GETS) traffic in the 5E13 generic of the *5ESS* switch and the NA009 generic of the *DMS* 100/200 switch.

- Feature 223, "(GETS) Data Display for *5ESS"* provides for the collection, thresholding, exception processing, and display of per-office and per-trunk group 5-minute surveillance measurements of GETS calls and trunk queuing activities and GETS related 30-second discretes.
- Feature 224,"(GETS) Data Display for *DMS*100/200" provides for the collection, thresholding, exception processing, and display of per-office and per-trunk group 5-minute surveillance measurements of GETS calls and GETS related 30-second discretes.

Customer benefits

They provide customer benefits in one or more of the following areas:

- Compliance with U.S. Government Telecommunications Initiatives by supporting GETS traffic surveillance and control mandates
- Service Quality and Sustained Call Completions for GETS traffic by providing the network traffic managers with data on, and control capabilities for, the GETS high priority calls.

They also provide enhanced routing and priority service through the Public Switched Telephone Network (PSTN) to "Emergency Managers" during times of crisis or natural disasters.

□

Feature 327, “Enhanced Switch Support for *EWSD* Release 16”

Purpose

This feature provides for the certification of the *EWSD* Switch's Release 16. This feature is similar to Feature 319, “Enhanced Switch Support for DMS 100/200 Generic NA009 Switches”.

□

Feature 328, “Enhanced Switch Support for *GTD-5* Generic 1732”

Purpose

This feature provides for the certification of the *GTD-5* Switch's generic 1732. This feature is similar to Feature 319, “Enhanced Switch Support for DMS 100/200 Generic NA009 Switches”.

Feature 330, “Audible Alarms for the Browser-based GUI”

Purpose

This feature provides the network traffic managers and their management with a tool to ensure all exceptions are noticed. They have the security of knowing an audible alarm alerts them to their critical exceptions as defined by their thresholding scheme. During “off-hours” coverage in a center, audible alarms allow the duty person some freedom to investigate other center operations without being tied to the NTM console area. During “in-hours” coverage, audible alarms allow the users to do other work functions, uninterrupted by constantly looking up at the surveillance displays to check for critical exceptions.

The audible alarm sounds until the user “acknowledges” the alarm, or the duration value of the audible alarm has been reached. The duration of the audible alarm is set at 5 seconds. If the alarm is not acknowledged, an audible alarm is generated again 30 seconds after the first audible alarm, and sounds for another 5 seconds. The users acknowledge an alarm by clicking on an object on the display.

All user desktop hardware platforms currently displaying exceptions on either an “open” or iconized map- or tabular- based GUI display may generate audible alarms. The user is required to acknowledge the audible alarm from the desktop hardware platform where the alarm was generated. This feature allows the users to turn on and off the alarming capability as needed. When turned off, there are no audible alarms.

□

Feature 335, “Browser-based Enhanced Discrete Trending”

Purpose

This feature provides for the support of enhanced discrete trending with the Browser-based Graphical User Interface (GUI). Included with the GUI is the display of discrete trending data for the past 5 minutes of a discrete’s history. This feature enhances the trending for one discrete on a network element to allow the display of 60-minutes of discrete trending. The discrete data provides the network traffic manager with improved surveillance of the traffic in the network and improved insight into the current condition of the network. The 30-second nature of the discrete information acts like an early warning system to impending 5-minute network problems, thus allowing the user to focus their attention on a particular area of the network.

BBGUI

This feature enhances the discrete trending capability of the browser-based GUI by allowing the user to extend the amount of history shown in the discrete trending histogram for one discrete on a single network element from the default of 5-minutes to a length of 60 minutes. This furthers the ability of network managers to use the discrete trending capability to increase call completion.

Display options

The discrete data in the display is auto-updated on each 30-second discrete period. Newly activated discretes are added to the active discrete data during this update period. The active discrete data items that become inactive are moved into the aging section of discrete data during this update period. The aging discrete data that passes the aging limit is removed from the display during this update period. Any aging (inactive) discrete data items that are re-activated are moved into the active section of discrete data during this update period.

When a discrete on a network element is chosen to be displayed for 60-minutes, the display is initially filled with the appropriate length of that discretes’ history. The display is then auto-updated on each 30-second discrete period.

□

Feature 341, “Map Alert Restrictions for the Browser-based GUI”

Purpose

This feature allows a network traffic manager to choose which alerts are displayed on a given browser-based Graphical User Interface (GUI) map.

Pre-341

Today, the initial map selection display allows a user to select what attributes an alert must have if it is to appear on the map. For example, a user may choose “on” for the “Suspect Data Filter” attribute in order to see only alerts associated with data that is not suspect.

New functionality

This feature provides for additional attributes being included in the set of selections.

Working with Alcatel-Lucent representatives, a customer can define new “attribute categories”. These new attribute categories can each contain one or more specifically defined alert types, which are used to filter the data displayed. Taking these attribute categories and their associated alert type definitions, Alcatel-Lucent performs a one-time customization of the NTM browser-based GUI to add these new attribute categories to the set of attribute selections.

Examples

For example, if it was decided that a GUI map needed to display only those trunk groups with Attempts Per Circuit Per Hour (ACH) greater than five, then this feature supports the definition of a “Trunk Group Restriction” attribute category with an alert type of “ACH > 5”. The attribute “Trunk Group Restriction” would be visible on the initial map selection display with a single choice of “ACH > 5”. If the user selected this choice, then the map would display only those trunk groups that satisfied this restriction (along with any other restrictions selected from the other attribute categories). If the user did not make this selection, then the map would default to displaying all trunk group alerts.

Within a given attribute category, if more than one alert type is defined, then the user can select them singly or in any combination.

□

Feature 342, “Historical Data Playback for the Browser-based GUI”

Purpose

This feature enhances the network traffic manager’s ability to perform “off-line” reviews and analysis of previous traffic events in the network. The browser-based Graphical User Interface (GUI) functionality is expanded to support the definition of a “playback session” for the 5-minute exception and control data normally sent to the GUI displays. Once defined, these 5-minute exception and control data “historical sessions are available to be “relived” through the associated GUI displays by the network traffic managers. This feature’s playback capability further enhances the user's ability to perform deferred analysis of network traffic events. This feature also provides a useful demonstration capability to show visitors to the Network Traffic Management Center significant events in the network, by way of the graphical access to the recorded historical data.

This feature adds a new overall capability to NTM. This new capability allows a network traffic manager to recall for viewing previous intervals of 5-minute exception and control data through the browser-based GUI displays. This new capability is an addition to the GUI “subsystem” and is separated into:

- Defining 5-minute exception and control data “historical sessions” on the GUI displays.
- Playing back 5-minute exception and control data “historical sessions” on the GUI displays.

Defining

A new GUI display allows for the specification of the name and start/end time and date of the “historical session” and to activate a defined “historical session”. The ability to define and activate a “historical session” is restricted to those persons with the appropriate permissions to do so.

Additionally, there is an application-wide “auto update” delay defined for the time that an individual “frame” of 5-minute data is displayed before the display is advanced to the next “frame” of 5-minute data. This delay value can be administratively changed from 30 to 300 seconds, inclusive, on an application-wide basis. The default delay is 60 seconds.

Playing back

Only two (2) “historical sessions” may be active on the NTM host at a time. When a user selects a defined “historical session” to be activated, NTM checks to see how many active “historical sessions” there are and if the data for the start/end time and date time span is contained in the NTM database. If the limit of “historical sessions” is reached or the data

is not present in the NTM database, the request is rejected. In the latter case, the NTM System Administrator would have to load the appropriate historical database into NTM before the request would be honored.

A user's desktop GUI platform can have some displays in "historical playback" mode and others in the "current" mode, i.e. displaying the latest 5-minute data collected from the network.

The default operation of playback is the sequential display of every 5-minute period within the defined start/end time and date time span. The capability is provided for a user to remove any number of the 5-minute periods from the playback sequence before the playback is commenced. Editing the data in a single 5-minute period is not supported.

Manual Playback

A user can enter one of the two active "historical sessions" from any GUI map or non-map display that supports "historical playback". The user enters a "historical session" by selecting its name from the "Session List" for the same period object that the user selects the "current" or "historical period" mode from.

Upon entering, the user views the first period in the defined time span for that "historical session". If the user opens other displays from the initial "historical session" display, those displays shows data for the same time period being viewed on the initial "historical session" display.

The user can select "next", "previous", or "rewind to beginning" actions in order to manually navigate through the "historical session", or they can select "auto update".

Auto Update Playback

For performance reasons and to provide a consistent view of the data on all "historical session" displays on a given workstation, every display on every user desktop GUI platform for a given active "historical session" that is in auto update mode must display data from the same 5-minute time period. Therefore, when a user has a "historical session" in manual playback mode and selects "auto update", the display "jumps" to show the time period that is common to all that "historical session's" displays. Once aligned to the common time period, the user's display advances to the next period as a centralized synchronizing timer dictates. Thereafter, the display advances to the next time period based on the application-wide "auto update delay" value.

All of a given "historical session's" displays in "auto update" mode are stepped through the "historical session's" data "frames" until the end of the defined time span for that "historical session". When the last "frame" is reached, the displays "wrap around" to the beginning "frame" and start again, continuously cycling through the entire "historical session" until the display or the "historical session" is terminated.

Feature 346, “Support of Exception Thresholding for Additional Managed Objects”

Purpose

This feature provides thresholding capabilities for additional managed objects (raw and derived measurements). These managed objects also are retrievable via the “ongoing” command, and available to be automatically updated in the Browser-based Graphical User Interface (GUI).

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Improved Detection of Network Events. The ability to threshold additional managed objects enables the user to better define certain exception conditions.
- Increased User Effectiveness. By allowing the managed objects to be automatically updated in the GUI, the user can quickly see continuous changes in those managed objects’ values.

□

Feature 349, “Enhanced Switch Support for *5ESS* Generic 5E16”

Purpose

The interface between NTM and Generic 5E16 of the *5ESS* Switch are tested to verify that the interface is stable, maintainable, conforms to established interface protocols, and supports all pre-existing NTM capabilities. Generic 5E16 of the *5ESS* Switch are an internally supported generic in NTM.

NTM supports the increase in the number of switching “domains” in the *5ESS* Switch from the current value of 99 to the new limit of 254. The higher domains are supported in both the NTM Record Base and in the appropriate manual controls when accessed from both the NTM GUI or the “command line”. All associated switch control audits are suitably modified to accommodate the greater range of domain numbers.

□

Feature 350, “Enhanced Switch Support for Succession Network Switch Generic ICS03”

Purpose

NTM supports Reroute controls with code-specific parameters or HTR options and Cancel-To controls with HTR options on the Succession Network Switch, while maintaining all pre-existing NTM functionality. To accomplish this, the NTM-to-Succession Network Switch interface are enhanced, and NTM incorporates the following items.

Protective TG control management

Supports the management of the protective TG Cancel-To control with new HTR options in Succession Network Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Expansive TG control management

Supports the management of the expansive TG Reroute control with code-specific parameters or HTR options in Succession Network Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Code control management

The maximum number of code controls supported in Succession Network Switches by NTM was increased to 256.

Manual protective TG control audit

Supports the auditing of the new HTR options for Cancel-To manual protective TG controls active in the Succession Network Switches.

Manual expansive TG control audit

Supports the auditing of the new HTR options and code-specific parameters for Reroute manual expansive TG controls active in the Succession Network Switches.

Manual hard-to-reach list management

Supports the management of a HTR code list of up to 128 codes, with each code being a combination of one or more of the following: Carrier Identification Code (CIC), North American Numbering Plan (NANP) or International Numbering Plan identifier, and a 1-10

digit code for NANP codes or 1-15 digit code for International Numbering Plan codes. This management includes verifying with the switch that the HTR code list is not corrupted and populating the HTR list in the switch.

Manual hard-to-reach audit

Supports auditing of the codes, up to a maximum of 128, on the HTR list in the Succession Network Switch.

5-minute hard-to-reach surveillance data

Supports the collection, storage, recording, thresholding, and display of 5-minute HTR data, “HTR Answers” and “HTR Machine Attempts”, from the Succession Network Switch.

Derived data measurements

Supports the processing, recording, storage, thresholding, and display of the derived HTR data measurement “Percent Answer to Bid Ratio” associated with the new “raw” HTR measurements received from Succession Network Switches.

Feature 351, “Enhanced Switch Support for *DMS* 100/200 Generic NA017”

Purpose

NTM supports Reroute controls with both code-specific parameters or HTR options and Cancel-To controls with HTR options on the *DMS* 100/200 Switches, while maintaining all pre-existing NTM functionality. To accomplish this, the NTM-to-*DMS* 100/200 Switch interface are enhanced, and NTM incorporates the following items.

Protective TG control management

Supports the management of the protective TG Cancel-To control with new HTR options in *DMS* 100/200 Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Expansive TG control management

Supports the management of the expansive Reroute control with code-specific parameters or HTR options in *DMS* 100/200 Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Code control management

The maximum number of code controls supported in *DMS* 100/200 Switches by NTM was increased to 256.

Manual protective TG control audit

Supports the auditing of the new HTR options for Cancel-To manual protective TG controls active in the *DMS* 100/200 Switches.

Manual expansive TG control audit

Supports the auditing of the new HTR options and code-specific parameters for Reroute manual expansive TG controls active in the *DMS* 100/200 Switches.

Manual hard-to-reach list management

Supports the management of a HTR code list of up to 128 codes, with each code being a combination of one or more of the following: Carrier Identification Code (CIC), North American Numbering Plan (NANP) or International Numbering Plan identifier, and a 1-10 digit code for NANP codes or 1-15 digit code for International Numbering Plan codes. This management includes verifying with the switch that the HTR code list is not corrupted and populating the HTR list in the switch.

Manual hard-to-reach audit

Supports auditing of the codes, up to a maximum of 128, on the HTR list in the *DMS* 100/200 Switch.

5-minute hard-to-reach surveillance data

Supports the collection, storage, recording, thresholding, and display of 5-minute HTR data, “HTR Answers” and “HTR Machine Attempts”, from the *DMS* 100/200 Switch.

Derived data measurements

Supports the processing, recording, storage, thresholding, and display of the derived HTR data measurement “Percent Answer to Bid Ratio” associated with the new “raw” HTR measurements received from *DMS* 100/200 Switches.

□

Feature 352, “Enhanced Switch Support for *DMS* 250 Generic SN04TDM”

Purpose

NTM supports Reroute controls with both code-specific parameters and HTR options and Cancel-To controls with HTR options on the *DMS* 250 Switches, while maintaining all pre-existing NTM functionality. NTM also supports the increase in TG size and the increase in TG data size in the *DMS* 250 Switch generic SN04-TDM. To accomplish this, the NTM-to-*DMS* 250 Switch interface is enhanced, and NTM incorporates the following items.

Protective TG control management

Supports the management of the protective TG Cancel-To control with new HTR options in *DMS* 250 Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Expansive TG control management

Supports the management of the expansive Reroute control with code-specific parameters or HTR options in *DMS* 250 Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Code control management

The maximum number of code controls supported in *DMS* 250 Switches by NTM was increased to 256.

Manual protective TG control audit

Supports the auditing of the new HTR options for Cancel-To manual protective TG controls active in the *DMS* 250 Switches.

Manual expansive TG control audit

Supports the auditing of the new HTR options and code-specific parameters for Reroute manual expansive TG controls active in the *DMS* 250 Switches.

Manual hard-to-reach list management

Supports the management of a HTR code list of up to 128 codes, with each code being a combination of one or more of the following: Carrier Identification Code (CIC), North American Numbering Plan (NANP) or International Numbering Plan identifier, and a 1-10

digit code for NANP codes or 1-15 digit code for International Numbering Plan codes. This management includes verifying with the switch that the HTR code list is not corrupted and populating the HTR list in the switch.

Manual hard-to-reach audit

Supports auditing of the codes, up to a maximum of 128, on the HTR list in the *DMS* 250 Switch.

5-minute hard-to-reach surveillance data

Supports the collection, storage, recording, thresholding, and display of 5-minute HTR data, “HTR Answers” and “HTR Machine Attempts”, from the *DMS* 250 Switch.

Derived data measurements

Supports the processing, recording, storage, thresholding, and display of the derived HTR data measurement “Percent Answer to Bid Ratio” associated with the new “raw” HTR measurements received from *DMS 250* Switches.

Increased maximum measurement values

Supports an increase in the number of registers allocated to each 5-minute TG measurement. These measurements are extended in length beyond the current limit of two (2) bytes, allowing the measurements to take on values up to 1,048,576.

□

Feature 353, “Enhanced Switch Support for *DMS* 500 Generic NCS17”

Purpose

NTM supports Reroute controls with code-specific parameters or HTR options and Cancel-To controls with HTR options on the *DMS* 500 Switches, while maintaining all pre-existing NTM functionality. NTM supports the increase in TG size and the increase in TG data size in the *DMS* 500 Switch generic NCS17. To accomplish this, the NTM-to-*DMS* 500 Switch interface was enhanced, and NTM incorporates the following items.

Protective TG control management

Supports the management of the protective TG Cancel-To control with new HTR options in *DMS* 500 Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Expansive TG control management

Supports the management of the expansive Reroute control with code-specific parameters or HTR options in *DMS* 500 Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Code control management

The maximum number of code controls supported in *DMS* 500 Switches by NTM are increased to 256.

Manual protective TG control audit

Supports the auditing of the new HTR options for Cancel-To manual protective TG controls active in the *DMS* 500 Switches.

Manual expansive TG control audit

Supports the auditing of the new HTR options and code-specific parameters for Reroute manual expansive TG controls active in the *DMS* 500 Switches.

Manual hard-to-reach list management

Supports the management of a HTR code list of up to 128 codes, with each code being a combination of one or more of the following: Carrier Identification Code (CIC), North American Numbering Plan (NANP) or International Numbering Plan identifier, and a 1-10

digit code for NANP codes or 1-15 digit code for International Numbering Plan codes. This management includes verifying with the switch that the HTR code list is not corrupted and populating the HTR list in the switch.

Manual hard-to-reach audit

Supports auditing of the codes, up to a maximum of 128, on the HTR list in the *DMS* 500 Switch.

5-minute hard-to-reach surveillance data

Supports the collection, storage, recording, thresholding, and display of 5-minute HTR data, “HTR Answers” and “HTR Machine Attempts”, from the *DMS* 500 Switch.

Derived data measurements

Supports the processing, recording, storage, thresholding, and display of the derived HTR data measurement “Percent Answer to Bid Ratio” associated with the new “raw” HTR measurements received from *DMS* 500 Switches.

Increased maximum measurement values

Supports an increase in the number of registers allocated to each 5-minute TG measurement. These measurements are extended in length beyond the current limit of two (2) bytes, allowing the measurements to take on values up to 1,048,576.

Increase in supported trunk group size

Supports the increase in size time division multiplexed (TDM) trunks to 32k members.

□

Feature 354, “Switch Support for Succession Network Switch Generic SN02”

Purpose

The interface between NTM and the Succession Network Switch, Generic SN02, are a TCP/IP-based “direct connect” interface. Documentation of the Open Interface defined between Nortel Networks and Alcatel-Lucent (DC and NTM OS/*DMS* TCP/IP Communications I/F, version 1.00) is available upon written request.

Security enhancements

The Open Interface, while loosely based on Telcordia Technologies’ TR-TSY-000740, “Stored Program Control System/Operations System (SPCS/OS) – Network Data Collection Operations System (NCS OS) Interface”, and TR-746, ““Stored Program Control System/Operations System (SPCS/OS) – Network Traffic Management Operations System (NTM OS) Interface via a Network Data Collection Operations System (NDC OS)”, adds important security enhancements to better address the networking security needs of those companies using NTM to interface to Succession Network SN02 Switches.

Capabilities

NTM supports the capabilities available through the Alcatel-Lucent’ interface for the Succession Network Switch. To accomplish this, NTM incorporates these items.

30-second discrete data

Supports the collection, processing, recording, storage, and display of control- and audit-related discretes.

5-minute surveillance data

Supports the collection, processing, recording, storage, and display of all the circuit-switch based 5-Minute surveillance measurements currently available in the *DMS* 100/200 Switch Generic NA014 in addition to dynamic packet trunk (DPT) group data. The interface collects data on the traditional trunks as well as those terminated on the MG-4000 units. The applicable 5-minute measurement categories are listed below:

- Additional Ineffective Machine Attempts (IMAs)
- Call Direction and Load
- Counts per Code Control
- Counts per Reroute Control

- Critical Service Circuits
- Delayed Readiness
- Inter-Exchange Carrier Start Signal Timeouts
- Matching Loss and No Circuits
- Network Management Control Counts
- Overload
- Processor Occupancy Data
- Trunk Group with Maintenance Busy counts

Derived data measurements

Supports the creation, processing, recording, storage, and display of all "derived data measurements" associated with the "raw" measurements in all the currently supported categories of 5-Minute Surveillance Data.

Data scheduling audit

Supports the management of scheduling the collection of 5-Minute Data from the Succession Network Switch.

Protective TG control management

Supports the management of the protective TG controls Cancel-To, Cancel-From, and Skip in Succession Network Switches. A total of 128 protective and expansive TG controls are supported.

Expansive TG control management

Supports the management of the expansive TG Overflow Reroute and Immediate Reroute controls in Succession Network Switches. A total of 128 protective and expansive TG controls are supported.

Manual call gapping control management

Supports the management of the Manual Call Gapping control in Succession Network Switches. A total of 64 Manual Call Gapping controls are supported.

Total office control removal management

Supports the management of the Total Office control in Succession Network Switches.

"NTM interest" TG scheduling

Supports the scheduling of up to 250 Trunk Groups in the switch for which 5-Minute Surveillance Data are collected.

NTM TG schedule

Supports managing a Succession Network Switch's "NTM TG Schedule" that contains up to 250 TGs.

TG list audit

Supports the auditing of all of the TGs in the Succession Network Switch. For this interface, the maximum number of TGs in a Succession Network Switch is set at 9999.

TG reference data audit

Supports the auditing of TG Reference Data for up to 250 TGs in the Succession Network Switch.

Manual protective TG control audit

Supports the auditing of all manual protective TG controls active in the Succession Network Switch.

Manual expansive TG control audit

Supports the auditing of all manual expansive TG controls active in the Succession Network Switch.

Code control audit

Supports the auditing of all Manual Call Gapping controls active in the Succession Network Switch generic SN02.

Identification of succession network switches with surveillance and control capability

Supports a single new "internal" generic identifier that symbolizes the Succession Network Switch generic SN02.

Measurement polling, undesired events handling, and data error checking for succession network switches

Supports a variety of polls and message types on the interface to Succession Network Switches for the management of the transmission of data, audits, and controls between NTM and the switch.

□

Feature 355, “Surveillance of 1024 Trunk Groups in a Succession Network Switch Generic SN02”

Purpose

NTM supports 5-Minute Surveillance Data for 1024 TGs in Succession Network Switches, instead of the current limit of 250. To accomplish this, NTM incorporates the new capabilities described for the following items.

“NTM interest” TG scheduling

Supports the scheduling of up to 1024 TGs in the switch for which 5-Minute Surveillance Data are collected.

5-minute surveillance data

Supports the collection of 5-Minute Surveillance Data for 1024 TGs.

5-minute surveillance data scheduling

Supports an extension of the scheduling of 5-Minute Surveillance Data in switches that have deployed the enhanced interface, in addition to the existing method. The method used can be selected by the user to meet operational needs.

NTM TG schedule

Supports managing a switch’s “NTM TG Schedule” that contains up to 1024 TGs.

TG reference data audit

Supports the auditing of switch TG Reference Data for up to 1024 TGs.

NTM 5-minute surveillance data schedule management

Supports the management of the switch’s “NTM Data Schedule” to include collecting 5-Minute TG data for 250 or 1024 TGs, but never both simultaneously in the same switch.

NTM database sizing

The NTM database was resized to accommodate storing 5-Minute Surveillance Data for 1024 TGs.

Identification of switches with 1024 TG surveillance capability

Provides a means for the network traffic managers to identify up to 50 switches that can report data on 1024 TGs. This allows NTM to collect and properly process the data for the additional TGs.

□

Feature 356, “Enhanced Switch Support for Succession Network Switch Generic SN03”

Purpose

NTM supports Reroute controls with code-specific parameters or HTR options and Cancel-To controls with HTR options on the Succession Network Switch, while maintaining all pre-existing NTM functionality. To accomplish this, the NTM-to-Succession Network Switch interface was enhanced, and NTM incorporates the following.

Protective TG control management

Supports the management of the protective TG Cancel-To control with new HTR options in Succession Network Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Expansive TG control management

Supports the management of the expansive TG Reroute control with code-specific parameters or HTR options in Succession Network Switches. The maximum number of protective and expansive controls that are supported was increased to 256.

Code control management

The maximum number of code controls supported in Succession Network Switches by NTM was increased to 256.

Manual protective TG control audit

Supports the auditing of the new HTR options for Cancel-To manual protective TG controls active in the Succession Network Switches.

Manual expansive TG control audit

Supports the auditing of the new HTR options and code-specific parameters for Reroute manual expansive TG controls active in the Succession Network Switches.

Manual hard-to-reach list management

Supports the management of a HTR code list of up to 128 codes, with each code being a combination of one or more of the following: Carrier Identification Code (CIC), North American Numbering Plan (NANP) or International Numbering Plan identifier, and a 1-10 digit code for NANP codes or 1-15 digit code for International Numbering Plan codes. This management includes verifying with the switch that the HTR code list is not corrupted and populating the HTR list in the switch.

Manual hard-to-reach audit

Supports auditing of the codes, up to a maximum of 128, on the HTR list in the Succession Network Switch.

5-minute hard-to-reach surveillance data

Supports the collection, storage, recording, thresholding, and display of 5-minute HTR data, “HTR Answers” and “HTR Machine Attempts”, from the Succession Network Switch.

Derived data measurements

Supports the processing, recording, storage, thresholding, and display of the derived HTR data measurement “Percent Answer to Bid Ratio” associated with the new “raw” HTR measurements received from Succession Network Switches.

□

Feature 359, Support for 200 Large Switches”

Purpose

NTM is enhanced to be able to collect data from up to 200 “large” switches, i.e. *DMS* and Succession Network Switches sending data on up to 1024 trunk groups (TGs) and *5ESS* Switches sending data on up to 2000 trunk groups.

Switch limit

With this feature, the limit on the number of switches supported by NTM changes to:

- Maximum number of 4ESS Switches from which data is being simultaneously collected: 10
- Maximum number of all other switch types that do not support an increase in TGs under surveillance and from which data is being simultaneously collected: 800.
- Maximum number of TGs under surveillance and from which data is being simultaneously collected: 55,000.
- Maximum number of Data Collector Concentrators (DCCs) from which data is being simultaneously collected: 60

This feature provides for the support of 200 “large” switches by NTM.

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Comprehensive NTM Surveillance by allowing NTM to collect data from the larger switches being deployed in today’s networks.
- Service Quality, Sustained Call Completions, and Revenue Protection by providing the network traffic managers with a complete view of all of the switches in the network for use in identifying network events.

□

Feature 364, "*5ESS* Generic 5E16.1"

Purpose

The interface between NTM and Generic 5E16.1 of the *5ESS* Switch was subjected to rigorous testing to verify that the interface is stable, maintainable, conforms to established interface protocols, and supports all pre-existing NTM capabilities. Generic 5E16.1 of the *5ESS* Switch is an internally supported generic in NTM.

HTR list

NTM supports the management of a HTR List in the *5ESS* Switch. Network traffic managers are able to add or remove codes to/from the HTR List. The HTR List in a given *5ESS* Switch may contain a maximum of 128 codes. These codes may be in the form of a 4-digit Carrier Identification Code (CIC), a network routing number of from one (1) to ten (10) digits, a "national" versus "international" call prefix indicator, or a combination of the first two or all three types of code entries.

5-minute data

NTM supports the collection of 5-minute measurement data for those codes on the HTR List. Based on the data collected for each code, NTM calculates an Answer-To-Bid Ratio (ABR) for each code. Thresholds can be established by the user for the ABR values to identify codes that do not meet the desired criterion for being declared HTR.

Controls

NTM supports HTR options on the following controls:

- Cancel-To
- Cancel-From
- Skip
- Reroute
- Automatic Congestion Control (ACC)
- Circuit Reservation

Users are able to select control percentages for Alternate Routed Easy-To-Reach (ETR), Alternate Routed HTR, Direct Routed ETR, and Direct Routed HTR traffic for each of these controls.

NTM supports a “Code” option on both the Immediate and Overflow Reroute controls. A user is able to specify a code to be rerouted by the switch. The code may be in the form of a 4-digit CIC, a network routing number of from one (1) to ten (10) digits, a “national” versus “international” call prefix indicator, or a combination of the first two or all three types of code entries.

Audits

NTM supports the collection of 5-minute surveillance data on the SS7 signaling links that terminate on Global Switching Modules (GSMs). A new signaling link audit is used to obtain signaling link reference data from the switch.

NTM supports new control audits to support the new control capabilities in the *5ESS* Switch.

□

Feature 365, “Bandwidth Directionalization & Prioritization control support in Succession Network Switch Generic SN04”

Purpose

NTM supports bandwidth directionalization and DPT prioritization controls on the Succession Network Switch generic SN04, while maintaining all pre-existing NTM functionality. To accomplish this, the NTM-to-Succession Network Switch interface was enhanced, and NTM incorporates the following items.

DPT control management

Supports the management of the bandwidth directionalization and DPT prioritization controls in Succession Network Switches.

Manual bandwidth directionalization control and DPT prioritization control audits

Supports the auditing of the bandwidth directionalization control and the DPT prioritization controls active in the Succession Network Switch.

5-minute bandwidth directionalization and DPT prioritization surveillance data

Supports the collection, storage, recording, thresholding, exception processing, and display of 5-minute bandwidth directionalization and DPT prioritization data from the Succession Network Switch. This includes the number of calls cancelled by bandwidth directionalization controls and DPT prioritization controls.

Bandwidth directionalization and DPT prioritization discretes

Supports the collection of 30-second bandwidth directionalization and DPT prioritization discretes from the Succession Network Switch, along with their storage and display.

Increased maximum measurement values

Supports an increase in the number of registers allocated to each 5-minute TG measurement. These measurements are four (4) bytes in length, as opposed to the current limit of two (2) bytes. These measurements accurately report values well beyond the current limit of 65,525.

Increase in supported trunk group size

Supports the increase in size of DPTs to 128,000 members and time division multiplexed (TDM) trunks to 32,000 members.

□

Feature 369, “TCP/IP Interface to NPM”

Purpose

The current NTM utilizes a TCP/IP network for communication with the existing DCCs, including the *NetMinder* Traffic Data Management (TDM) software and the NTM FEP. This feature provides a new interface option, which utilizes a TCP/IP network over Ethernet for communication to the Telcordia Technologies’ NPM.

Network design

Incorporation of this feature provides flexibility in network design schemes that a customer may implement. These new schemes may be used to design multiple independent NTM-to-Telcordia Technologies’ NPM communication paths to increase the reliability of the network.

With proper design of the network, the communication throughput between NTM and a Telcordia Technologies’ NPM may be increased relative to the current Datakit network. This may be possible because:

- Ethernet throughput is higher than that of the Datakit fiber interface boards currently on the NTM host computer.
- Additional parallel communication links can be configured when using the TCP/IP network.

This feature requires that a TCP/IP interface and Ethernet hardware be deployed on both the NTM host computer and the Telcordia Technologies’ NPM hardware platform.

□

Feature 374, “Enhanced Password Aging”

Purpose

This feature provides enhanced security for user password aging and security in the NTM Browser Based Graphical User Interface. The following capabilities are added to NTM to enhance the password aging and security feature of the Browser Based Graphical User Interface.

Minimum password age

A minimum password age was added to prevent users from changing their newly changed password within the specified number of days. The minimum password age is set to 3 days. The system administrator is able to modify the default minimum password age by using a system parameter.

Prevention of password cycling

Users are prevented from toggling or cycling their passwords. A range of passwords is saved and verified each time a user changes their password. If a user tries to change their password to a previous password that is within the range of cycled passwords, they are required to use a different password. The default number of passwords checked is 5. The system administrator can modify this value to a maximum setting of 25 by using a system parameter.

□

Feature 375, “Enhanced Switch Support for *DMS* 250 Generic SN05-TDM”

Purpose

The interface between NTM and the generic SN05-TDM of the *DMS* 250 Switch are subjected to rigorous testing to verify that the interface is stable, maintainable, conforms to established interface protocols, and supports all pre-existing NTM capabilities. Generic SN05-TDM of the *DMS* 250 Switch is an internally supported generic in NTM.

GETS

GETS (AKA High Probability of Completion [HPC]) provides enhanced routing and priority service through the Public Switched Telephone Network (PSTN) to “Emergency Managers” during times of crisis or natural disasters.

This feature provides for the collection, thresholding, exception processing, and display of per-office and per-trunk group 5-minute surveillance measurements of GETS calls and GETS related 30-second discretes.

5-minute data

The 5-minute data consists of:

- Per-trunk group measurements for each trunk group under surveillance
  - GETS Call Attempts
  - GETS Call Overflows
  - GETS Trunk Group Queue Time-Outs
  - GETS Trunk Group Queue Overflows
- Five per-office GETS traffic volume and direction measurements
  - Originating GETS Attempts
  - Incoming GETS Calls
  - Terminating GETS Calls
  - Outgoing GETS Calls
  - Outgoing GETS Calls to No Circuit

Discretes

The 30-second discretes indicate:

- One or more GETS calls exempted from trunk group controls
- One or more GETS calls given No Circuit Available final handling treatment

Controls

In the switch, the operation of selected controls was modified to exempt all GETS calls from the control except under very specific conditions. However, with the appropriate parameter settings, reroute controls apply to GETS calls.

Calculations and thresholding

NTM, having collected the GETS data, subjects the data to all appropriate derived data creation calculations, data value thresholding, and exception processing. The NTM Graphical User Interface was modified to present GETS data and control capabilities in a clear, concise, and effective manner. It is anticipated that all GETS-related trunk group and "machine" data are available for analysis on specific displays containing GETS information.

□

Feature 376, “Sonus GSX9000 5.1 Support”

Purpose

The interfaces between NTM and the GSX9000 and PSX are TCP/IP-based interfaces via the Insight EMS, loosely based on Telcordia Technologies’ Technical Reference (TR)-746, Issue 5, March, 2000, “Stored Program Control System Operations System (SPCS/OS) - Network Traffic Management Operations System (NTM OS) Interface via a Network Data Collection Operations System (NDC OS)”. To accomplish this, NTM incorporates the new capabilities described for the following items.

30-second discrete data

Supports the collection, processing, recording, storage, and display of the following discretes.

PSX:

- Code Control Active
- Code Control Changed
- Number Services SCP-Initiated Control

GSX9000:

- MC1 Condition
- MC2 Condition
- MC3 Condition
- Manual Trunk Group Control Active
- Manual Trunk Group Control Changed
- NM Trunk Group Schedule Compromised
- NM Packet Schedule Compromised
- Trunk Group List Changed
- Trunk Group Reference Data Changed

5-minute surveillance data

Supports the collection, processing, recording, storage, and display of 5-Minute Surveillance measurements. This includes the following categories of data:

PSX:

- Counts per code control (Code control number, Call attempts, Calls passed)

- NM Control counts (Calls cancelled by manual code controls)

GSX9000:

- Additional Ineffective Machine Attempts (Outgoing trunk start signal timeout, Miscellaneous IMAs, Vacant code treatments)
- Call direction and load (Incoming calls, Outgoing calls)
- Counts per RR control (Controlled trunk group ID, Reroute control ID, Call attempts, Calls rerouted successfully)
- Matching loss and No circuit (Total calls to no-circuit)
- NM Control counts (Calls skipped by manual TG controls, Calls attempted to reroute by reroute controls, calls successfully rerouted, calls cancelled by manual TG controls)
- Overload (MC1 usage, MC1 transitions count for processors, MC2 usage, MC2 transitions count for processors)
- Trunk group (Trunk group ID, Outgoing attempts, Usage, Incoming attempts, Overflow)

Derived data measurements

Supports the creation, processing, recording, storage, and display of "derived data measurements" associated with the "raw" measurements in all 5-Minute Surveillance Data.

Protective TG control management

Supports the management of the protective TG controls SKIP, Cancel-From, and Cancel-To in GSX9000 Network Elements. A total of 128 protective and expansive TG controls are supported per network element.

Expansive TG control management

Supports the management of the expansive TG controls Immediate Reroute and Overflow Reroute in GSX9000 Network Elements. A total of 128 protective and expansive TG controls are supported per network element.

Automatic TG control management

Supports the management of the automatic TG control Circuit Reservation (CR) in GSX9000 Network Elements. A total of 256 CR controls can be supported.

Manual call gapping control management

Supports the management of the Manual Call Gapping control in the PSX network element. A total of 64 Manual Call Gapping controls are supported per network element.

TG list audit

Supports the auditing of all of the TGs in the GSX9000 Network Element. For this interface, the maximum number of TGs in the GSX9000 Network Element is set at 250.

TG reference data audit

Supports the auditing of TG Reference Data for up to 250 TGs in the GSX9000 Network Element.

Manual protective TG control audit

Supports the auditing of all manual protective TG controls active in the GSX9000 Network Element.

Automatic TG control audit

Supports the auditing of Circuit Reservation controls active in the GSX9000 Network Element.

Code control audit

Supports the auditing of all Manual Call Gapping controls active in the PSX Network Element.

Packet scheduling

Adds support for the management of scheduling the collection of 5-Minute Data for Sonus network elements.

Identification of GSX9000 and PSX network elements with surveillance and/or control capability

Supports new “internal” switch types and generic identifiers that symbolize the PSX module of the Insignus Softswitch and GSX9000 network elements that support this interface.

Measurement polling, undesired events handling, and data error checking

Supports a variety of polls and message types on the interface to the Insight EMS for the management of the transmission of data, audits, and controls between NTM and the network elements.

□

Feature 379, “Marked Alarm Persistence on BDR”

Purpose

This features provides a way to keep marked alarms and exception inhibits in sync across a dual host system that uses the NTM BDR features (Feature 8, “Disaster Recovery (Duplex)”and Feature 40, “Enhanced Disaster Recovery”). An internal utility retrieves the marked alarms from the database and writes them to a file. The default files are “/musr/rb/mark/mark” or “/musr/snw/<snw_name>/rb/mark/mark”. This is done for all Primary partitions on the host on which it was initiated. Once it generates this file, it copies the file to the appropriate partitions on the back-up host(s). The commands “`create` all” or “`create` rspte” can be used to install these marks onto the backup host. After creating the file, `dayend` also copies the file to the back-up host.

This feature makes the BDR feature more seamless by providing a mechanism to create and delete Machine Data Marks, Trunk Group Marks, and the inhibition status of Trunk Group Exception processing.

Record base

This feature expands the record base to include a file that describes Machine Data Marks, Trunk Group Marks and Inhibitions. Also, this feature enables the automated generation of this record base file. The BDR feature is needed to copy this file back and forth between the host and takeover machines. A mark that is instituted or removed from a system is automatically created or removed when the create command is run, either before or during takeover.

Feature 380, “Browser-based GUI TG Number Search Option”

Purpose

This feature provides a network traffic manager with the ability to search for and display TGs by their TG Number.

This feature provides a new search type based on “TG Number” for searches associated with the browser-based GUI’s “Trunk Groups” and “Trunk Group Details” displays.

If the only search criterion for the “Trunk Groups” display is the “TG Number”, then the display shows data for all switches that have that TG Number assigned. If the search criteria are both “Near End” switch and “TG Number”, then the display is limited to a single entry.

The “TG Number” is also added to the “Trunk Groups” display’s “advanced search” for consistency with the current policy for advanced search criteria.

For the “Trunk Group Details” display, if a “TG Number” is specified for a search, then the identity of the “Near End” switch must be specified as well. If that TG Number is assigned in that switch, the display provides the data associated with that specific TG.

□

Feature 381, "TCP/IP Interface to *GTD*-5 Switches"

Purpose

The interface between NTM and the *GTD-5* Switch was subjected to rigorous testing to verify that the interface is stable, maintainable, conforms to established interface protocols, and supports all pre-existing NTM capabilities, where supported by the switch.

NTM supports a TCP/IP communications capability over an Ethernet LAN or WAN to the *GTD-5* Switch.

NTM assumes all of the NTM-related responsibilities of the DCC(s) that have, heretofore, been used to communicate with the switch.

Security

In addition, a system connection/security message structure was added to the functionality specified in the Telcordia Technologies' Technical Reference (TR) – TSY – 000740, "Stored Program Control System/Operations System – Network Data Collection Operating System (NDC OS) Interface (A Module of LSSGR, FR-64 and OTGR, FR-439)", Issue 3, December 1998.

This feature provides NTM with a Transmission Control Protocol/Internet Protocol (TCP/IP) communications capability over an Ethernet Local Area Network (LAN) or Wide Area Network (WAN) to the *GTD-5* Switch and its Local Access and Transport Area (LATA) Switching Systems Generic Requirements (LSSGR) – like interface.

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Increased Effectiveness of the NTM Data Collection. Increasing the speed and throughput of the data collection network may result in fewer switches reporting late data. Providing a reliable data network may result in fewer errors in the data reported. Communicating to all the switches in parallel, instead of today's serial communication through each DCC, may reduce the total time required to collect surveillance data and perform audits and controls. Together, these improvements may result in the network traffic managers having access to the latest network data quicker, thereby speeding up the start of their analysis and control actions.
- Increased Reliability of the NTM Data Collection. Removing the DCC from the data collection transport "path" eliminates a single point of failure in the current data collection architecture. The need to maintain time synchronization with the DCC, which is required to prevent lost data, is also eliminated. Each of these improvements may result in data collection being successful more often.

- Sustaining the NTM application's backward compatibility of the interface insures that vital pre-existing NTM capabilities continue to function where supported by the switch.
- Provides a transition from the *GTD-5* GPU to the new *GTD-5* OG interface.
- Provides a cost reduction by eliminating the need for many FEP and AI boxes when offices are transitioned to TCP/IP.

□

Feature 382, “Trunk Group Comment”

Purpose

This feature provides the customer with the ability to record a comment about a specific trunk group in the Trunk Group record base file, and view the comment on the Trunk Group Graphical User Interface (GUI) pages.

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Increased Productivity by providing the ability to record and view information regarding a specific trunk group without having to find the details elsewhere.

New capability

This feature adds a new capability to NTM. This capability allows a network traffic manager to enter details (a “comment”) about a trunk group in the Trunk Group record base file. The comment can be up to 80 characters in length, is stored in the NTM database, and is available for display on the Trunk Group GUI pages. On the Trunk Group Container page, the comment field is an available column to choose for the table layout. On the Trunk Group Detail page, the comment is shown with the reference data.

Feature 383, “Enhanced Support for *5ESS* Generic 5e16.2”

Purpose

The interface between NTM and Generic 5E16.2 of the *5ESS* Switch was subjected to rigorous testing to verify that the interface is stable, maintainable, conforms to established interface protocols, and supports all pre-existing NTM capabilities. Generic 5E16.2 of the *5ESS* Switch are an internally supported generic in NTM.

This feature provides for the certification of the *5ESS* Switch’s Generic 5e16.2. In addition, NTM provides support for the new Optical Interface Unit (OIU) module of the *5ESS*.

5-minute data

NTM supports a new 5-minute category of surveillance data that provides detailed call direction, e.g., incoming, outgoing, etc, data on TDM- and IP-transported calls. This data also identifies the number of calls that overflow from or switch between the TDM and IP networks, and vice versa. These call mix counts provides data on how traffic is being handled on the OIU.

NTM supports new 5-minute counts of surveillance data that provide the number of incoming calls answered and the number of outgoing calls answered for Bearer Independent Call Control (BICC) trunk groups that were affected by Reroute of Release.

IP and ICMP performance measurements

NTM supports the collection and display of new IP performance measurement, and ICMP performance measurements on a per-OIU basis. This data includes datagrams received/discarded (due to various error categories), ICMP messages received, ICMP messages received with errors, and ICMP echo request/reply messages received/sent.

Reference data

NTM supports a new “reference data” indicator from the *5ESS* Switch that specifically identifies a trunk group has having IP transport capabilities.

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Certification of the *5ESS* Switch's Generic 5E16.2 verifies that this version of the interface to the switch conforms to the established interface protocols.
- Thorough testing of the NTM functionality supported by the interface to Generic 5E16.2 of the *5ESS* Switch insures a stable, predictable interaction between the network traffic managers and the switch in support of the NTM domain.

- Sustaining the NTM application's backward compatibility of the interface insures that vital pre-existing NTM capabilities continue to function.
- Providing “internal support” of the Generic 5E16.2 of the *5ESS* Switch provides for accurate generic identification on the NTM application's browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with NTM.
- Better understanding of traffic flows through explicit call direction measurements for Time Division Multiplexing (TDM) - and IP - transport of calls.
- Monitoring of the IP transport of calls through the Optical Interface Unit (OIU).
- Collection of number of incoming and outgoing calls answered that were affected by a Reroute on Release.

□

Feature 385, “Trend Analysis”

Purpose

This feature provides a means to graph certain data over a period of time, thus providing a better view of the behavior of the network. This allows the network manager to graphically see measurements for a specific set of controls, network elements, or trunk groups, and how they varied during a particular time interval. Also, the user can see a graph for a specific measurement compared among network elements or trunk groups. These capabilities enable the network manager to monitor an event and follow its progress in order to fully understand the effects of controls and know how to take corrective action.

This feature retrieves current or historical data for a specific period of time, for 6, 12, 18 or 24 five-minute data collection periods (30 minutes to 2 hours), and presents the data graphically and in summary tables using the browser-based graphical user interface (GUI). If the period of time (trend window) includes the current data collection period, the page can automatically update every five minutes.

Displays

Each page allows the user to set the trend window and select the start time period, either the current data collection period or a historical data collection period, at which to begin the graph. The page shows a line graph of one to six items, each shown using a different color, with the time periods along the X-axis, and the measurement values along the Y-axis. The points on the graph reflects the total measurement for that time period. Three tables are displayed below the graph:

- The first table shows the total data count for each period in the trend window. The text showing the period in this table is a link that automatically performs a new search using that period as the starting point.
- The second table is a summary table to display the total for each measurement across the entire trend period (up to 2 hours).
- The last table contains the detailed data represented by the leading edge (most recent data period) shown on the graph. Only the top 25 records are shown.

The page contains a toolbar menu that includes the ability to go forward or back one period at a time, refresh the page, switch to auto-update mode (if viewing current data), change to projection mode, and format the page for printing.

Several new displays are provided and are integrated with existing GUI pages.

Call gap trend

This display is an option on the existing Call Gap page. The user can enter a code, CIC, and/or network element. The graph and corresponding data tables shows the attempts and successes for the code controls matching the search criteria during the trend window. The page also displays a link to a Service Attempts graph. The Service Attempts trend shows the number of service attempts and the number of calls blocked by mass calling controls based on the network elements entered in the search.

Machine data trend

This display is an option on the Network Elements container page, and allows the user to specify one or more network elements and one or a combination of measurements to be graphed and displayed in the associated tables. The measurements are a pre-defined list that can be changed in a site-specific file. The page can graph either multiple measurements, each using a separate color, or one measurement for multiple network elements, with each network element represented by a separate color for up to six lines on the graph. Some examples of what may be trended are:

- Total Incoming Machine Attempts (IMA) or Percent Total IMA across various network elements.
- LNP Queries and LNP Failures summed for all network elements specified as search criteria.
- Incoming, Outgoing, Terminating, and Originating calls summed for all network elements specified in the search.
- Various IMA counts summed for all network elements.

Trunk group trend

This display are an option on the Trunk Groups container page and allows the user to specify one or more trunk groups and one or a combination of measurements to be graphed and displayed in the associated tables. The measurements are a pre-defined list that can be changed in a site-specific file. The page can graph either multiple measurements, each using a separate color, or one measurement for multiple trunk groups, with each trunk group represented by a separate color for up to six lines on the graph. Some examples of what may be trended are:

- % Overflow across various trunk groups.
- Peg Count and Overflow summed for all trunk groups specified in the search criteria.
- Peg Count, Incoming Peg Count, %Occupancy, and Overflow summed for all trunk groups specified in the search.
- Attempts per Circuit per Hour, Incoming Connections per Circuit per Hour, and Outgoing Connections per Circuit per Hour, summed for all trunk groups specified in the search.

Reroute trend

This display is an option on the existing Expansive Trunk Group controls page. The user can enter a single trunk group. The graph and corresponding data tables shows the reroute attempts and successes for the trunk group specified in the search criteria during the trend window.

Feature 391, “SSL Support for the Browser-based GUI”

Purpose

This feature configures the web server on the NTM host to provide SSL encrypted communication between itself and a browser for the http protocol. By default, unencrypted communication between the web server and the browser remains available. However, an option to disable unencrypted http protocol communication is provided.

This feature also provides a set-up script so that the browser-based GUI can be accessed in one of the following modes:

- http or https (This is the default configuration. The user selects whether or not to access a page using SSL encrypted communication.)
- https only (Communication is always encrypted.)
- http only (Communication is never encrypted.)

□

Feature 394, "TCP/IP Interface to *4ESS* Switches via Datatek DT-4180"

Purpose

This feature provides NTM with a Transmission Control Protocol/Internet Protocol (TCP/IP) communications capability over an Ethernet Local Area Network (LAN) or Wide Area Network (WAN) to the *4ESS* Switch and its Local Access and Transport Area (LATA) Switching Systems Generic Requirements (LSSGR) – like interface.

Customer benefits

This feature provides customer benefits in one or more of the following areas:

- Increased Effectiveness of the NTM Data Collection. Increasing the speed and throughput of the data collection network may result in fewer switches reporting late data. Providing a reliable data network may result in fewer errors in the data reported. Together, these improvements may result in the network traffic managers having access to the latest network data quicker, thereby speeding up the start of their analysis and control actions.
- Sustaining the NTM application's backward compatibility of the interface insures that vital pre-existing NTM capabilities continue to function where supported by the switch.
- Provides a cost reduction by eliminating costly BX.25 on the HP platform support by transitioning the interface to TCP/IP.

Network

NTM will support a TCP/IP communications capability over an Ethernet LAN or WAN to a Datatek DT-4180. The Datatek DT-4180 will provide mediation and PAD support for the BX.25 interface to the *4ESS* Switch. One Datatek DT-4180 can provide support for up to 16 *4ESS* interfaces to NTM. However, NTM will only support the maximum allowed per BDR pair.

□

Feature 399, "Common Sign On"

Purpose

NTM can optionally authenticate user access requests through an external RADIUS server. The RADIUS server may be a customer embedded server, or the iAssure CSO product. With the iAssure CSO product, NTM supports the following capabilities:

- Standard RADIUS protocol authentication via a NavisRadius Server enhanced by application specific access policies.
- Administer primary and secondary RADIUS servers against which to authenticate users
- Set timeout parameters for authentication
- Allow administrators to define the authentication environment that will be in use: Standard or RADIUS server authentication. NTM can be switched between using standard authentication and RADIUS authentication if needed. Switching between authentication schemes can involve manually updating passwords.
- Ability to generate a list of currently defined users for the purpose of exporting this information to the CSO product for bulk import
- Support web navigation from the CSO product user administration pages to NTM user administration pages
- Migration path to Single Sign-On
- Integrated web GUI for administering user accounts
- CSO-supported password expiration and ineffective attempts locking

RADIUS server

If a customer-embedded RADIUS server is used then NTM supports:

- Standard RADIUS protocol authentication
- Administer primary and secondary RADIUS servers against which to authenticate users
- Set timeout parameters for authentication

Allow administrators to define the authentication environment that will be in use: Standard or RADIUS server authentication. NTM can be switched between using standard authentication and RADIUS authentication if needed. Switching between authentication schemes can involve manually updating passwords.

□

Feature 400, "System Hardware HP Platform and Performance Upgrade"

Purpose

This Feature transfers the appropriate NTM software Release 14 capabilities and functionalities to a new high performance HP hardware platform.

The NTM software Managers and Users will derive many advantages from this platform upgrade:

- A high availability, fault resilient platform
- Scalability of performance, CPU, Input/Output devices, disk space, expansion slots
- Symmetrical multiprocessing
- Significantly faster performance

Configuration Options

Three distinct configurations are available:

- large
- medium
- small

Large Configuration

The large configuration offers some significant capacity expansion over previous versions of NTM.The maximum number of internal entities supported by the database is:

- Standard Trunk Group (TG) Capacity Switches, (1A ESS, 5ESS, DMS, EWSD, GTD-5, LSSGR87): 1500. Starting with NTM Release 17.1 the value has been increased to 2000 for the *Linux* platform.
- Large TG Capacity Switches: 100. Additional expansion features can allow up to a total of 400
- 4ESS Switches: 16
- Data Collector Concentrators (DCCs): 120

Changes will also be made in other database capacity limits, including:

- Maximum number of TGs defined in the data base: 200,000
- Maximum number of historical data bases: 8
- Maximum number of controls stored in On-Line Control Log: 40,000

Changes will also be made in real-time operating limits. These include:

- Maximum number of TGs scheduled for simultaneous TG data collection under normal operations: 75,000
- Maximum number of TGs scheduled for simultaneous TG data collection under Backup and Disaster Recovery (BDR) Takeover Mode operations: 150,000
- Exceptions per 5-minute period; normal load: 2000
- Exceptions per 5-minute period; heavy load: 4000
- Ad-hoc data retrievals of 5 or less data items from 200 or less offices or TGs during a 5-minute interval: 3

Medium Configuration

The maximum number of internal entities supported by database is:

- Standard Trunk Group (TG) Capacity Switches: (1A ESS, 5ESS, DMS, EWSD, GTD-5 , LSSGR87): 800
- Large TG Capacity Switches: 50 . Additional expansion features can allow up to a total of 200
- 4ESS Switches: 10
- Data Collector Concentrators (DCCs): 60

Changes will also be made in other database capacity limits, including:

- Maximum number of TGs defined in the data base: 100,000
- Maximum number of historical data bases: 8
- Maximum number of controls stored in On-Line Control Log: 20,000

Changes will also be made in real-time operating limits, including:

- Maximum number of TGs scheduled for simultaneous TG data collection under normal operations: 35,000
- Maximum number of TGs scheduled for simultaneous TG data collection under Backup and Disaster Recovery (BDR) Takeover Mode operations: 75,000
- Exceptions per 5-minute period; normal load: 1000
- Exceptions per 5-minute period; heavy load: 2000
- Ad-hoc data retrievals of 5 or less data items from 200 or less offices or TGs during a 5-minute interval: 3

Small configuration

The maximum number of internal entities supported by database is:

- Standard Trunk Group (TG) Capacity Switches: (1A ESS, 5ESS, DMS, EWSD, GTD-5 , LSSGR87): 200

- Large TG Capacity Switches: 25. Additional expansion features can allow up to a total of 100
- 4ESS Switches: 10
- Data Collector Concentrators (DCCs): 30

Changes will also be made in other database capacity limits, including:

- Maximum number of TGs defined in the data base: 100,000
- Maximum number of historical data bases: 8
- Maximum number of controls stored in On-Line Control Log: 5,000

Changes will also be made in real-time operating limits. These include:

- Maximum number of TGs scheduled for simultaneous TG data collection under normal operations: 10,000
- Maximum number of TGs scheduled for simultaneous TG data collection under Backup and Disaster Recovery (BDR) Takeover Mode operations: 20,000
- Exceptions per 5-minute period; normal load: 1000
- Exceptions per 5-minute period; heavy load: 2000
- Ad-hoc data retrievals of 5 or less data items from 200 or less offices or TGs during a 5-minute interval: 3

Feature 402, "Nortel Softswitch Support"

Purpose

This feature provides support for the Nortel Succession generic sn06, along with the capabilities summarized below:

- Identification of the *MEVS* (Managed Enterprise Voice Service) component on the Succession. This is referred to in NTM as UAIP (Universal Access IP).
- Identification of SIP-T trunk groups.

Feature 403, "Nortel DMS GSP Network Element Support"

Purpose

This feature provides support for Nortel Networks GSP Switch. This Feature provides for the accurate storage, processing, collection, thresholding, and display of counts available from the Switch as well as controls and audits capabilities.

This Feature provides customer value in one or more of the following areas:

- Providing “internal support” of the Nortel GSP provides for accurate generic identification on the NTM software application's browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with the NTM software.
- NTM surveillance for those GSP Network Elements that incorporate the interface, by providing the network traffic managers with 30-second and 5-minute Surveillance Circuit Switch Data.
- NTM controls for those GSP Network Elements that incorporate the interface, by providing the network traffic managers with the trunk group (TG) based, protective and expansive control capabilities, to the extent they are supported by the open interface defined between Nortel Networks and Alcatel-Lucent.
- Service Quality, Sustained Call Completions, and Revenue Protection by providing the network traffic managers with new and more flexible control capabilities in the Nortel Networks family of switch products for use in responding to network events.

Feature 404, "Additional Data Support for Nortel Networks Sucession Switch"

Purpose

This Feature will provide the NTM software the capability to collect additional ATM measurements from the Nortel Networks Succession switch. The Multi-media Gateway 4000 (*MG4000*) and the Passport 15000 (*PP15K*) generate these measurements. The data is sent to the SuperNode Data Manager (SDM) in a comma-separated value format. From there, it is available for uploading to an OSS via FTP.

Currently the NTM software utilizes a TCP/IP network for communication with the SDM for collection of NM data from the Succession. This Feature will provide an additional data stream from the SDM to NTM. Initially, this new data stream will only be used to collect ATM counts that are also collected by the Alcatel-Lucent VitalEvent product. However, by creating this additional interface to the SDM, future expansion of the Succession data model is possible so that new Operational Measurement data packages can be collected. This will allow for more useful data to be presented to the network managers without having to modify the existing interface to the Succession.

Incorporation of this feature will also provide the customer with a better reference model for their Succession offices. Before this feature the Succession has only been identified as a single entity. In actuality, it can be made up of a number of dispersed component elements. These components may all reside in the same physical location or they could be spread hundreds of miles apart.

Feature 407, "Single Sign On for NTM"

Purpose

Single Sign-On (SSO) extends Feature 399, "Common Sign On" by reducing the number of logins required to access participating web applications. A successful login to one application enables access to all allowed applications.

In support of the SSO environment, the NTM software will be enhanced to receive a secure token generated by the *Navis* Identity Software (*Navis* ID). When the NTM software is first accessed and receives the token, it will verify the token with the *Navis* ID, and, if valid, will allow the user access without requesting the user to re-enter login and password information. If the NTM software does not receive a token, or if the token is not valid, it will prompt the user to enter login and password.

Feature 399, "Common Sign On" is a perquisite to this feature.

□

Feature 409, "TCP/IP Interface to 5ESS Switches via AI"

Purpose

This Feature provides the NTM software with a Transmission Control Protocol/Internet Protocol (TCP/IP) communications capability over an Ethernet Local Area Network (LAN) or Wide Area Network (WAN) to the 5ESS Switch using an Applied Innovation Inc.switch to convert the X.25 protocol.

This Feature provides customer benefits in one or more of the following areas:

- Sustaining the NetMinder NTM software application's backward compatibility of the interface insures that vital pre-existing NTM capabilities continue to function where supported by the switch.
- Provides a cost reduction by eliminating extra DCC boxes and their OSS support and providing a TCP/IP interface to the AI switch. Additionally, no switch feature upgrades are necessary for this interface.

The NTM software supports a TCP/IP communications capability over an Ethernet LAN or WAN to an Applied Innovation Inc. switch. The AI switch provides mediation and PAD support for the X.25 interface to the 5ESS Switch. One Applied Innovation Inc. switch is providing support for up to 50 5ESS interfaces to the NTM software. However, the NTM software only supports the maximum allowed per BDR pair.

Prerequisites

The following must be acquired:

- NTM software on an appropriately configured HP host platform
- properly configured Applied Innovation Inc. switch and the appropriate cabling
- properly equipped and engineered Ethernet between the NetMinder NTM software and the AI switch
- properly equipped and engineered X.25 network between the AI switch and the network element(s)
- License for the appropriate Release of the NTM software.

□

Feature 410, "TCP/IP Interface to DMS Switches via AI"

Purpose

This Feature provides the NTM software with a Transmission Control Protocol/Internet Protocol (TCP/IP) communications capability over an Ethernet Local Area Network (LAN) or Wide Area Network (WAN) to the Nortel Networks DMS family of switches using an Applied Innovation Inc.switch to convert the X.25 protocol.

This Feature provides customer benefits in one or more of the following areas:

- Sustaining the NTM software application's backward compatibility of the interface insures that vital pre-existing NTM capabilities continue to function where supported by the switch.
- Provides a cost reduction by eliminating extra DCC boxes and their associated OSS support and providing a TCP/IP interface to the AI switch. Additionally, no new switch features are needed to support this interface.

The NTM software supports a TCP/IP communications capability over an Ethernet LAN or WAN to an Applied Innovation Inc. switch. The AI switch provides mediation and PAD support for the X.25 interface to the DMS Switch. One Applied Innovation Inc. switch is providing support for up to 50 DMS interfaces to the NTM software. However, the NTM software only supports the maximum allowed per BDR pair.

Prerequisites

The following must be acquired:

- NTM software on an appropriately configured HP host platform
- properly configured Applied Innovation Inc. switch and the appropriate cabling
- properly equipped and engineered Ethernet between the NTM software and the AI switch
- properly equipped and engineered X.25 network between the AI switch and the network element(s)
- License for the appropriate Release of the NTM software.

□

Feature 414, "Additional OM Data Support for Nortel Networks Succession Switch"

Purpose

This feature will provide an interface between the Nortel Succession Super DataNode Manager (SDM), and the Network Traffic Management software for collecting OM TRK, OM OFZ, and OM ISUPERRS measurements required to perform critical network management, as made available by the SDM. These measurements will then be accessible to alerting and analysis tools that are part of the NTM software, to monitor both circuit and packet networks. This data will be available to assist the network manager in detection of abnormal events, evaluation of the scope of those events, and determination of a possible cause.

The NTM software will support the capabilities available through the Alcatel-Lucent' interface for the Succession Switch. The NTM software , will support the collection, processing, recording, storage, and display of additional office 5-Minute surveillance measurements available in the Succession office, including:

5-minute data

TG Surveillance Data

- The applicable 5-minute trunk group measurement counts are:
  - Incoming failure
  - Outgoing failure
  - Answers

Office Surveillance Data from Nortel Succession

- The applicable 5-minute office measurement counts are:
  - Outgoing match failures
  - Outgoing retrial match failures
  - Outgoing original seize failures
  - Outgoing retrial seize failures
  - Incoming calls to an announcement
  - Incoming calls to tone
  - Incoming calls to lockout
  - Incoming calls abandoned by the customer
  - Incoming calls abandoned by the machine

ISUP Data from Nortel Succession

- The applicable 5-minute ISUP measurement counts are:
  - ISUP Error bad

- ISUP Error blocking
- ISUP Error circuit group reset
- ISDN HOP counter expiry
- ISDN Error release message
- ISUP Release complete message
- ISUP circuit group message

Derived Data

The NTM software will support the creation, processing, recording, storage, and display of all “derived data measurements” associated with the “raw” measurements in all the currently supported categories of 5-Minute Surveillance Data.

NTM Compound Thresholding

The NTM software will support compound thresholding for the new TG Surveillance Data. This allows the data to be more rigorously evaluated resulting in displayed exceptions that are more apt to identify network problems.

Miscellaneous Functions

The NTM software will support a variety of polls and message types on the interface to the Nortel Succession for the management of the transmission of data between the NTM software and the switch.

Feature Benefits

This Feature provides support for Nortel Networks Succession Office with a new interface that allows for the collection of additional Operational Measurements (OM) groups, TRK, OFZ, and ISUPERRS. The feature provides for the accurate storage, processing, collection, thresholding, and display of counts available from the Office. This interface will incorporate File Transfer Protocol and be in addition to the existing TR-746 interface.

This feature provides customer value in one or more of the following areas:

- Providing “internal support” of the Nortel Succession SN06 provides for accurate generic identification on the NTM software application's browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with the NTM software.
- NTM surveillance for those Succession Network Elements that incorporate the interface, by providing the network traffic managers additional 5-minute Surveillance Circuit Switch Data.

- Service Quality, Sustained Call Completions, and Revenue Protection by providing the network traffic managers with additional data that can assist them in identifying and responding to network events.

□

Feature 415, "Browser-based Access to NetMinder Signaling Traffic Management (STM) data"

Purpose

This feature will provide access to VitalSTM data through the NTM software's Browser-based Graphical User Interface (GUI). Links will be provided on the NTM software user interface that will display signaling data collected by VitalSTM. This data will be presented to the user with the NTM software look and feel. These measurements will then be accessible to alerting and analysis tools that are part of the NTM software. This data can be used to monitor signaling networks and will be available to assist the network manager in detection of abnormal events, evaluation of the scope of those events and determination of a possible cause. Links back to NTM software data will also be provided where appropriate. Data that is part of VitalSTM's standard data model will be available on the NTM software displays.

Feature Benefits

This Feature provides Browser-based User Interface access to VitalSTM software data.

This Feature provides customer value in one or more of the following areas:

- Providing the NTM software application's GUI look and feel for VitalSTM software data, thereby enhancing the consistency of the network traffic manager's interactions with the NTM software.
- NTM surveillance for signaling data thus providing the network traffic managers additional 5-minute Surveillance Circuit Switch Data.
- Service Quality, Sustained Call Completions, and Revenue Protection by providing the network traffic managers with new and more flexible capabilities for use in responding to network events.

□

Feature 416, "Support of Nortel Succession IP Solution"

Purpose

This feature will provide an interface between the Nortel Succession Network Manager (SNM), and the NTM software for collecting packet related measurements required to perform critical network management, as made available by the SNM. These measurements will then be accessible to alerting and analysis tools that are part of the NTM software, for monitoring packet networks and will be available to assist the network manager in detection of abnormal events, evaluation of the scope of those events and determination of a possible cause.

The NTM software will support the capabilities available through the Alcatel-Lucent' interface for the Succession Switch. To accomplish this, the NTM software will incorporate the capabilities described for each of the following areas:

5-Minute Packet Surveillance Data from Nortel Succession

The NTM software will support the collection, processing, recording, storage, and display of packet related 5-Minute surveillance measurements currently available in the Succession Switch. These measurements are part of the enhanced Passport 15000 Performance Measurements (PM). Additional 5-minute measurements from the Passport 15000 may not be applicable for every customer configuration. Different measurements will be valid based on the configuration of the Passport 15000.

The applicable 5-minute measurement counts are:

- Incoming IP bytes
- Outgoing IP bytes
- Incoming IP packets
- Outgoing IP packets
- Incoming TCP packets not destined for a VSP
- Incoming UDP packets not destined for a VSP
- Incoming ICMP packets not destined for a VSP
- Incoming OSPF packets not destined for a VSP
- Incoming ARP packets not destined for a VSP
- Incoming other packets not destined for a VSP
- Outgoing TCP packets not originating from a VSP
- Outgoing UDP packets not originating from a VSP
- Outgoing ICMP packets not originating from a VSP

- Outgoing OSPF packets not originating from a VSP
- Outgoing ARP packets not originating from a VSP
- Outgoing other packets not originating from a VSP
- Incoming gateway to gateway voice bearer traffic packets
- Incoming gateway voice control packets
- Incoming premium network control traffic packets
- Incoming non-critical OAMP packets
- Incoming default forwarding packets
- Incoming other traffic packets
- Outgoing gateway to gateway voice bearer traffic packets
- Outgoing gateway voice control packets
- Outgoing premium network control traffic packets
- Outgoing non-critical OAMP packets
- Outgoing default forwarding packets
- Outgoing other traffic packets
- Incoming malformed IP packets
- Outgoing rejected packets
- Incoming local packets requiring exception handling
- Incoming forwarding packets requiring exception handling
- Incoming Continuous Bit Rate ATM Cells with CLP=0+1
- Incoming Real-time Variable Bit Rate ATM Cells with CLP=0+1
- Incoming Non-Real-time Variable Bit Rate ATM Cells with CLP=0+1
- Incoming Unspecified Bit Rate ATM Cells with CLP=0+1
- Outgoing Continuous Bit Rate ATM Cells with CLP=0+1
- Outgoing Real-time Variable Bit Rate ATM Cells with CLP=0+1
- Outgoing Non-Real-time Variable Bit Rate ATM Cells with CLP=0+1
- Outgoing Unspecified Bit Rate ATM Cells with CLP=0+1
- Incoming Continuous Bit Rate Setup PDUs
- Incoming Real-time Variable Bit Rate Setup PDUs
- Incoming Non-Real-time Variable Bit Rate Setup PDUs
- Incoming Unspecified Bit Rate Setup PDUs
- Outgoing Continuous Bit Rate Setup PDUs
- Outgoing Real-time Variable Bit Rate Setup PDUs

- Outgoing Non-Real-time Variable Bit Rate Setup PDUs
- Outgoing Unspecified Bit Rate Setup PDUs
- Incoming Continuous Bit Rate Setup failures
- Incoming Real-time Variable Bit Rate Setup failures
- Incoming Non-Real-time Variable Bit Rate Setup failures
- Incoming Unspecified Bit Rate Setup failures
- Outgoing Continuous Bit Rate Setup failures
- Outgoing Real-time Variable Bit Rate Setup failures
- Outgoing Non-Real-time Variable Bit Rate Setup failures
- Outgoing Unspecified Bit Rate Setup failures

Derived Packet Data Measurements for Nortel Succession

The NTM software will support the creation, processing, recording, storage, and display of all "derived data measurements" associated with the "raw" measurements in all the currently supported categories of 5-Minute Surveillance Data.

NTM Compound Thresholding

The NTM software will support compound thresholding for the packet Surveillance Data. This allows the data to be more rigorously evaluated resulting in displayed exceptions that are more apt to identify network problems.

Miscellaneous Functions

The NTM software will support a variety of polls and message types on the interface to the Nortel Succession for the management of the transmission of data, audits, and controls between the NTM software and the switch.

Feature 420, "Support of IWBM OM for Nortel Networks Succession"

Purpose

This Feature provides support for Nortel Networks Succession Switch with enhancements to the interface that allows for the collection of a new Operational Measurements (OM) group. This Feature provides for the accurate storage, processing, collection, thresholding, and display of counts available from the Switch. This interface will support both File Transfer Protocol and the TR-746 interface.

5-Minute Packet Surveillance Data from Nortel Succession

The NTM software will support the collection, processing, recording, storage, and display of packet related 5-Minute surveillance measurements currently available in the Succession Switch. These measurements are part of the IWBM OM. The Interworking Spectrum Peripheral Module (IW SPM) provides a mechanism to bridge between legacy and packet fabrics and generates these measurements. The applicable 5-minute measurement counts are listed below:

- Get_bridge attempts
- Get_bridge attempt failures
- Get_bridge attempts aborted
- Free_bridge attempts
- Free_bridge attempt failures
- Free_bridge attempts aborted

□

Feature 422, "Enhanced Security for Nortel Networks TR-746 Interface"

Purpose

This Feature provides enhanced security for the Nortel Networks Succession Switch SN08 for the Telcordia Technologies' Technical Reference (TR) – TSY – 000740, "Stored Program Control System/Operations System – Network Data Collection Operating System (NDC OS) Interface (A Module of LSSGR, FR-64 and OTGR, FR-439)", Issue 4, March, 2000 interface. That interface allows for the collection of 5-minute Network Management performance measurement data, application of network management controls, audits to ensure that data is synchronized between the NetMinder NTM software and the Succession Network Switch, and 30-second discrete messages. The connections shall be secured using the industry standard SSH security scheme. This Feature provides for the accurate storage, processing, collection, thresholding, and display of counts available from the Switch.

Feature Benefits

This Feature provides customer value in one or more of the following areas:

- Providing "internal support" of the Nortel Succession generic SN08 provides for accurate generic identification on the NetMinder NTM software application's browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with the NetMinder NTM software.
- Enhanced security for NTM surveillance on those Succession Network Elements that incorporate the interface.

Description

This Feature provides a scheme for securing the TCP/IP connections used for the TR-746 interface between the NetMinder NTM Software and the Nortel Networks Succession Switch via the SuperNode Data Manager (SDM). The connections between the NetMinder NTM Software and the SDM are established using an SSH technique known as local port forwarding. Port forwarding allows forwarding of TCP/IP connections to a remote machine over an encrypted channel and allows those forwarded ports to be used securely by other TCP/IP-based applications. All data flowing through the forwarded port is automatically encrypted and authenticated. Each of the three connections initiated by the NetMinder NTM software (controls/30 second discretes, 5 minute measurement data, and audits) must be separately port-forwarded.

This Feature impacts the setup of the initial configuration for connection to the SDM. However, after that initial configuration, any impact of the changes implemented for this Feature is transparent to the users.

In that some SDMs may not be equipped with this capability, NTM software and configuration must allow for the selection of normal TR-746 connections. This is selectable on a switch-by-switch basis.

Feature 431, "TCP/IP Interface to *4ESS* Switches via AI Switch"

Purpose

This Feature provides the NTM software with a Transmission Control Protocol/Internet Protocol (TCP/IP) communications capability over an Ethernet Local Area Network (LAN) or Wide Area Network (WAN) to the *4ESS* office.

Feature Benefits

This Feature provides customer benefits in one or more of the following areas:

- Sustaining the NTM software application's backward compatibility of the interface insures that vital pre-existing NTM capabilities continue to function where supported by the switch.
- Provides a cost reduction by eliminating costly BX.25 on the HP platform support by transitioning the interface to TCP/IP.
- Increased Effectiveness of the NTM software Data Collection.
- Increasing the speed and throughput of the data collection network may result in fewer switches reporting late data.
- Providing a reliable data network may result in fewer errors in the data reported.

Together, these improvements may result in the network traffic managers having access to the latest network data quicker, thereby speeding up the start of their analysis and control actions.

Descripition

The NTM software will support TCP/IP communications capability over an Ethernet LAN or WAN to an Applied Innovation, Inc. AI296 card. The Applied Innovation, Inc. AI296 card will provide mediation for the BX.25 interface to the *4ESS* Switch. One AI296 can provide support for up to 16 *4ESS* interfaces to the NTM software. However, the NTM software will only support the maximum allowed per BDR pair.

□

Feature 432, "Enhanced Security for Nortel Networks Using sftp"

Purpose

This Feature provides support for Nortel Networks Succession Switch SN08 with security enhancements to the file acquisition methods used to pull performance management CSV files from the SuperNode Data Manager (SDM). Releases of Nortel Networks Succession Switch prior to SN08 allowed ftp of CSV files from well known directories. This feature allows for the use of the sftp utility for file transfer, providing a more secure channel for this process. Once the CSV data is acquired, it is subject to NTM normal data handling: accurate storage, processing, collection, thresholding, and display of counts available from the Switch.

Feature Benefits

This Feature provides customer value in one or more of the following areas:

- Providing "internal support" of the Nortel Succession generic SN08 provides for accurate generic identification on the NetMinder NTM software application’s browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with the NetMinder NTM software.
- NTM surveillance for those Succession Network Elements that incorporate the CSV interface implemented in a more secure manner.

Description

This feature provides a scheme for securing the file transfer connections between Nortel Networks Succession SDM and NTM by utilizing secure ftp (sftp), a utility provided by SSH implementations.

This Feature impacts the setup of the initial configuration for connection to the SDM. However, after that initial configuration, any impact of the changes implemented for this Feature is transparent to the users.

In that some SDMs may not be equipped with this capability, NTM software and configuration must allow for the selection of ftp file transfer. This is selectable on a switch-by-switch basis.

□

Feature 433, "Support of Nortel Networks Succession SN08 Interface from SDM/CBM"

Purpose

This Feature provides support for Nortel Networks Succession Switch SN08 with enhancements to the interface that allows for the collection of a Performance Management (PM) file from a new machine called the Core and Billing Manager (CBM). This machine can be used in the network as the PM data repository, instead of the existing repository – the SuperNode Data Manager (SDM). This Feature provides for the accurate storage, processing, collection, thresholding, and display of counts available from the CBM. This interface will support both File Transfer Protocol and the TR-746 interface. There are no known software changes between the CBM and the SDM from an NTM point of view.

Feature Benefits

This Feature provides customer value in one or more of the following areas:

- Providing "internal support" of the Nortel Succession generic SN08 provides for accurate generic identification on the NetMinder NTM software application's browser-based Graphical User Interface (GUI) and any application- or user- generated reports, thereby enhancing the consistency of the network traffic manager's interactions with the NetMinder NTM software.
- NTM surveillance for those Succession Network Elements that incorporate the interface via the CBM.

Description

This feature provides an interface between the Nortel Succession Customer Billing Module (CBM) and the NetMinder NTM software that allows for the collection of 5-minute Network Management performance measurement data, application of network management controls, audits to ensure that data is synchronized between the NetMinder NTM software and the Succession Network Switch, and 30-second discrete messages. The CBM provides the same interface as the existing PM data repository, the SDM. Measurements are accessible to alerting and analysis tools that are part of the NetMinder NTM software, as appropriate, for monitoring the network and are available to assist the network manager in detection of abnormal events, evaluation of the scope of those events and determination of a possible cause.

Feature 436, "UDDM/UDNEI"

Purpose

In order to increase the speed by which the Network Traffic Management system can support new network element types and their associated data types, a new software feature is developed to add flexibility to the NTM software platform to allow end users and consultants (who have some basic programming skills) to extend NTM. The extensions include a User Defined Data Modeling (UDDM) capability, thresholding of data types defined via UDDM, User Defined Network Element Interfaces (UDNEI), and a transformation capability to map data collected via UDNEI to the data model established via UDDM.

UDDM

With UDDM, users can employ a simple tool to extend the NTM database. This tool allows the specification of new data types for periodic data, for reference data, for threshold data, or for any table that the user desires. Once the specification is loaded into the system, physical tables will be created to house the data. If a new periodic data type is defined along with companion reference and threshold tables, NTM's processing engine will allow the specification of threshold processing rules equal to those provided by Feature 189, "Replacement Thresholding Capability for Trunk Group Data".

UDNEI

In order to collect data to populate a newly defined data model, NTM will introduce the UDNEI capability. This capability includes several re-usable data collectors, but also the framework to allow users to provide their own data collection software. In addition, once the data is acquired, a specification driven engine can be employed to map the acquired data to the newly defined data model. This tool will have the capability to map fields, perform calculations and thresholding, and perform reference data lookups as needed.

Benefits

All data collected and processed via these capabilities will be available to the NTM Web-based graphical user interface. Any threshold exceptions will be displayed on the NTM alert screens (both tabular and maps). In addition, a new tabular page will be developed that will display data for any UDDM data type in a manner entirely consistent with current NTM data pages. These NTM data pages are referred to as "container" and "detail" pages.

□

Feature 437, "Enhanced Thresholding and Analysis"

Purpose

The main function of NTM is to collect periodic data from network elements about network objects. For each object for each period of data collection, the data is subjected to threshold tests and failed threshold tests are reported as alerts on various GUI screens. In general, the user must decide how to react to those alerts. The user may decide to invoke a control right away, or wait another period to make sure the alert is persistent, or try and look at other data in the system to help understand the event and its impact on the network. This feature is intended to help the user in this last task – to look at related data from other objects and/or to look at data from previous reporting periods for the object generating the alert.

Benefits

This functionality is broken into 2 parts. The first part is a framework for adding new event analysis jobs. The second is the jobs themselves. The framework is comprised of a set of software that understands that a set of event analysis jobs have been defined. Its function is to make sure that these jobs get executed, that any alerts generated from these jobs get posted to the GUI, and that the jobs terminate gracefully. The individual jobs are defined to perform the cross-object or historical data analysis.

Since NTM release 15 introduced the Oracle RDBMS as the data repository for periodic and reference data, all event analysis jobs are using Oracle as their source of data. Once the data has been “analyzed” – this would usually involve some type of cross-object or cross-time aggregation – the resultant data must be subject to threshold testing and alerting. This feature will rely on Feature 436, "UDDM/UDNEI" to achieve that function. The resultant data is passed on to a Configurable Converter (CC).

□

Feature 438, "Support for NexTone Session Border Controller"

Purpose

A Session Border Controller (S/BC) is a network device that may be deployed in certain VoIP architectures at the “edge” of the network. One of its main functions is to “bridge” 2 connections (that are really part of the same user session) between 2 networks, namely the network to which the S/BC belongs and some peer network. For VoIP, the S/BC would bridge 2 RTP connections. Of course, calls may originate from the network to which the S/BC belongs OR from the network that the S/BC is bridging to. The S/BC will typically support the Session Initiation Protocol (SIP), among other protocols, to setup and tear down connections.

Functionality

The Network Traffic Management software system supports the S/BC available from NexTone. In particular, NTM will support 5-minute data for signaling counts as well as for quality of service (QOS) on the media path. In addition, NTM supports a message throughput control on the S/BC.

RTP connections are both terminated at and originated from the S/BC. A typical scenario may involve the S/BC accepting a connection from its peer network. The S/BC in turn will query (SIP INVITE) an application server in order to determine the media (or bearer) path required for the call. Once the address of that media destination is known, a second RTP connection is made to that end point. It is these 2 RTP connections that are bridged. In the case of NexTone, as the user session is terminated, a Session Detail Record (SDR) is logged for each of the connections. These SDRs are forwarded to the NexTone Real-time Session Manager (RSM).

NTM interacts with the RSM to both collect 5-minute performance data and to audit and edit the message throughput control. Both the 5-minute performance data and the control interface will employ Web Services (via SOAP/XML). The 5-minute performance data interface allows for the specification of an “SQL-like” object that aggregates the SDRs that are resident on the RSM. The control interface allows for the reading/auditing of current control parameters settings as well as for the editing of those parameters.

The data model on NTM relies on 2 reference tables and will utilize the query interface of the RSM to populate 5 periodic tables. The RSM itself will be considered the “network element” that is placed in NTM’s RSPTE table. Each S/BC can support a number of EndPoints (for both signaling and media). The Signalling EndPoints each belong to some realm.

□

Feature 439, "NTM Support for BroadSoft BroadWorks"

Purpose

BroadWorks is a leading application and feature server as defined in the IP Multimedia Subsystem (IMS) architecture. In the IMS architecture, user profile information and service logic are extracted from the access networks and consolidated in BroadWorks, enabling providers to deliver services to users regardless of the underlying network.

Functionality

This feature supports 5-minute data collection and thresholding for the following 3 parts of the BroadWorks architecture: Application Server, Media Server, and Network Server. This support is applicable to both release 13.0 and 14.0 of BroadWorks.

Application Server

The Application Server operates at the core of BroadWorks and is responsible for the execution of enhanced personal and group features. The Server's database maintains user and group profiles, as well as service and subscription data. Key functionality includes management of network traffic and handling of signaling interfaces.

Media Server

The Media Server enables providers to rapidly go to market with a broad array of media-based features. The Media Server provides features typically found in multiple servers, including Unified Messaging, IVR, Auto Attendant, Lawful Intercept, service announcements, and media mixing.

Network Server

The Network Server enables BroadWorks to achieve massive scalability and geographic redundancy. The server also provides network level applications such as least-cost routing and E911 support as well as enterprise-focused network applications such as Voice VPNs and web-configurable private dial plans.

□

Feature 440, "UDNEI SSH Support"

Purpose

This feature is intended to supplement the existing UDNEI Normalizer functionality by adding SSH communication capability. It can be used in place of the Telnet normalizer functionality where a secure connection is desired. It does not extend the UDNEI framework in any way.

Feature 455, "Support for NexTone Session Border Controller Outbound Call Limiting"

Purpose

The feature supports a new control termed the Outbound Call Limiting (OCL) control. This control allows an administrator of a NexTone S/BC to filter or limit the number of outgoing calls at different levels. Specifically, the administrator can choose to limit the number of SIP INVITES allowed per period of time for a destination telephone number, an IP of the machine that would next receive the SIP invite, or a realm name of the realm that would next receive the SIP INVITE.

Functionality

This feature provide a means for NTM to:

- Define new OCL controls.
- Apply those controls to individual S/BCs (via the RSM interface).
- View the current OCL controls on the NTM GUI – along with associated 5-minute periodic data on control impact.
- Audit the current state of OCL controls existing on the S/BCs.
- Disable any currently active OCL control.

□

Feature 460, "Periodic Data Aggregation"

Purpose

The 8920 NTM main data processing engine collects periodic data, performs calculations, runs threshold tests, and presents the results to users in near-real time. This feature provides periodic data aggregation at hourly, daily, and monthly levels. The aggregated data are being made available in tables stored in the 8920 NTM relational database. Thus, this feature can be used to support report writing on aggregated tables. The feature is also the foundation for Feature 461, "Statistical Thresholds".

The Periodic Data Aggregation feature allows a user to choose whether they want aggregations performed for a given UDDM periodic data table. In addition, the user is able to choose the level of aggregation desired.

This feature relies on Feature 436, "UDDM/UDNEI".

Feature 461, "Statistical Thresholds"

Purpose

8920 NTM currently provides a rich set of threshold testing capabilities on the data it collects. In general, network data can be tested against predefined values in order to grade the quality of performance. Passing the threshold test for a network object signifies adequate performance. Threshold test failures can be graded into severity classes of minor, major, and critical.

Another type of threshold testing is introduced by this feature. Statistical thresholding aims to discern if the performance of a network object is different than it has been in the past. This feature is beneficial in cases where the user is unfamiliar with the performance behavior of the network object and want to compare current behavior with history. In order to perform this style of threshold testing, a performance system must track the historical performance of a network object in order to create an historical mean that is then compared to newly reported values. In 8920 NTM, such historical averages are computed from data saved by a separate Feature 460, "Periodic Data Aggregation".

12 Training Objectives and Exercises

Overview

Purpose

This Appendix contains objectives and exercises that accompany Alcatel-Lucent Learning course number OS3119.

Objectives

This course provides a detailed functional overview of NTM. It is designed to enable the student to:

- Describe the system hardware and software
- Use system commands
- Identify procedures and commands used for database management
- Describe data flow

Course locations

Courses can be taught at your location. Call 1-614–860–5040 for suitcasing requirements. Enrollment: https://www.alcatel-lucent.com, or 1-888-Lucent8 (888-582-3688), prompt 2, prompt 2

□

Chapter 2, “System Functions”

Objectives

This lesson is designed to teach you how to:

- Differentiate between types of system data
- Identify various network elements
- Activate and deactivate element Interfaces
- List error detection formats
- Explain internal system timers
- Determine an “Exception”

Exercises

1 What is the difference between Surveillance Data and Reference Data?

_____

_____

_____

2 What is an example of a Network Element?

_____

3 What command do you use to activate and deactivate element interfaces?

_____

4 You enter an audit command at the command prompt and the system response is NG. What has happened?

_____

5 At what point in the data collection process is discrete data considered late?

_____

6 At what point are discretes from a network element considered “missing”?

_____

7 At what point is measurement data considered late?

_____

8 At what point is measurement data considered missing?

_____

9 What is an “Exception”?

_____

□

Chapter 3, “Network Management Reference Data”

Objectives

This lesson is designed to teach you how to:

- Describe the difference between external and internal offices
- Describe the different reference data types
- Describe the NTM databases

Exercises

1 What is the difference between external and internal offices?

_____

2 Fill in the blanks with the following choices:

Five	**Three**	**Fifty**	**Ten**	**175**	**128**	**Eight**

The NTM database contains _____ trunk group threshold tables. Each table contains _____ entries (or indices). Each entry (or index) contains up to _____ threshold values for each of the trunk group exception calculations to be performed. Each index contains a maximum of _____ calculations.

3 Match the database types in Column A with the function in Column B.

	Column A		Column B
___	Temporary Database	A	This is not a database, but a set of standard Linux directories of ASCII files.
___	Historical Databases	B	This database is used as a testing location to ensure that changes made to record base files will not cause database errors.
___	Offline Database	C	The system runs on this database which contains reference, surveillance, and control data.
___	Current Database	D	The modified files remain in this database until the installdb command copies them into the current database.
___	Record Base	E	There are eight of these databases. When the contents of the oldest databases are overwritten by the dayend process, that database becomes the "youngest" database.

□

Chapter 4, "Surveillance Data"

Objectives

This lesson is designed to teach you how to:

- List the two kinds of surveillance data and explain the difference

Exercises

1 Surveillance data is collected periodically by NTM from the network offices for two types of data. Name the two types.

_____

_____

2 Describe the two types of surveillance data you listed in Question 1.

_____

3 Match the measurement data types in Column A with the function in Column B.

	Column A		Column B
___	Trunk group data	A	Consists of information about the status of links and linksets and other elements.
___	Signaling system data	B	Consists of information about controls at the office.
___	Control data	C	Consists of trunk group measurements on assigned trunk groups.
___	Machine or entity data	D	Consists of information about hard-to-reach codes.
___	Destination data	E	Data categories vary from one office type to another.

□

Chapter 5, "Thresholds"

Objectives

This lesson is designed to teach you how to:

- Define thresholds
- List exception types and levels and how they are used
- Explain how calculations are derived

Exercises

1 What is a threshold?

2 Fill in the exception levels.

Data marked with level from…	Is shown on Displays as what color?
1 - 3	
4 - 7	
8 - 10	

3 What does exception level 0 mean?

_____

4 `True or False:` Data such as percentages are collected from the switch every data collection period, typically 5-minutes.

_____

□

Chapter 6, “Audits and Controls”

Objectives

This lesson is designed to teach you how to:

- Explain what audits are and what they do
- Explain what controls are and what they do
- Differentiate between regular audits vs. schedule audits vs. discrete triggered audits
- Explain manual controls vs. automatic controls

Exercises

1 `True or False:` A regular audit brings the appropriate data to NTM from the office then compares data in its current database with the office database. If differences are found, the office data overwrites the software data in the current database. A schedule audit works in the opposite direction.

_____

2 What are the two subtypes of regular audits?

_____

3 What is the difference between manual and automatic controls?

Chapter 7, "Hard-To-Reach (HTR)"

Objectives

This lesson is designed to teach you how to:

- Explain how HTR Status is determined
- List actions related to HTR

Exercises

1 How is the automatic HTR status calculated by the *4ESS* switch?

2 Circle which of the following is not an action related to HTR.

- Populating Record Base files
- Using Peg Counts (Bids)
- Using GUI pages
- Using HTR commands

Chapter 8, “Accessing Historical Data”

Objectives

This lesson is designed to teach you how to:

- Use Dejavu
- Recognize conditions under Dejavu may not be accurate

Exercises

1 List three things that Dejavu enables the network manager to do.

_____

_____

_____

_____

2 `True or False:` Dejavu enables network managers to view 12-hour records of surveillance data.

_____

3 Under what conditions would Dejavu ***not*** be accurate?

_____

_____

□

Chapter 9, “NTM Network Management”

Objectives

This lesson is designed to teach you how to:

- Determine an event indicator (discretes)
- Describe measurement data
- Describe trunk group performance indicators

- Recognize relationships between trunk groups and performance indicators
- Determine network attempts, ineffective network attempts and ineffective machine attempts
- Name switch measurements
- Identify machine problems

Exercises

1 Name the two kinds of discretes.

_____

_____

2 Name three types of measurement data that may be forwarded to NTM from the offices.

_____

_____

_____

3 What is Overflow?

_____

4 What formula do you use to calculate an ACH for more than one hour?

_____

5 Give one example for a relationship between an ACH, OCCH, and HT.

_____

6 What is a Network Attempt (NA)?

_____

7 What is an Ineffective Network Attempt (INA)?

_____

8 What is an Ineffective Machine Attempt (IMA)?

_____

9 Name two subcategories of LNP attempts.

_____

10 What is an MC2?

_____

Chapter 10, "NTM Engineering Guidelines"

Objectives

This lesson is designed to teach you how to:

- Identify hardware and software constraints

Exercises

1 What is the maximum number of TCP/IP connected network elements allowed without any optional features?

_____

_____

2 How many threshold tables does NTM allow?

_____

3 What is the database limits on Pooled Trunk Groups?

_____

4 What is the maximum office name length?

_____

Glossary

%%OCC Percent Occupancy

The fraction of time that a circuit or a piece of equipment is in use, expressed as a decimal. Numerically, it is the Erlangs carried, and it equals the carried CCS divided by 36. Percent occupancy measurements include both message time and setup time.

%OFL Percent Overflow

The relationship between the total attempts offered in a specific time period to a route or a destination and the number of attempts not finding an idle circuit.

AAB A-B trunk group

A trunk group that connects an originating office (A) directly to a terminating office (B). See "AV" (p. 3) and "VB" (p. 25).

ACC Automatic Congestion Control

Senses machine congestion and activates preplanned internal and external overload controls. Also called/see also DOC. See the acc command (4-9) in the *Input Commands Guide*.

ACG

Automatic Call Gap

ACH Attempts per Circuit per Hour

Relationship between the number of attempts that result in an answer signal and the total number of attempts.

ACM Address Complete Message

A messages sent in the backward direction indicating that all the address signals required for routing the call to the called party have been received.

Activate
To make an office active for data collection.

ADL-V
AT&T Digital Link — Phase 5

Aggregated Trunk Group
An aggregated trunk group is not a physical trunk group but rather a collection of all traffic information on trunk groups to a particular "to office", represented with a unique trunk group ID. In this way, controls can be sent to a 7R/E switch for a given "to office" by specifying the tg ID of the aggregated trunk group.

Aggregation Limit
Date and time limit you can set on the aggregation view to limit the number of records that will appear in your report.

AIC Available Idle Circuits
A traffic measurement used by network managers to determine which trunk groups have capacity available for rerouting traffic from an overloaded trunk group.

AIN Advanced Intelligent Network Also called an Intelligent Network) A network:

- That affects the routing of calls within it from moment to moment based on a criteria other than simply finding a path through the network for the call
- Where the originator or the ultimate receiver of the call can inject intelligence into the network and affect the flow of his call (either outbound or inbound).

Intelligent networks generally include SCP, SSP, and STP components.

Alarm
Visible report of a trouble condition in the network. Alarms usually require immediate attention from network personnel.

Alert
Visible report of a potential trouble condition in the network.

Alerting Discrete
An on/off indicator that notifies network managers of changes to the status of the office. An alerting discrete provides a message to NTM that starts a corresponding audit (unless that audit has been previously inhibited by the network manager).

Allow
Indicates the permitting of an action, such as permitting automatically triggered audits to run.

Alternate Routed Traffic
Traffic that has been offered to a previous trunk group and has not been able to find an idle circuit. The switching system handling the traffic then offers it to an "Alternate Route," based on its internal routing tables.

Alternate Routing
A means of selectively distributing traffic over a number of routes, ultimately leading to the same destination.

APC
Adjacent Point Code

APR Allow Previously Rerouted
A trunk group reroute control option that allows previously rerouted traffic to reroute. Only *4ESS* and *5ESS* offices support this reroute control option.

APS
Attached Processor System

ASCII American Standard Code for Information Interchange
A 7-bit code for providing as many as 128 different characters. An eighth bit can be added as a parity check for error detection purposes.

ASP
Advanced Services Platform

ATM Asynchronous Transfer Mode
A high bandwidth, low-delay, connection-oriented, packet-like switching and multiplexing technique that allows very high speed transmission.

Attempt
An attempt to seize a circuit in a route. An attempt may be successful or unsuccessful.

Audit
An integrity check through which NTM corrects differences between its own database and office databases.

AV
A-V (via) trunk groups. A trunk group that connects an originating office (A) to a via office (V). See "AB" (p. 1) and "VB" (p. 25).

BBacking Up

The process of copying data onto a separate medium for the purpose of data retention.

BDR Backup and Disaster Recovery

See Feature 8, “Disaster Recovery (Duplex)”and Feature 40, “Enhanced Disaster Recovery” in the *System Overview*.

Blocking

The inability of the calling party to be connected to the called party because either all suitable trunk paths are busy or a path between a given inlet and any suitable free outlet of the switching network is unavailable.

Broadcast Message

A text message sent out by personnel using the NTM to other users on the system.

CCalculation

Calculated counts used to signify changing network conditions and, when thresholded, to alert network managers to events that might require action to prevent excessive network congestion.

CAMA Centralized Automatic Message Accounting

Specific version of AMA in which the ticketing of toll calls is done automatically at a central location for several central offices.

CANF Cancel From

A post-hunt protective trunk group control that prevents a percentage of overflow traffic for a selected originating trunk group from advancing to any alternate route. See the canf/cant/skip command (4-13) in the *Input Commands Guide*.

CANT Cancel To

A pre-hunt protective trunk group control that prevents a percentage of traffic from accessing a selected destination trunk group. See the canf/cant/skip command (4-13) in the *Input Commands Guide*.

CCIS Common Channel Interoffice Signaling

Carries telephone signaling information along a path different from the path used to carry voice.

CCITT

Consultative Committee on International Telegraphy and Telephony

CCS Centi (Hundred) Call Seconds
A unit of traffic used to express the average number of calls or the average number of devices in use. One CCS is equal to the continuous load for 100 seconds. The CCS for an hour is 36.

CCS Common Channel Signaling
A form of signaling in which a group of circuits share a signaling channel.

CCS7-NA
North American Version of CCITT#7

CG Call Gap
A protective control that allows a fixed number of calls to succeed to a code (telephone number) in a 5-minute interval. See the cg command (4-21) in the *Input Commands Guide*.

CGX
Call Gaps with an IC prefix (*1AESS* only)

CICR Cancel In-Chain Return
A reroute trunk group control option. When set to YES, does not allow traffic to return to in-chain routing. When set to NO, allows traffic to return to in-chain routing.

CLI
Caller Line Identification

Client
A client uses the resources of another device (computer) or application. Client is another term for a PC on a local area network.

CLLI
Common Language Location Identifier

CNI
Common Network Interface

Code
A numbering system for telephone addresses, for example, 614-555-1234 (NPA-NXX-XXX).

Connection
An attempt for a circuit that succeeds in obtaining a circuit. Also called a seizure.

Container Page
One of the five basic types of pages used in the GUI. It displays the results of a search or a map of a network area.

Control Data
Data that describes the actual controls in place for the network.

CPE
Customer Premises Equipment

CPU
Central Processing Unit

CR
Critical Alarm

CR Circuit Reservation
An automatic trunk group control that reserves the last few trunks of a trunk group for critical users exclusively and eliminates the need to queue critical users for inter-switch trunks. See also/also called STR. See the cr command (4-32) in the *Input Commands Guide*.

Crash Dump
The output from the hardware registers, the hardware stack, and the CPU.

CRO Cancel Rerouted Overflow
A reroute trunk group control option that prevents overflow traffic on a via route (VB) from overflowing back to the direct route (AV). Not activating the CRO can result in an external loop.

CSL
Communications Software Launcher

Customer Premises Equipment
All telecommunications terminal equipment located on the customer premises.

DDatabase
A collection of data organized for rapid search and retrieval by a computer.

DCC
Data Collection Concentrator

DCE
Distributed Computing Environment

DCS
Display Construction Set

Deactivate
To make an office inactive for data collection.

Demand Data

Data retrieved by the demand command (5-20) from the system database. The User Report Writer feature and SQL files use this data to create informational reports.

Destination

A specified area or country in which the called subscriber is located. A destination is identified by its destination code (the digits used for routing the call).

Detail Page

One of the five basic types of pages used in the GUI. It provides information (such as reference data) on specific network elements or network connections.

Direct Routed Traffic

Traffic that is being offered to the trunk group for the first time, not having been previously offered to a different trunk group. This traffic, which has not alternate routed, is sometimes called “First Routed” traffic.

Discrete

An on/off indicator that notifies network managers that:

- Changes have been made to the status of the office
- Significant events have taken place within the office

NTM polls the offices for discretes at regular intervals.

Disk Array

A disk subsystem combined with management software that controls the operation of the physical disks and presents them as one or more virtual disks to the host computer.

DOC Dynamic Overload Control

Also called/see also ACC

Domain

A type of calling service, such as POTS (Plain Old Telephone Service), ACNT (*Accunet*), SDN (Software Defined Network), or ISDN (Integrated Services Digital Network).

Dot Profile (.profile)

A file located in your home directory that alters your default *Linux* system environment. You can use your .profile to define environmental variables such as your terminal type, prompt string, or mailbox address.

DP

Dial Pulse

DPT

Dynamic Packet Trunks

DPTPRI
Dynamic Packet Trunks Prioritization

DPTRES
Dynamic Packet Trunks Reservation

DPTTID
Dynamic Packet Trunks Terminal Identifier

DSC
Dynamic Service Control

DSDC Direct Services Dialing Capability
Network services provided by local switches interacting with remote databases via CCIS.

DTMF
Dial Tone Multifrequency

DTS
Dial Tone Speed

EEA Equal Access
A trunk group reroute option for switches that limits the reroute to equal access traffic.

EADAS Engineering and Administration Data Acquisition System
A system in which traffic data are measured at switching systems by electronic devices, transmitted to a centrally located minicomputer, and recorded on magnetic tape in a format that is suitable for computer processing and analysis. Performs data collection in NTM for certain switch types.

Erlang
A measurement of traffic load equal to the continuous occupancy of one circuit (or unit of equipment) for one hour. An Erlang can express the capacity of a system; for example, a trunk group of 30 trunks, which in a theoretical peak sense might carry 30 Erlangs of traffic, would have a typical capacity of perhaps 25 Erlangs averaged over an hour.

Error Code
An identification field used to identify the module or feature reporting the error. See the **ERR_CODE** field help file.

Error Log
The error log is a file that contains the error messages being generated by NTM. See the errlog command (9-7) in the *Input Commands Guide*.

Error Messages
System responses resulting from software-detected errors, changes in the system status, or non-executable commands.

Error Number
Number associated with error codes that help identify specific messages. See the **ERR_NUM** field help file.

ESP
Essential Service Protection Triggered

ESS
Electronic Switching System

ETR Easy To Reach
A code (telephone number) is determined to be easy to reach because the attempts and failures to the code do not exceed user-defined thresholds.

Exception
A calculation based on office or trunk group data that exceeds a user-defined threshold. It indicates an abnormal working condition in the network.

Exception Level
A number associated with an exception, indicating the severity or priority of the exception. High-numbered exception levels are more severe.

Exception Processing
Process used to collect raw data from the switch, perform calculations on the data, and, as a result, find exceptions based on predefined thresholds.

Exception Report
Formatted report of all exceptions that have occurred during the most recent 5-minute period.

Execution Error
The NTM GUI presents error messages in response to conditions such as improper permission, execution errors, etc. Execution errors are related to the execution of requests that affect the network elements to which the NTM host is connected (e.g., control requests or HTR administration).

External Network Element
A network element that is defined in the NTM Record Base but for which surveillance data is not received by NTM.

FFEP Front-End Processor

An application that acts as a DCC. Available with purchase of Feature 214, "FEP Release 4" or Feature 257, "FEP Release 5".

FHC

Final Handling Code

Final Trunk Groups

A trunk group that acts as a final route for traffic. Traffic can overflow to a final group from high-usage groups that are busy. Traffic cannot overflow from a final trunk group. Calls that overflow a Final Trunk Group are terminated unless they are rerouted by an NTM Reroute control. See the rr command (4-44) in the *Input Commands Guide*.

FML Field Manipulation Language

A set of C-language functions for defining and manipulating data storage structures called fielded buffers.

FOO

A foo is a term universally substituted for something real when discussing ideas or presenting examples.

From Office

Internal network element that originates the trunk group.

FSD

Feature Specification Document

Full Create

The process of constructing the database itself (once the database files have been prepared) or making major database modifications through the use of the `create` command with no arguments. This process also modifies the offline database.

Full Trunk Group

A trunk group that does not overflow calls to another trunk group because enough trunks are provided to give an acceptable blocking probability.

GGeneric

The version released to provide specific services, features, or functions.

GETS

Government Emergency Telecommunications Service

GSC
Group Signaling Congestion

GSM
Global Switching Module

GUI Form Elements
The elements that appear within a form on a web page. Form elements may consist of a label and one or more fields when they are used outside a table. See "GUI form elements" (p. 20) in the *User Guide*.

Hhecto
A unit of measure meaning 10 to the power of 2.

High-Usage Trunk Group (HU)
A trunk group that is the primary direct route between two switching systems. The group is designed for high average occupancy. To provide an overall acceptable probability of blocking, an alternate route must be provided for overflow traffic.

Host Computer
Computer (machine) used to run the NTM.

HPC High Probability of Completion
A phase of GETS that extends the enhanced routing and priority service to LEC networks traversed by the call.

HT Holding Time
The average duration of phone calls.

HTR Hard-To-Reach
A code (telephone number) is designated as hard-to-reach because the number of attempts and failures to the code exceed user-defined thresholds. See Chapter 7, "Hard-To-Reach (HTR)" in the *System Overview*.

HU High Usage
A trunk group that is the primary direct route between two switching systems. The group is designed for high average occupancy. For an overall acceptable probability of blocking, an alternate route must be provided for overflow traffic.

Hunt Types
The three hunt types for reroutes are ***regular***, ***order***, and ***spray***.

- The regular hunt uses only one out-of-chain engineering route for the reroute. Order and spray hunts can have from two to seven out-of-chain engineering reroutes.

- For the order hunt, an ordinary route-advance pattern is specified for the out-of-chain engineering reroutes, and the same route is always used as the starting point for the trunk hunt.
- For the spray hunt, rerouted traffic is divided evenly among the out-of-chain engineering routes through a rotation scheme.

See the HUNT field help file.

Hysteresis
The minimum amount of change required to make a difference.

ICCH Incoming Connections per Circuit per Hour
The incoming peg count divided by the number of equivalent 2-way circuits.

IEC
InterExchange Carrier

IMA
Ineffective Machine Attempts

Immediate Reroute
A reroute that diverts calls to one or more specified via trunk groups prior to the hunting of the "reroute from" trunk group.

IMS
IP (Internet Protocol) Multimedia Subsystem

INA
Ineffective Network Attempts

Incoming Calls
Incoming trunk seizures at the office.

Inhibit
Indicates the blocking of an action, such as blocking automatically triggered audits from running.

Input Command
User-invoked instructions to a system, entered in the command shell. Also called an input message and command. See the *Input Commands Guide*.

Internal Calls
Originating calls intended to complete on lines served by the switch.

Internal Error Message
An error message reported in the error log and on the system console.

Internal Network Element
Network elements from which surveillance data is collected.

INWATS Inward Wide Area Telephone Service
A service that allows subscribers to receive calls from specified areas with no charge to the person who's calling.

IP
In Progress

IRR Immediate Reroute
A pre-hunt trunk group control option that causes a percentage of a specified type of traffic to be rerouted before it is offered to the regular in-chain trunk group.

ISA
Integrated Service Assurance

ISDN Integrated Service Digital Network
A set of standards for digital transmission over ordinary telephone copper wire as well as over other media. ISDN integrates analog or voice data together with digital data over the same network.

Issue
Office generic issue number.

ISUP Integrated Service Digital Network User Part
Defines the protocol and procedures used to set up, manage, and release trunk circuits that carry voice and data calls over the public switched telephone network (PSTN). ISUP is used for both ISDN and non-ISDN calls. Calls that originate and terminate at the same switch do not use ISUP signaling.

IWBM
Inter-working Bridge Measurements.

LLATA
Local Access and Transport Area

Launch page
One of the five basic types of pages used in the GUI. It is used to select high-level data types to monitor.

LEC
Local Exchange Carrier

Link Status
The signaling system connection status of an office.

LNP
Local Number Portability

Logical Database
A logical database consists of a computer program system database and a *Linux* operating system file area.

LRN
Location Routing Number

LSSGR
LATA Switching System Generic Requirements

MMB Maintenance Busy
Conditioning a circuit, a terminal, or a termination to be unavailable for service. When unavailable, it is generally necessary that it appear busy to circuits that seek to connect to it. Sometimes referred to as “make busy”. See the MB field help file.

MC
Machine Congestion Level

Menu Mouse Button
Mouse button used to display context-sensitive menus. (Usually the right mouse button.) Click the menu mouse button once to display the menu, then use the Select Mouse Button to select an item (or subitem) from the menu.

MF
Multifrequency

Mnemonic
Executable name used to access menus, menu items, and pages on the terminal screen. A mnemonic is a word or string that is intended to be easier to remember than the thing it stands for.

Monitoring
Comparing the traffic on selected trunk groups with assigned thresholds.

MSU
Message Signaling Unit

MTP Message Transfer Part
The part of the SS7 protocol that provides for basic routing of signaling messages between signaling points.

NNC
No Circuits

NCP Network Control Point
A routing, billing, and call control database system.

NEA Non-Equal Access
A trunk group reroute control option for switches that limits the reroute to non-equal access traffic.

Network Traffic Management
A system that provides near-real time surveillance of the network elements connected to it for the purpose of managing network congestion.

Network Data
Traffic data that is collected from the network elements on a periodic basis, typically 5 or 15 minutes.

Network Management
A set of procedures, equipment, and operations designed to keep a traffic network (a telephone network, for example) operating near maximum efficiency when unusual loads or equipment failures would otherwise force the network into a congested, inefficient state.

Network Management Data
A combination of data collected from the switches and data entered in the record base. This data describes the base of the network and what occurs in the network.

NFS Network File System
A distributed-file-system protocol that allows a computer on a network to use the files and peripherals of another networked computer as if they were local.

NHR Not Hard-to-Reach
A code (telephone number) determined to be not hard-to-reach because the attempts and failures to the code do not exceed user-defined thresholds.

NMC Network Management Center
A centralized location at the network management layer used to consolidate input from various network elements to monitor, control, and manage the state of a network in a telecommunications organization.

NOCS Network Operation Center
A group responsible for the day-to-day care of a network.

NPA Numbering Plan Area
A geographic division within which telephone directory numbers are subgrouped. A 3-digit NXX (local office) code is assigned to each NPA, where:

- N=any digit 2 through 9
- X = any digit 0 through 9

NPR
NTM Performance Reporting

NS
Number Service

NTM
Network Traffic Management

NTM **Host**
The server on which the NTM is run.

OOCC Occupancy
The time a circuit or switch is in use.

OCCH Outgoing Connections per Circuit per Hour
The outgoing peg count divided by the number of equivalent 2-way circuits.

Office
A local switch, DCC, or FEP connected to your host computer.

OFL Overflow
Number of attempts failing to find an idle circuit in a group of circuits.

One-Way Trunk
A trunk that can be seized at only one end.

Ongoing Data
Data retrieved by the `ongoing` command from the system's shared memory.

Originating Calls
Line seizures at the office.

ORR Overflow Reroute
A reroute post-hunt trunk group control option that takes the overflow traffic on a trunk group and reroutes it to a trunk group with idle capacity.

Outgoing Calls
Calls intended to complete on trunks to points outside the system (same as outgoing seizures).

Overflow Peg Count
Peg count overflowing to another trunk group or to a circuit busy signal.

OVLD Overload
An increase in offered load beyond the capacity for which the network components (for example, trunks and switching systems) are engineered.

PPage
A page is a universal resource locator (URL), part of the NTM application. A page is displayed inside a Window. The user selects, changes and transfers pages within the same window.

Parameter area
The area of a control request display that contains various control parameters.

Parameter Set
A predefined group of control parameter values that may be used to quickly apply a control to one or more switches.

PAS
Public Announcement Service

PATR Performance and Troubleshooting Reports
This feature enables NTM personnel to collect various office and application performance data, and to output reports on request. Depending on the report type selected, the data may be real-time or hourly. The hourly data may be for a 24-hour period or less. Seven days of data are collected and stored for report access.

PC Peg Count
A count of all calls offered to a subgroup during a measurement interval.

PCI
Panel Call Indicator

PIIT Prohibit International Inbound Traffic
A reroute trunk group control option. When set to YES, does not allow inbound international traffic to be rerouted. When set to NO, allows inbound international traffic to be rerouted. See the rr command (4-44) in the *Input Commands Guide*.

Post-Hunt Control
A trunk group control that may affect a call that is attempting to alternate route to the next designated trunk group, for example: CANF.

PP
Preprogram

PPC
Peripheral Processor Complex

Pre-Hunt Control
A trunk group control that may affect a call before it is offered to a particular trunk group, for example: CANT, SKIP.

Preplan
Command used to create and manage pre-designated control plans to be used in emergency situations. See the preplan command (4-72) in the *Input Commands Guide*.

PS/UT
Pseudo-Subunit / Unit Type

PTS
Public Telecommunications Systems

QQOR
Query on Release

RRADR
Receiver Attachment Delay Readiness

RC
Routing Code

RDB
Routing Data Block

Real Time Usage
The percentage of time used out of total available real time, not including multi-task time.

Record Base
A collection of ASCII files containing reference information about the network to be managed by NTM.

Record Base Administration
The process of creating and maintaining the reference data portion of the NTM database.

Reference Data
Data that describes what the network is managing. This consists of either data about the network management center itself (such as the configuration of the center and threshold tables) or data about the network being monitored (such as the switching systems and trunk groups in the network management center's cluster). User-defined reference data is stored in the "/musr/rb" directory. Some reference data is supplied to the database by audits. This data typically changes infrequently.

Regular Expressions
A way of searching for patterns of characters in text strings. In NTM, it applies to Network Element search fields used to find particular switches or trunk groups.

Reorder Tone
A tone that is applied 120 times per minute to indicate all switching paths busy, all toll trunks busy, equipment blockages, unassigned code dialed, or incomplete registration of digits at a tandem or a toll office. Also called **Channel Busy** or **Fast Busy Tone**.

Request Page
One of the five basic types of pages used in the GUI. It is used to display control parameters before a control is applied.

Reroute
See "RR" (p. 20).

Reservation Level
The Circuit Reservation (CR) control allows the user to specify a maximum number of idle circuits to reserve and what the switch is to do with direct and/or alternate routed traffic when the reservation level is reached.

RLU
Remote Line Unit

ROA
Re-Order Announcement

Route
One or more trunk groups providing a connection between offices.

Route Group
A route group consists of one or more routes that may be used for a given destination. A route group may be accessed by more than one combination of destination and additional parameters.

RP Revertive Pulse
Revertive Pulsing is a method of signaling between switching systems in which information is conveyed from System A to System B. System B sends a sequence of pulses to System A, where the pulses are counted. System A signals System B when the correct number of pulses has been received.

RR ReRoute
An expansive trunk group control that is used to take traffic from congested or failed routes to other trunk groups not normally included in the route advance chain. These other trunk groups, called "vias," should have available idle circuits (AIC) to be used for the reroute. See the rr command (4-44) in the *Input Commands Guide*.

RSPTE Regional, Sectional, Primary, Toll, and End office
See the "RSPTE File" (p. 67) in the *Record Base Administration Guide*.

RSU
Remote Switching Unit

SSCCP Signaling Connection Control Part
A signaling protocol that provides additional routing and management functions for transfer of messages other than call setup between signaling points.

SCP Service Control Point
A remote database within the SS7 network that supplies the translation and routing data needed to deliver advanced network services. Also called Signal Control Point.

SDM
Supernode Data Manager

SDN Software Defined Network
A service developed for multi-location businesses that allows network managers to tailor their network to their own specific communications needs.

SDOC
Selective Dynamic Congestion Control/Automatic Congestion Control

Search Page
One of the five basic types of pages used in the GUI. It is used to request data on network elements, network connections, and controls. It can be used in simple or advanced modes.

Seizure
An attempt for a circuit in a trunk group that succeeds in obtaining a circuit.

Select Mouse Button
Mouse button used to specify an object to operate on and to manipulate objects and controls. (Usually the left mouse button.)

Set
Logical grouping of network elements (offices or trunk groups). NTM with standard features allows each office to be a member of up to four office sets, and each trunk group to be a member of up to four trunk group sets.

Shared Memory
A RAM-based data structure on the host that is used to store discrete, control, and exception data. Portion of memory accessible to multiple processes.

Signaling
The transmission of address (pulsing), supervision, or other switching information (including any information required for billing) between stations and switching systems, and between switching systems.

SILC Selective Incoming Load Control
An automatic trunk group control that can be enabled or disabled on a selected trunk group in a "From Office" when the office encounters machine congestion. See the silc command (4-55) in the *Input Commands Guide*.

Single File Create
The process for creating (compiling) individual record base files.

Single Office Create
The process for creating (compiling) all office-related files for one office only. A single office `create` acts directly on the current database; no `installdb` command is necessary to install the changes to the database. See the *Record Base Administration Guide*.

SKIP Skip route control
A pre-hunt trunk group control that allows all or a percentage of traffic to bypass a specific route and to advance to the next route in its normal routing pattern. See the canf/cant/skip command (4-13) in the *Input Commands Guide*.

SMS Service Management System
Allows provision and updating of information on subscribers and services in near-real time for billing and administrative purposes.

SQL Structured Query Language
Database language used for creating, maintaining, and viewing database data. See Chapter 3, "SQL Interpreter" in the *Data Tables Guide*.

SQL File

A data request file that lets you specify what data should be retrieved from the database or the ongoing shared memory and to define the format of the data.

SS7 Signaling System 7

Signaling protocol that uses destination routing, octet-oriented fields, variable length messages and a maximum message length allowing for 256 bytes of data. The four basic sub-protocols of SS7 are: MTP, SCCP, ISUP, and TCAP.

SSP Service Switching Point

A switch that can recognize IN (Intelligent Network) calls and route and connect them under the direction of an SCP. Also called **Signal Switching Point**.

STP Signal Transfer Point

A message switching system that permits signaling messages to be sent from one switching system to another by way of one or more other offices at which STPs are located. It reduces the number of data links required to serve a network.

STR Selective Trunk Reservation

An automatic trunk group control that reserves the last few trunks of a trunk group for critical users exclusively and eliminates the need to queue critical users for inter-switch trunks. Also called CR/TSR. See the cr command (4-32) in the *Input Commands Guide*.

Subnetwork

A subdivision of the network that allows parts of the network to be monitored and controlled independently of the main network.

Suffix

A user-defined string (up to 5 characters long) used to identify a particular office or trunk group. The suffix is separated from the office or trunk-group name by a hyphen.

Surveillance Data

Discrete and measurement data collected periodically from the switch.

SVC Switched Virtual Circuit

A virtual circuit connection established across a network on an as-needed basis and lasting only for the duration of the transfer.

Switch

A computer system that channels telephone calls from one place to another and keeps track of each call that it transfers.

Switch Name

A code name that identifies an office.

Syntax

The format in which a command is entered, including the input command name, parameters, and action options.

System Error

The NTM GUI presents error messages in response to conditions such as improper permission, execution errors, etc. A system error is presented when an error occurs on the NTM host during the generation of a web page or during the processing of a request from a web page (except certain control related requests).

T

TTandem Office

In general, an intermediate switching system for interconnecting local and toll offices. All toll offices are tandem offices. A more specific meaning of local tandem or metropolitan tandem office is an office that connects end offices to other end offices or to other tandem offices within a metropolitan area.

TCAP Transaction Capabilities Application Part

A signaling protocol that provides for transfer of non-circuit related information between signaling points.

TCU

Time Switch and Peripheral Control Unit

TDM

Time Division Multiplexing

Terminating Calls

Calls intended to complete on lines served by the system.

TFP

Transfer Prohibit

TG Trunk Group

A group of trunks with similar electrical characteristics that go between two geographical points. A trunk group performs the same function as a single trunk, except that on a trunk group multiple conversations can be carried. Trunk groups are used as traffic demands them.

Threshold

A preset limit of exceptions that each network element must exceed during each 5-minute period before NTM determines that the office is experiencing patternable trouble.

Thresholding
The process of setting values to be compared against data values (raw counts) collected from the switches every 5 minutes to determine exception conditions.

TID
Terminal Identifier

To Office
Internal or external network element that is the termination of a trunk group.

TPC
Telephony Processor Complex

Traffic Network
An arrangement of channels, such as loops and trunks, associated switching arrangements, and station equipment designed to handle a specific body of traffic; a subset of the facility network.

Trunk
A telephone communication path or channel between two points, one of them usually being a telephone company central office or switching center.

Trunk Group
See "TG" (p. 23).

Trunk Group Number
Number assigned to a trunk group in the switch.

TSG
Trunk Subgroup

TTO
Transmitter Time-Out

Two-Way Trunk
A trunk that can be seized at either end.

UUDTS
Unitdata Services

URW User Report Writer
The User Report Writer consists of the transaction processing system report writer software package and a system command set. The transaction processing system generates informational reports based on data that changes periodically.

Usage

A measure of trunk or equipment occupancy expressed in Erlangs or CCS.

V

VVacant Code

An unassigned numbering plan area, central office, or station code. A call placed to a vacant code is normally directed to a VCA (vacant code announcement).

Validate

A command used to verify that the values and actions specified are correct for a specific display or page.

VB

V-B (terminating) trunk group. A trunk group that connects a via office (V) to a terminating office (B). See "AB" (p. 1) and "AV" (p. 3).

Via Office

An office that transits a rerouted call between the originating office and the terminating office.

Via Trunk Group

A trunk group designated to carry the calls redirected by a reroute control activated on the "reroute from" trunk group of the reroute control. If a trunk group is identified as a "via trunk group" it is the "AV" portion of the "AV"-"VB" path for rerouted calls.

VRTO Via Route Turnoff Override

VRT is a reroute option that protects regular traffic from rerouted traffic, by not allowing rerouted traffic to use a via TG that is filling with regular traffic. VRTO overrides the VRT option so that network managers can use the via trunk group anyway. See the rr command (4-44) in the *Input Commands Guide*.

W

WWindow

A window is box-type graphic displayed when specific buttons, icons, function keys or hot keys are selected in a windows operating system environment. Each window contains various control attributes including a means to close the box, typically an "X" in the upper right corner. The window identifier is displayed in the task bar. The user opens and closes windows.

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