# Network Traffic Management

## 8920 Network Traffic Management software

*Installation Guide*
Release 17.3

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# 1 Introduction to Installation

## Overview

### Purpose

This guide provides instructions for:

- Red Hat Enterprise Linux® installation
- 8920 Network Traffic Management software installation
- Web Server configuration

This chapter provides:

- A list of the qualifications needed to perform installation of 8920 NTM.
- An overview of the tasks required to get NTM installed and running on the host machine
- A list of items that will be useful to collect before beginning the installation

### Terms

In the scope of this guide, these key terms are defined as follows:

- ***Initial Load*** — the first time NTM is installed at a customer's site
- ***Upgrade*** — a subsequent version of NTM installed after an initial load has been performed

- ***Patches*** — changes or improvements that do not require NTM to be reloaded

## Contents

This chapter contains the following topics

# Qualifications to install NTM

### Recommendation

It is recommended that the initial load procedures and any upgrades to the software involving significant *Red Hat Enterprise Linux*® upgrades be performed by Alcatel-Lucent Consulting Services.

### Intended audience

The intended audience for this document is the NTM deployment personnel. Other personnel may be able to install the software upgrades or patches if they have the following qualifications:

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- Working knowledge of local network configuration, including gateways, DNS and web servers
- NTM training on System Administration (OS3189) and Installation.
- Understanding of NTM beyond this *Installation Guide* including
  - Chapter 3, “Record Base Concepts” in the *Record Base Administration Guide*
  - Chapter 9, “Adding and Removing Network Elements” in the *System Administration Guide*
  - “Introduction to Report Writer” in the *Report Writer Guide*
  - NTM commands such as but not limited to: `audit`, `create`, `startsys`, `stopsys`, `installdb` and `dbtest`.

□

# Prerequisites to an NTM installation/upgrade

## Overview

Before an installation or upgrade can be performed, you must meet the prerequisites and gather information to assist in the processes.

## Installation

Using incorrect information may result in conflicts with other machines on the network.

**CAUTION**

**A complete backup of all site specific software should be performed prior to this installation. This data may need to be reinstalled after the installation or upgrade of RHEL and NTM.**

To correctly connect the machine to a network, gather the following supplies and information before installing NTM:

- System host name
- The internet (IP) address of the NTM host
- The internet (IP) address of the NTM secondary host if using BDR or a “hot spare” host.
- The internet (IP) address of the Report Writer Feature Host if the feature has been purchased and configured as a Stand-alone host.
- The name, room number, telephone number, login ID, and user group for each user
- The subnetwork names and the group names that will use each subnetwork including the main, partition and subnet information. The subnetwork mask of the machine. If you are loading a new generic on an existing system, the subnetwork information will not be affected.
- The ports needed for NTM installation should be reserved by local system administrators (see Table 2 in the *System Overview*)
- List of features purchased, as many steps in procedures are based on various features
- LAN card hardware addresses
- IP address of the primary Ethernet interface on the machine
- IP address of the secondary Ethernet interface on the machine
- Host name and IP address of the default gateway
- Local DNS domain, name, and server (if applicable)

- Host name, IP address, and domain name of the DNS server (if applicable)
- Time zone in which the system will operate
- Have access to the system console as this procedure is started and completed at the console.

### Upgrade

Certain system information needs to be collected from your system prior to the upgrading of RHEL or NTM.

This information is in ***addition*** to the data described in "Procedures required for installation/upgrade" (p. 1-13). It includes:

- Verify that current backups have been made of all NTM data ***and*** a complete file system backup using the appropriate methods.

  **Reference:** Chapter 5, "Backing Up and Restoring the System" in the *System Administration Guide*

- Determine if DNS is used and understand how to mount and unmount DNS file systems.
- Determine which host is the LDAP supplier and which are Consumers in order to reestablish these roles during the new installation.

### Information needed during an upgrade or in the event of a load failure

Following the recommended installation procedures should normally upgrade NTM and *RHEL (RHEL* upgrades only when required by NTM*)*. However, in certain instances the load may be incomplete or fail to execute properly.

In the event of a load failure, a complete load of RHEL may be required. To expedite this process, the data in Table 1 and Table 2 should be collected prior to ***ALL*** upgrades. It is recommended that you contact Alcatel-Lucent Customer Support before proceeding with a complete RHEL load. Alcatel-Lucent Customer Support may require some of the information found in these tables. This data may also be used to verify configurations, customized site data, and network connections after a load has been performed.

Data from executing commands can be redirected to a temporary directory and file. These files then can be printed and set aside in case of a load failure. Command output data should be printed for the following commands:

**Table 1 Command output data to be redirected to a file and printed**

| Command to execute |
|---|
| grep 'model name' /proc/cpuinfo > $<*Temporary Directory name*>/model.out |
| lspci > $<*Temporary Directory name*>/ioscan.fn.out |

**Table 1 Command output data to be redirected to a file and printed**

| **Command to execute** |
|---|
| ifconfig -a > $<*Temporary Directory name*>/lanscan.out |
| netstat -rn > $<*Temporary Directory name*>/netstat.rn.out |
| df -k > $<*Temporary Directory name*>/df.out |
| mount > $<*Temporary Directory name*>/mount.out |
| lpstat -t > $<*Temporary Directory name*>/lpstat.out |
| /nm/ubin/vrfyfeat > $<*Temporary Directory name*>/vrfyfeat.out |
| /nm/ubin/vrfygen > $<*Temporary Directory name*>/vrfygen.out |
| rpm -qa > $<*Temporary Directory name*>/swlist.out |
| linkstat > $<*Temporary Directory name*>*/linkstat.out* |
| snw_info>$<*Temporary Directory name*>*/snwinfo.out* |
| **Save a copy of the current LDAP directory under the NTM directory by executing:**<br>1. Log in as `nmadm`.<br>2. /nm/web/sup_soft/ldap/bin/ldbm2ldif /musr/nmadm/ntmldap.ldif |

**Table 2 Files to be printed for reference in the event of a load failure**

| File |
|---|
| /etc/hosts |
| /etc/hosts/hosts.equiv (Optional) |
| /etc/passwd |
| /etc/fstab |
| /etc/group |
| /etc/inittab |
| /etc/nsswitch.conf |
| /nm/etc/permissions |
| /etc/rnms.env |
| /etc/NMsysconf |
| /etc/services |
| /etc/resolv.conf |
| /etc/motd |
| /nm/ubin/start.all |
| /nm/etc/nmsconf.fld |
| /etc/cron.*/ntm-* |
| /var/spool/cron/root |
| /var/spool/cron/nmadm |
| /etc/cron.allow |
| /etc/cron.deny |
| Save any other pertinent user crontabs found in the /var/spool/cron/ directory |
| Save the files found under /etc/yum.repos.d |

# Media and other materials

## Installation

Table 3 lists NTM product and patch versions recommended for this installation.

**Table 3 Product and patches of software to be installed**

| Patch or Product Number | Version |
|---|---|
| *Red Hat Enterprise Linux®* | 5.5 (or newer) with the latest patches installed |
| 8920 Network Traffic Management software and documentation DVD | Platform: Linux RHEL5.5<br>Release 17.2<br>August, 2010 Issue 1<br>comcode: 301054516 |
| 8920 Network Traffic Management software<br>3rd Party (DVD) | Platform: Linux RHEL5.5<br>August, 2010 Issue 1<br>comcode: 301054516 |

Additional media containing the customer specific feature and generic locking files will also be supplied.

## *Report Writer* installation

Table 4 lists software patches and their versions recommended for the Report Writer Feature installation.

**Table 4 NTM with *Report Writer* — product/patches to be installed**

| Patch or Product Number | Version |
|---|---|
| HPUX Install/Update/Recovery CD | December 2003 |
| HPUX Support Plus CD | December 2003 |
| NTM Patch Bundle | Latest Available |
| NTM System CD (net12.0)<br>(This is needed only if the *Report Writer* feature is installed and is configured as a stand-alone host.) | May 2002 |

### *Oracle* Enterprise Edition

Oracle Enterprise Edition with Partitioning Option is required. A license for the appropriate version and option is required to use Oracle software and documentation of such license is required before NTM installation. Oracle database software version 11gR2 is included on the NTM 3rd Party DVD-ROM supplied by Alcatel-Lucent.

### References

In addition to this manual, users should have available the current release of the *System Administration Guide* as it is referred to throughout this manual.

It may be helpful to have access to the latest versions of Red Hat Enterprise Linux documents and web page (*http://www.redhat.com/rhel*).

□

# Installation process

### Purpose

This process describes the steps needed to set up NTM, install the software on the hardware platform, and start NTM. These tasks will be described in greater detail later in this guide and in the *System Administration Guide*.

### High-level process required to install NTM

Follow these steps to install NTM:

1. Collect and gather prerequisite information and material as described in "Prerequisites to an NTM installation/upgrade" (p. 1-4) to perform an NTM installation.

2. If the system had been loaded previously, back up the system.

   **Reference:** Chapter 5, "Backing Up and Restoring the System" in the *System Administration Guide*

3. If using Feature 8, "Disaster Recovery (Duplex)" and Feature 40, "Enhanced Disaster Recovery", transfer control to and from a secondary host.

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

4. See the "NTM Disk and File System Configuration" (p. 6-4) to ensure the proper disk configuration is in place to support NTM installation.

5. If required, load the *RHEL* system software.

   **Reference:** Chapter 1, "Red Hat Enterprise Linux 5 Installation"

6. Perform appropriate additional procedures.

   **Reference:** Chapter 3, "Additional Procedures"

**7** Load NTM on the host.

**Reference:** Chapter 6, “Loading NTM on the Host”

**8** Configure NTM web servers.

**Reference:** Chapter 7, “Configuring Web Servers for NTM”

**9** Add users.

**Reference:** Chapter 2, “Adding and Removing Users on the Host” in the *System Administration Guide*

**10** Add groups.

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

**11** Add network elements.

**Reference:** Chapter 9, “Adding and Removing Network Elements” in the *System Administration Guide*

**12** Start the system.

**Reference:** Chapter 4, “Starting and Stopping the System” in the *System Administration Guide*

**13** If Feature 272, “NTM Report Writer” has been purchased, install the *Report Writer* feature.

**14** Back up the system.

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

END OF STEPS

**Important!** To take advantage of certain features, Record Base files may need to be defined according to the associated section(s) in the *Record Base Administration Guide*.

□

# Procedures required for installation/upgrade

### Table

The procedures found in Table 5 is documented throughout this guide. To prevent potential load failure, please read and follow the steps in the order they are given, paying particular attention to information in the **Before you begin** sections.

**Table 5 Procedures to install/upgrade NTM**

| Description | Required for: New | NTM and *RHEL* Upgrade | NTM Upgrade |
|---|---|---|---|
| "Red Hat Enterprise Linux 5 Installation" (p. 1-14) | X | X | X |
| "NTM Disk and File System Configuration" (p. 4) | X | X | |
| "Additional Procedures" (p. 3-1) | X | X | X |
| "Backing Up and Restoring the System" (p. 5-1) | | X | |
| "Loading the NTM application" (p. 6-11) | X | X | X |
| "Comparing new and user-changed system files" (p. 6-14) | | X | X |
| "Building the databases" (p. 16) | X | X | X |
| "Configuring the "base_config.pl" file" (p. 7-8) | X | X | X |
| "Installing directory server entries — initial" (p. 7-9) | X | | |
| "Upgrading directory server entries" (p. 7-11) | | X | X |
| After all hosts in the multi-host environment have been upgraded to the same release of NTM, then use "Setting up replication" (p. 7-16) to establish LDAP replication. | X | X | X |
| "Verifying changes are being made to the directory server" (p. 7-19) | X | X | X |

# Red Hat Enterprise Linux 5 Installation

### Overview

The 8920 NTM product Release 17.0 and later is designed to operate on the *Linux* platform, specifically the Red Hat Enterprise Linux 5 (RHEL) operating system. NTM is designed to operate under version RHEL 5.4 or newer.

### Installation

The RHEL installation steps are well documented and the user is directed to the official Red Hat Enterprise Linux 5 installation guide (and associated guides, release notes, etc.) for the necessary installation procedures.

### Red Hat Network

The machine must be registered with Red Hat Network (RHN) for support, and have the latest patches installed. Note, the installation should not enable Security Enhanced Linux (SELinux) or the firewall.

### Security Enhanced Linux

NTM is not designed to operate under Security Enhanced Linux (SELinux), therefore SELinux should be disabled, and the firewall disabled.

□

# 2 *HP* to *Linux* Migration

## Overview

### Purpose

This chapter discusses the things you need to do after Linux is loaded and before the NMinstall occurs.

> **Important!** Be aware that the */musr* directory will be deprecated in the future releases. New location for the user's home directories will be */home*.

### Contents

This chapter contains the following topics:

# Files Migration

### List of Files

Review, or copy the following files from the existing HPUX system to the new *Linux* system. Files in the following list are noted in relative to their HPUX location.

Bring files over:

- */musr/nmadm/ntmldap.ldif* ( generated by */nm/web/sup_soft/ldap/bin/ldif2dbm /musr/nmadm/ntmldap.ldif* ), the directory location on the *Linux* platform is */var/lib/ldap/ldif*
- */nm/etc/permissions*
- subnetworks should match the */musr/rb/inms/inms*
- */nm/etc/nmsconf.fld*
- */etc/NMsysconf*
- */musr/rb* [record base]
- */musr/uddm* [UDDM items]

Check for data to bring forward:

- */etc/hosts*
- */etc/passwd*
- */etc/group*
- */var/adm/cron/cron.allow*
- crontabs – the location of the crontab files is different between the HP and *Linux* platforms. On *Linux* the directory containing the crontab files is /var/spool/cron. Do not copy the crontab files over from HP to *Linux*. The installation software will populate the crontab files with the necessary application entries, if there were additional entries needed the user will need to manual replicate those entries. The HP to *Linux* paths for 2 are shown below:
  - */usr/spool/cron/crontabs/root* to */var/spool/cron/root*
  - */usr/spool/cron/crontabs/nmadm* to */var/spool/cron/nmadm*
- */etc/services*
- */etc/motd*
- */etc/inittab*
- */nm/ubin/start.all*

- Mark/Inhibit, if there have been additional Mark types added then the following should be migrated in order to retain the Mark set:
  - */nm/web/jsp/WEB-INF/classes/ntmgui_site_defs.properties*
  - */nm/web/site/mark_inhibit.pl*

Optional (data may have already been used to load *Linux*):

- */etc/resolv.conf*
- */etc/nsswitch.conf*
- */etc/ntp.conf*
- */etc/ntp.drift*

□

# 3 Additional Procedures

## Overview

### Purpose

This chapter provides additional procedures related to installation and cofiguration of *Linux* and NTM system.

### Contents

This chapter contains the following topics:

# CKNTM Tool

### Purpose

The ckntm tool is provided to analyze the system configuration and check all of the required settings.

### CKNTM Variables

The ckntm tool utilizes 2 environmental variables which can be used to adjust the configuration of the ckntm. These variables must be set up and exported before ckntm execution.

`CKNTM_CONFIG` contains full path to the configuration file e.g. CKNTM_CONFIG=/opt/ckntm/conf/default.config. Changing this variable you can choose proper configuration file for your system (e.g. small/medium/large).

`CKNTM_OUTPUT` contains a path where the output files from verification process must be stored. The default directory is: */tmp/ckntm-XXXXXX* where *XXXXXX* is a combination of random letters and digits. It can be used for analyzing successive verifications.

### Instructions

Follow these steps to analyze your system using ckntm tool:

1. Log in as `root` on the system console.

2. Execute `/opt/ckntm/ckntm`

**Result:** You will see the similar output to the following:

```
/opt/ckntm/tests/disk_layout.test
/opt/ckntm/tests/backup_space.test
/opt/ckntm/tests/memory.test
/opt/ckntm/tests/cpu_power.test
/opt/ckntm/tests/is_root_user.test
/opt/ckntm/tests/hostname.test
/opt/ckntm/tests/etc_hosts.test
/opt/ckntm/tests/kernel.test
/opt/ckntm/tests/packages.test
/opt/ckntm/tests/oracle.test
/opt/ckntm/tests/services.test
/opt/ckntm/tests/unsafe_services.test
/opt/ckntm/tests/umask.test
/opt/ckntm/tests/users.test
/opt/ckntm/tests/groups.test
Scenario duration:
  begin time: Mon Jul 11 13:24:17 CEST 2011
    end time: Mon Jul 11 13:24:19 CEST 2011

Scenario parameters used:
  CKNTM_CONFIG=/opt/ckntm/conf/default.config

Output directory is
  CKNTM_OUTPUT=/tmp/ckntm-I14237

==============[ Summary ]==============
  Passed: 15 disk_layout backup_space memory cpu_power
   is_root_user hostname etc_hosts kernel oracle services
   packages umask unsafe_services users groups
Warnings: 0
  Failed: 0
 Skipped: 0
========================================

To see more details about failed tests and warnings, run:
  /opt/ckntm/ckntm_report -v /tmp/ckntm-I14237 fail warn
```

3 Analyze the output. You can precisely check the output from tests which finished with specific flag using `ckntm_report` command.

**Example:** Usage `ckntm/ckntm_report [-v] output_directory [result [result...]]`

where `result` can be one of the following: `fail` / `skip` / `warn` / `pass`

If you want to analyze all the tests which finished with fail or warning use: `ckntm/ckntm_report -v /tmp/ckntm-S24132 fail warn`

4 Output from the `cktm` tool includes the proposed solutions to resolve errors or warnings. Those hints can contain path to one of the `os_config` scripts, see: "Using os_config scripts" (p. 6) section.

5 The following `cktm` command checks to make sure the Oracle database software is installed on the machine. You should run this command only when directed during the installation or upgrade procedures.

```
/opt/cktm/cktm oracle
```

**Result:** This version of the cktm command will produce output like the following. You can use `cktm_report` to view the results in more detail (see Step 3 for more information).

```
/opt/cktm/tests/oracle.test
Scenario duration:
  begin time: Thu Sep 13 22:14:13 CEST 2012
    end time: Thu Sep 13 22:14:14 CEST 2012

Scenario parameters used:
  CKNTM_CONFIG=/opt/cktm/conf/default.config

Output directory is
  CKNTM_OUTPUT=/tmp/cktm-t11139

==============[ Summary ]==============
  Passed: 0
Warnings: 0
  Failed: 1 oracle
 Skipped: 0
=======================================

To see more details about failed tests and warnings, run:
  /opt/cktm/cktm_report -v /tmp/cktm-t11139 fail warn
```

6 The following `cktm` command can be run after installation or upgrade of NTM to verify that the Oracle database instance is running and if NTM can communicate with the database correctly. You should run this command only when directed during the installation or upgrade procedures.

```
/opt/cktm/cktm oracle_inst
```

**Result:** This version of the cktm command will produce output like the following. You can use `cktm_report` to view the results in more detail (see Step 3 for more information).

```
/opt/cktm/tests/oracle_inst.test
Scenario duration:
  begin time: Thu Sep 13 22:18:49 CEST 2012
    end time: Thu Sep 13 22:18:50 CEST 2012

Scenario parameters used:
  CKNTM_CONFIG=/opt/cktm/conf/default.config

Output directory is
  CKNTM_OUTPUT=/tmp/cktm-A12418

==============[ Summary ]==============
  Passed: 0
Warnings: 0
  Failed: 1 oracle_inst
 Skipped: 0
=======================================

To see more details about failed tests and warnings, run:
  /opt/cktm/cktm_report -v /tmp/cktm-A12418 fail warn
```

END OF STEPS

# Using os_config scripts

### Purpose

The os_config scripts are a group of configuration scripts which help in resolving problems which have been found using ckntm tool. Use of the specific script will be recommended at the end of the `cktm` output report. The os_config scripts are delivered as part of `cktm` package in */opt/ckntm/os_config/*

### Filesystem Script

The *os_config/filesystem_cfg.sh* script creates all the required logical volumes for the NTM system. It can be useful to resolve problems found with the *disk_layout.test* from `cktm` tool.

### Kernel Script

The *os_config/kernel_param.sh* script set up all the required kernel parameters for Oracle and NTM system. It can be useful to resolve problems found with the *kernel.test* from the `cktm` tool.

The following is an example of the kernel parameters which are set up with the *os_config/kernel_param.sh* script and written in the */etc/sysctl.conf* file:

```
fs.aio-max-nr = 1048576
fs.file-max = 6815744
kernel.msgmnb = 131072
kernel.msgmni = 4096
kernel.sem = 250 32000 100 4096
kernel.shmall = 2097152
kernel.shmmax = 1073741824
kernel.shmmni = 4096
kernel.pty.max = 4096
kernel.threads-max = 8000
net.ipv4.ip_local_port_range = 9000 65500
net.core.rmem_default = 262144
net.core.rmem_max = 4194304
net.core.wmem_default = 262144
net.core.wmem_max = 1048586
```

### Services Script

The *os_config/services.sh* script turns on/off required system services. It can be useful to resolve problems found with the *services.test* from `cktm` tool.

# 4 Installing and Configuring the Datatek DT4180

## Overview

### Purpose

This chapter provides information about the Datatek DT4180. There are procedures to activate and configure the DT4180 protocol converter which is used to connect the NTM host to a *4ESS* office.

### Recommended sequence and time allotment for procedures

This table details the frequency and time required for each of the procedures in this chapter.

| Procedure | Approximate Time Required | Should be Performed… | Initial Load | Upgrade |
|---|---|---|---|---|
| "Activating the DT4180" (p. 8) | 15 minutes<br>This time can vary depending upon Datatek's response to providing an installation key. | The first time a DT4180 is installed. | X | X |

| Procedure | Approximate Time Required | Should be Performed… | Initial Load | Upgrade |
|---|---|---|---|---|
| "Configuring the DT4180" (p. 10) | 1 hour | Every time a Datatek DT4180 is first used to allow communication between an NTM host and a *4ESS* office. | X | X |
| "Configuring the ports on the DT4180" (p. 12) | 1 hour | Every time a Datatek DT4180 is first used to allow communication between an NTM host and a *4ESS* office. | X | X |

## Contents

The chapter contains the following topics:

# Background

## Overview

Prior to NTM Release 13, the NTM host communicated to *4ESS* offices via ACC cards using the BX.25 protocol (Figure 1). With the NTM Release 13 product, the NTM host communicates to *4ESS* offices via TCP/IP through a Datatek DT4180 protocol converter (Figure 2).

**Figure 1 4ESS connectivity before NTM Release 13**

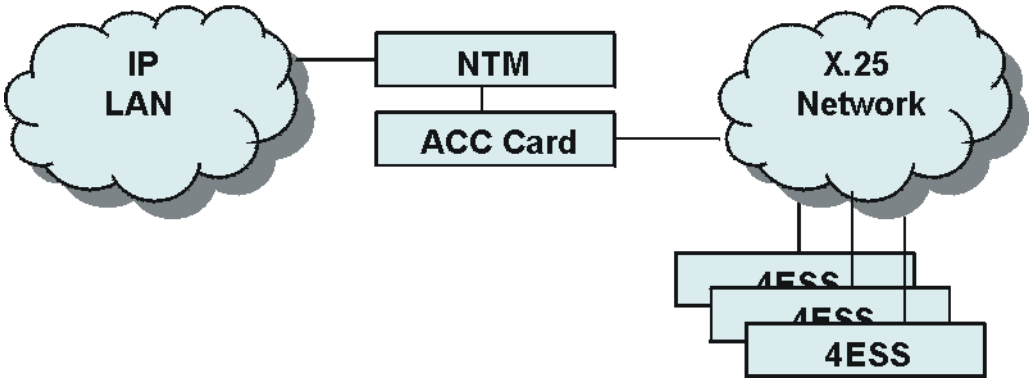
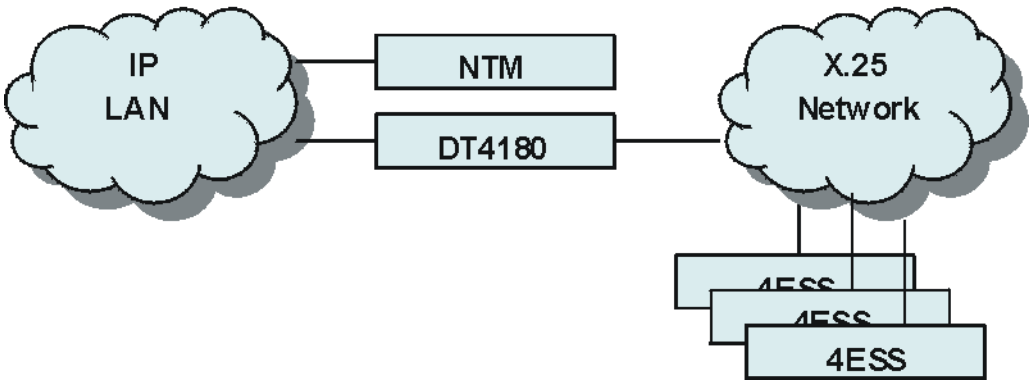



**Figure 2 4ESS connectivity after NTM Release 13**



# Cabling and connections

## Recommendations

It is recommended that the DT4180 be installed near the NTM host so connections can be easily made from the previously supported ACC cards to the DT4180. The connector on the existing cabling between the *4ESS* and the existing ACC cards is a male RS232 connector. This needs to be converted to an RJ45 style connection as shown in Figure 3. This conversion connector is male. The connector on the DT4180 is also male, so a dual female gender changer will be required to complete the initial connection Figure 6. The cable connecting the console to the DT4180 needs to be an RJ45 style connector configured as shown in Figure 5.

## Clocks

Each port on the DT-4180 can be configured to either provide the synchronous clock or accept the clock from an external source. When the port will be connected to a device that provides the clock signal, such as a modem, a Sync DTE adapter (Figure 3) should be used. When the DT-4180 port needs to provide a clock, the Sync DCE adapter(Figure 4) is required.

**Important!** In a multiple host environment, each DT4180 should be connected to one NTM host. In the case of a `bdr_takeover`, the backup host will connect via TCP/IP to the DT4180s of the failed host and transfer operations for all of the offices connected to that DT4180.

## Figures

Figure 3 through Figure 6 provide diagrams of connectors, cables, and adapters.

**Figure 3 RJ45 connector diagram DTE - DT4180 to 4ESS**

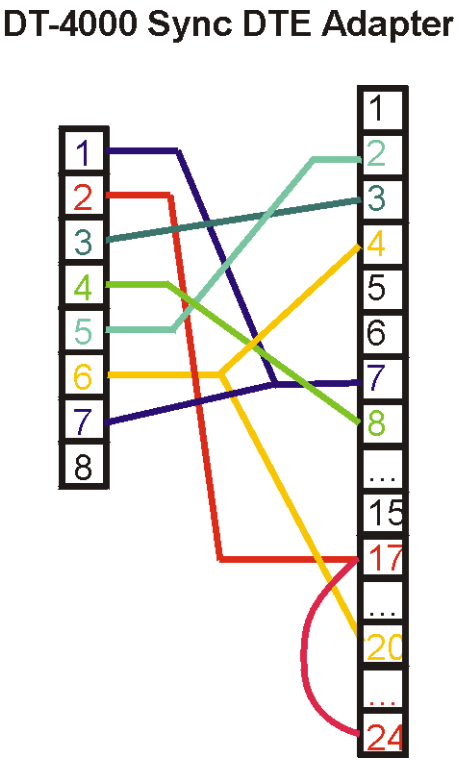



**Figure 4 RJ45 connector diagram DCE - DT4180 to 4ESS**

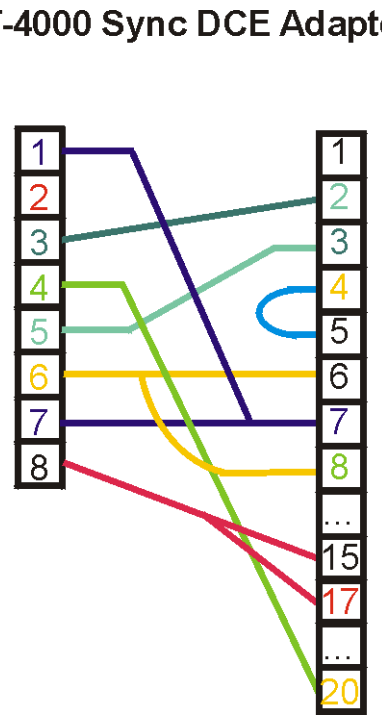


**Figure 5 RJ45 cable diagram - DT4180 to console adapter**

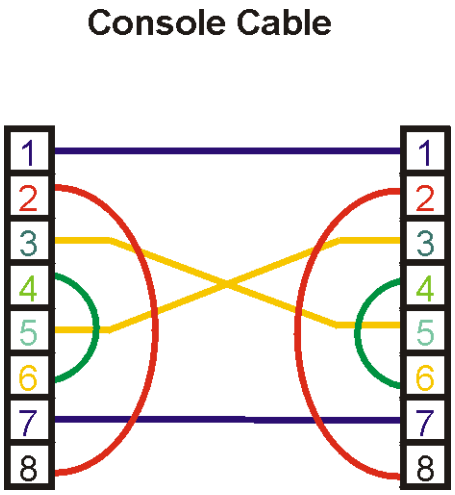
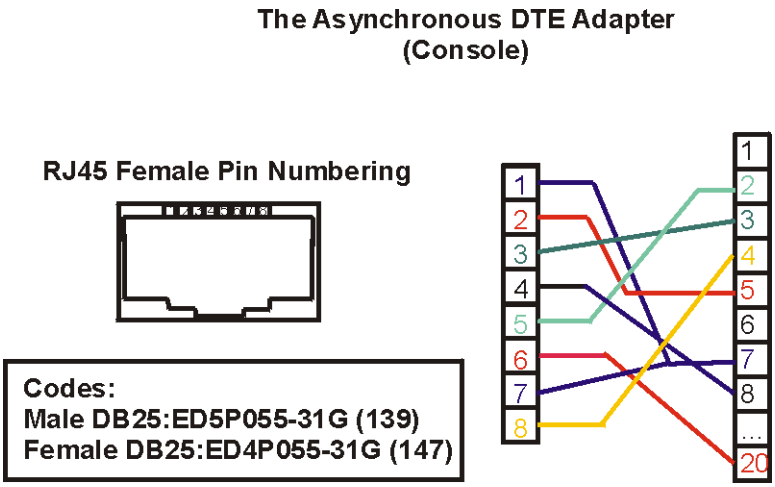
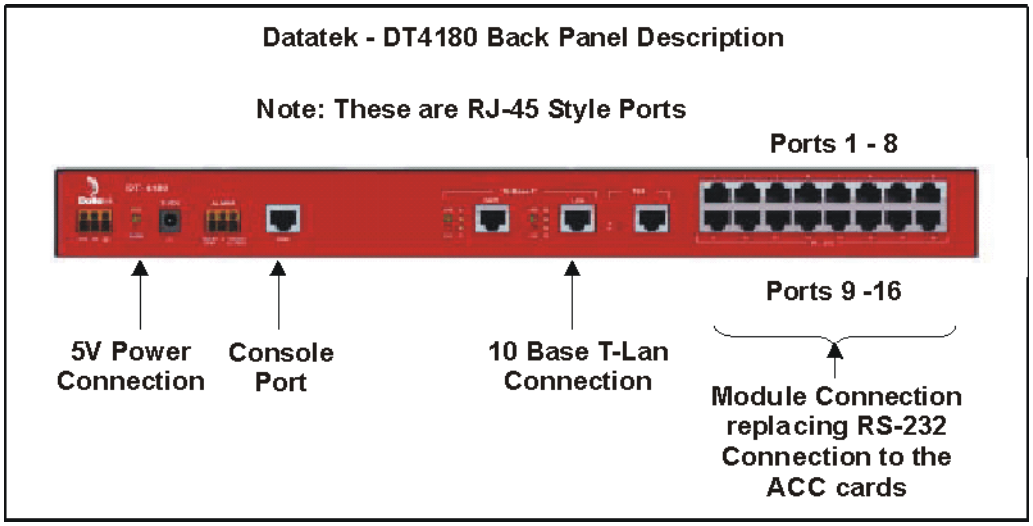



**Figure 6 RJ45 console adapter diagram - DT4180 to console adapter**




After preparing the cables with the connections required, attach the console cable to the Console Port illustrated in Figure 7. Attach the cables from the *4ESS* offices to the ports illustrated below. When using BDR, the same ports should be configured for an office for both the primary and the secondary hosts. The ports addresses are defined as:

**Figure 7 Datatek DT4180 Connection Panel**




## Table

Table 1 provides port settings for the *Datatek*.

**Table 1 Port settings**

| Port | Port Number | Port | Port Number |
|---|---|---|---|
| 1 | 30001 | 9 | 31601 |
| 2 | 30201 | 10 | 32801 |
| 3 | 30401 | 11 | 32001 |
| 4 | 30601 | 12 | 32201 |
| 5 | 30801 | 13 | 32401 |
| 6 | 31001 | 14 | 32601 |
| 7 | 31201 | 15 | 32801 |
| 8 | 31401 | 16 | 33001 |

# Activating the DT4180

## Purpose

After connecting the cabling from the *4ESS* offices to the DT4180, it is then necessary to activate the DT4180. This procedure should be performed once per DT4180 box.

## Instructions

Follow these steps to activate the DT4180:

**1** Obtain an IP address for the DT4180.

**2** Connect the RHEL Console to the DT4180 using the console port.

*Hint: If the Datatek DT4180 is build 7 or later, the console port is 1023; prior to build 7 it will be port 23.*

**3** Through the console, log in to the DT4180.

*Hint: The default password is "initial".*

**4** For communication with the NTM host, the Datatek DT4180 must be build 7 or later. Before proceeding, verify the build version by entering:

```
<DT4180> version
```

The version should be dated, "Friday Jul 25 2003" or later, and look something like this:

```
DT-4180 - Build 85 made on Fri Jul 25 20:01:55 EDT 2003.
   Limited Usage 'Test' version Indexed to Build 7.
```

If the version agrees with the example above, continue with Step 5.

If the build version is not version 7 or later, ***STOP*** and call Alcatel-Lucent field support at 1-866-LUCENT8.

**5** The DT4180 comes deactivated. To get an activation key from Datatek, you must provide them with an internal Serial Number and MAC address. These can be determined by executing:

```
<DT4180> install
```

**Result:** System information will be displayed (Figure 8).

6 Send the information from Step 5 to Datatek.

*Hint: Datatek can be contacted at 908-218-0500, Extension 162.*

**Result:** Datatek responds with an installation key number.

7 From the console window, enter:

```
<DT4180> install key=<installation key number>
```

**Result:** This activates the DT4180.

END OF STEPS

## Figure

Figure 8 provides a sample of output from the `install` command.

### Figure 8 install Output

```
Software installation requires a key.
The following information will be required for the key:
Product Name ==> DT-4180
MAC Address ==> 0.6.29.2.63.6
Serial Number ==> 0.0.0.79.196.13
Software Build ==> 85
```

□

# Configuring the DT4180

## Instructions

Follow these steps to configure the DT4180:

1 From the console, enter:

```
<DT4180> remove mod
```

*Hint: "?" provides a list of commands.*

2 Populate:

```
local ipaddr=<IP address>
local submask=<submask>
gateway ipaddr=<IP address>
dns ipaddrX=<IP address> X=<domain name>
```

3 Enter: `local tcpunreach=icmp`

4 Enter: `<DT4180> restore mod`

**Result:** This activates the changes you entered in Step 2.

5 Verify activation by entering:

```
<DT4180> vfy mod
```

**Result:** In the system information displayed (Figure 9), the service state should now show "Service State==> In Service"

6 Connect the DT4180 to the LAN through the port indicated on the DT4180 (Figure 7).

7 Log on to the NTM host and add the DT4180's IP address to the */etc/host* file.

**8** To verify activation and proper connection to the network, from the NTM host, enter:

`ping <DT4180 IP address>`

**Result:** The system should respond with `<IP address> is alive`.

END OF STEPS

## Figure

Figure 9 provides a sample of output from the `vfy mod` command.

**Figure 9 vfy mod System Output**

```
Current Module Level Configuration:
Serial Number ==> 0.0.8.79.196.13
Service State ==> Out of Service.
Local MAC Address ==> 0.96.29.2.63.6
Local IP Address ==>
Subnet Mask ==>
Gateway IP Address ==>
DNS Name Server Address ==> [#1]
SNMP Trap Manager ==> Not defined.
TCP Action on Unreachable Ports ==> Send ICMP 'Port Unreachable'.
```

# Configuring the ports on the DT4180

### Instructions

Follow these steps to assign each *4ESS* office to a port on the DT4180:

**1** Print (or view) the "/etc/bx25master" file on the NTM host (Figure 10). Determine the "calling" and "called" address for each *4ESS* office.

Collect this information for ***all*** *4ESS* offices. For customers with the NTM BDR features, include offices on both BDR pair hosts.

**2** A port must be out of service in order to change a parameter. Enter:

```
<DT4180> remove <port number>
```

*Hint: The two commands to take a port in and out of service are:* `restore` *and* `remove`.

**3** Assign each *4ESS* office to a port. Enter:

```
<DT4180> port <port number>
```

This port number must also be assigned for each *4ESS* office in the Office File.

All *4ESS* offices must be assigned to a port. The ports for the matching BDR pair should reside on the same port number for each *4ESS* on both DT4180 devices.

**4** Certain parameters of the port command need to be defined for NTM to communicate with the *4ESS* office. Enter:

```
<DT4180> port <port number> type=x25 clk=norm x25dxe=dte
   x25win=7
```

**5** Depending on whether the port is using synchronous clock signals or an external clock source, enter one of the following two options:

- synchronous clock signals

```
<DT4180> port <port number> prot=sdlc dxe=dce
```

- external synchronous clock source:

```
<DT4180> port <port number> prot=sdlc dxe=dte
```

6 Enter:

```
<DT4180> port <port number> vc=1 vcckt=svc vcsvc=mac vcpkt=256
   vcwin=3 padcmap=off
<DT4180> port <port number> vc=1 calling=<Calling number from
   bx25master file>
<DT4180> port <port number> vc=1 called=<Called number from
   bx25master file>
```

7 Enter `<DT4180> vfy port <port number>`

**Result:** The "called" and "calling" numbers should be displayed in the port information displayed (Figure 11).

8 Enter `<DT4180> restore <port number>`

**Result:** This activates the port adding the information entered in Step 3.

9 Enter `<DT4180> disc console`

**Important!** At any point, only one remote access is possible, do NOT forget to disconnect once you are done. No one else will be able to login remotely if you forget to logout.

*Hint: You can also set the TIMEOUT value for automatic logouts.*

```
<DT-4180> timeout [OFF | <number of seconds> ]
```

**Result:** This disconnects the console connection.

10 Follow the instructions in "Adding or removing an office" (p. 33) in the *System Administration Guide* to complete the process to install and collect data from your *4ESS* offices.

END OF STEPS

## Figures

Figure 10 and Figure 11 are referenced in this procedure.

**Figure 10 bx25master file output**

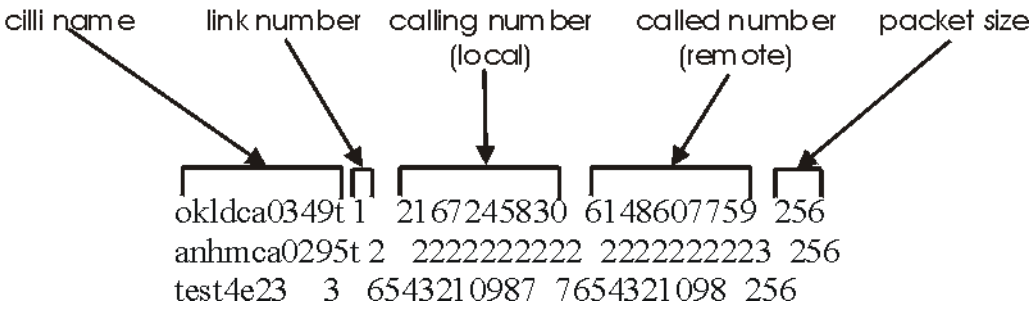



**Figure 11 Port Configuration File**

```
Type ==> Internal X25PAD Instance 5.
Service State ==> Out of Service.
Protocol ==> SDLC.
DXE ==> DTE (w/Normal Clocks).
Physical ==> RS-232.
Baud Rate ==> Not Applicable.
Line Encoding ==> NRZ.
Constant Carrier ==> Enabled.
Permanently Active ==> Enabled.
Line Fill ==> Flag.
Peer to Peer Data Encryption ==> Disabled.
Comment ==> “”
(B)X.25 Parameters:    (B)X.25 LAPB DXE ==> DTE.
(B)X.25 LAPB Tx Window Size ==> 7.
(B)X.25 LAPB T1 Timer Value ==> 3 Seconds.
(B)X.25 LAPB N2 Counter Value ==> 10.
VC 1 : MacStar Service Receive on TCP Port 30801
Packet Window Size ==> 3
VC Circuit Type:  SVC.
--> SVC Called Address: 22222222222
--> SVC Calling Address: 2222222223
--> SVC User Data: 0xC1
Automatic Forward (with M Bit) ==> Packet Size of 256 Bytes.
VC 2 : MacStar Service Receive on TCP Port 30802
Packet Window Size ==> 3
VC Circuit Type:  SVC.
--> SVC Called Address: Not Defined.
--> SVC Calling Address: Not Defined.
--> SVC User Data: 0xC1
Automatic Forward (with M Bit) ==> Packet Size of 256 Bytes.
VC 3 : MacStar Service Receive on TCP Port 30803
Packet Window Size ==> 3
VC Circuit Type:  SVC.
--> SVC Called Address: Not Defined.
--> SVC Calling Address: Not Defined.
--> SVC User Data: 0xC1
```

```
Automatic Forward (with M Bit) ==> Packet Size of 256 Bytes.
VC 4 : MacStar Service Receive on TCP Port 30804
Packet Window Size ==> 3
VC Circuit Type:  SVC.
--> SVC Called Address: Not Defined.
--> SVC Calling Address: Not Defined.
--> SVC User Data: 0xC1
Automatic Forward (with M Bit) ==> Packet Size of 256 Bytes.
VC 5 : MacStar Service Receive on TCP Port 30805
Packet Window Size ==> 3
VC Circuit Type:  SVC.
--> SVC Called Address: Not Defined.
--> SVC Calling Address: Not Defined.
--> SVC User Data: 0xC1
Automatic Forward (with M Bit) ==> Packet Size of 256 Bytes.
VC 6 : MacStar Service Receive on TCP Port 30806
Packet Window Size ==> 3
VC Circuit Type:  SVC.
--> SVC Called Address: Not Defined.
--> SVC Calling Address: Not Defined.
--> SVC User Data: 0xC1
Automatic Forward (with M Bit) ==> Packet Size of 256 Bytes.
VC 7 : MacStar Service Receive on TCP Port 30807
Packet Window Size ==> 3
VC Circuit Type:  SVC.
--> SVC Called Address: Not Defined.
--> SVC Calling Address: Not Defined.
--> SVC User Data: 0xC1
Automatic Forward (with M Bit) ==> Packet Size of 256 Bytes.
```

# 5 Installing and Configuring AI Switch

## Overview

### Purpose

This chapter details AISwitch 130 connections and configuration, as well as how to add and/or monitor an AISwitch 130. Beginning with NTM Release 13, BX.25 connectivity directly to the NTM host was no longer possible. There are procedures to activate and configure the AISwitch 130 to be used as a protocol converter between the NTM host and a *4ESS, 5ESS and DMS* offices.

## Contents

This chapter contains the following topics:



# Introduction

## Overview

For the polled *4ESS, 5ESS and DMS* switch type, NTM will connect via TCP/IP through either the AISwitch 130, or AISwitch 180. The AISwitch receives polls from NTM using TCP/IP and converts it into X25 packets. Conversely, the AISwitch receives responses from the office as X25 packets and forwards the data using TCP/IP to the NTM. Data collection via AISwitch and TCP/IP is available:

- for 4ESS switch with NTM Feature 431, “TCP/IP Interface to 4ESS Switches via AI Switch”
- for 5ESS switch with NTM Feature 409, "TCP/IP Interface to 5ESS Switches via AI"
- for DMS switch with NTM Feature 410, "TCP/IP Interface to DMS Switches via AI"

□

# Prerequisites

### Overview

The following section lists the: hardware, software, firmware and networking prerequisites required for Feature 431, “TCP/IP Interface to 4ESS  Switches via AI Switch”, Feature 409, "TCP/IP Interface to 5ESS Switches via AI" and Feature 410, "TCP/IP Interface to DMS Switches via AI".

### Hardware requirements

The AISwitch card cage (the AI130 CHASSIS or the  AI180 CHASSIS) with one AI198 Common Logic Controller card and one AI296 16-Port High Speed Multi-Protocol Line Card.

NTM must have a properly working, configured and routed IP network interface for access to the WAN.

### Firmware revision level

The AI198 needs to be at a minimum firmware revision level of 2.3 to communicate properly with the AI296. The AI296 should be a minimum firmware revision level of 9.4

### Software Requirements

8920 Network Traffic Management software must be using Release 14 or later.

The AISwitch must have a valid and unique IP address assigned and configured for both the AI198 and AI296 cards in order for proper AISwitch operation. This requires two IP addresses for every AISwitch.

A path on the IP WAN must exist so that the IP data may flow unrestricted from the AISwitches associated with the switches of interest to the target NTM.  This involves possible changes to the routing information on the NTM host so that a valid path is established to all of the monitored switches.  The same assumption concerning IP routing information is made for the AISwitch and it's connection to the WAN.

At a minimum, the IP address of all the AISwitches must be entered into the */etc/hosts* file on the NTM host to enable data transport between all the network elements required for proper data collection.

□

# Initial connection to the AISwitch 130

## Overview

When you first get the AISwitch 130, the only way you can get into it is via the craft port. After you have configured the AISwitch 130 and set up the name, you can telnet to the AISwitch 130 instead.

Connecting a terminal or PC to the AISwitch 130 requires a null modem or null modem cable. In a null modem cable, pins 2 and 3 are reversed on one end.

A dumb terminal or any computer running terminal emulation software can be connected to the craft port of the AISwitch 130. Communications with the craft port must be set to 8 bits per character, no parity, 1 stop bit, and 9600 baud. The craft port also responds to XON/XOFF flow control. The craft port should be port 256 on the system. The screen prompt will refer to it as the craft port.

| | | | |
|---|---|---|---|
| 9600 BPS | 8 Data Bits | 1 Stop Bit | NO Parity Bit |

## References

See the “AISwitch Series” chapter of the *AISwitch Hardware Manual* for more information. This information is also available at http://aiinet.com/documents/Manuals.asp.

# Tips on navigating through the AISwitch menu

### Overview

In the AI menu system, the following rules apply:

- A number followed by a description means you can enter that number followed by a space and a value to set that parameter.
- A number followed by a “+” and a description means there is a submenu.
- A number followed by an “*” and a description means you can toggle through the allowable settings by repeatedly entering the number and carriage return.
- Any changes made in sub-menus are never fully saved until you save at each menu above it until reaching the main menu.

# Configuring the AISwitch

### Purpose

Use the following procedure to set up the TCP/IP address and AISwitch name so that you can telnet to the switch.

### Before you begin

Have your network administrator define a TCP/IP address for the AISwitch (that is, the AI198 controller board) and each converter interface card (that is, each AI296 smart line card). You will also need to know the router address and subnet mask for the AISwitch.

**Important!** Use this procedure so that you are able to simply telnet to the AISwitch 130 (i.e. the AI198 board).

### Instructions

Follow these steps:

1. Connect to the AISwitch.

   **Reference:** "Initial connection to the AISwitch 130" (p. 5)

2. Enter `menu`

   **Result:** The Main Menu is displayed.

```
>menu
Main Menu
01+Configure options affecting the system as a whole
02+Create, delete, or modify a destination name
03+Display all destination names
04+Configure cards
05+Set or remove connection restrictions based on port numbers
06+Display all connection restrictions
07+Configure slot density
08+Configure the alias translation table
09+Display the list of alias translation entries
10+Configure the BOOTP table

21 Exit the configuration menu system
Enter item number and optional ",value" then push <CR> key
```

**3** Enter `1`

**4** Enter `12` to advance to the “Network Parameters” menu.

**5** Enter `1` and the *`TCP/IP address of the AISwitch`*.

**6** Enter `2` and the *`Router address`*.

**7** Enter `3` and the *`Subnet mask`*.

**8** Enter `4` and add the *`telnet server port number 23`*

**9** Enter `5` and add the *`ftp server control port number 21`*

**10** Enter `20` to save the changes.

**11** Enter `20` again to return to the Main Menu.

**12** Enter `21` to exit the menu system.

**13** Enter **menu** and the Main Menu is displayed.

```
>menu
Main Menu
01+Configure options affecting the system as a whole
02+Create, delete, or modify a destination name
03+Display all destination names
04+Configure cards
05+Set or remove connection restrictions based on port numbers
06+Display all connection restrictions
07+Configure slot density
08+Configure the alias translation table
09+Display the list of alias translation entries
```

```
10+Configure the BOOTP table

21 Exit the configuration menu system
Enter item number and optional ",value" then push <CR> key
```

**14** At the Main Menu, enter `1` .

**Result:** The following menu should be displayed:

```
Menu 1
01+Set log and alarm thresholds
02*The display of connection information on user terminals is turned---------ON
03 The duration of a long break sequence in 1/64 seconds-------------0000000120
04*The automatic baud rate detection system is turned------------------------ON
05*Printing of a destination name menu on user terminals is turned-----------ON
06*Allow ports of different speeds to be connected (down speed)--------------ON
07 The designator for this node is----------------AI198
08*Allow dual CPUs to automatically switch if fault--------------------------ON
09+AISwitch automatic commands
10*The display of destination names in four columns is turned---------------OFF
11*Automatic CLC update is-------------------------------------------------OFF
12+Network parameters
13+Time and Date format is hh:mm:ss mmddyy
14+SNMP Trap Table
15+Configure Banner
16+SNTP Configuration
17+Login Security Configuration
18 Interval of the faulted primary CLC trap (0..65535 min.)---------------00000


20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
```

**15** Enter `7 <name_of_the_AISwitch 130><10><13>`

**16** Enter `20` to save the changes.

**17** Enter `21` to exit the menu system.

**18** Reboot the AISwitch by pressing the “boot” button as shown in the AISwitch Hardware Manual or by entering the `reset` command at the AI system prompt.

END OF STEPS

□

# Configuring the AI296 Smart Line Cards

### Purpose

Use this procedure to configure the AI296 Smart Line Cards. Access to the AI296 configuration is done through the AI198 software configuration menus.

### Instructions

Follow these steps:

**1** Telnet to the AI198 Controller board and call up the AI198 menu system.
Enter: `telnet <hostname_of_the_AISwitch 130>`

**2** Log in as `ai`.

**Reference:** See the "System Configuration by Menu" chapter of the *AI198 System Manager/User's Manual* for information on menu navigation and menu descriptions.

**3** Enter `menu`

**Result:** The Main Menu is displayed.

```
>menu
Main Menu
01+Configure options affecting the system as a whole
02+Create, delete, or modify a destination name
03+Display all destination names
04+Configure cards
05+Set or remove connection restrictions based on port numbers
06+Display all connection restrictions
07+Configure slot density
08+Configure the alias translation table
09+Display the list of alias translation entries
10+Configure the BOOTP table

21 Exit the configuration menu system
Enter item number and optional ",value" then push <CR> key
>
```

**4** Enter `4` to advance to the "*`Configure cards`*" menu.

**5** Enter baseport of the card to edit; enter `1 0` for the first AI296 card, `1 16` if you have a second AI296 card and `1 32` if you have three AI296 cards.

**6** Enter `2` to advance to the "*Configure as AI296 network interface card*" menu.

**7** Enter `11` to advance to the "*Configure as AI296 network interface card*" menu.

**Result:** The following menu should be displayed:

```
                                                                Menu 4.2.11
01 IP Address (0.0.0.1 - 255.255.255.254)-----------------------135.007.029.022
02 IP Address Range (1 - 255)-------------------------------------------------001
03 IP Subnet Mask (0.0.0.1 - 255.255.255.254) -------------------255.255.255.000
04 Primary IP Router Address (0.0.0.0 - 255.255.255.254) -------135.007.029.254
05 Secondary IP Router Address (0.0.0.0 - 255.255.255.254) -----000.000.000.000
06*TCP Default Window Size (200, 512, 1024, 2048)---------------------------2048
07*TCP Send Ahead------------------------------------------------------------ ON
08+SNMP System Parameters
09*Bring passive link down when all calls have cleared----------------------OFF
10 Passive link Standby Mode timer-----------------------------------------0000060
11 Passive link Stay Inactive timer----------------------------------------0000025
12+X.25 Link Setup
13+Async Link Setup
14+IP Over X.25 Subnets
15+IP Static Routes
16 Telnet port number (1..65534)-------------------------------------------00023


20 Retain these changes for saving in Menu 4
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

**8** Enter `1` and the *TCP/IP address of the AISwitch*.

**9** Enter `3` and the *Subnet mask*.

**10** Enter `4` and the *router address*.

**11** Enter `20` to save the changes.

**12** Enter `21` to exit the menu system.

END OF STEPS

□

# Configuring the links for the AI296 Smart Line Cards

### Purpose

Use this procedure to configure the links for the AI296 Smart Line Cards. Access to the AI296 configuration is done through the AI198 software configuration menus.

### Instructions

Follow these steps:

**1** Telnet to the AI198 Controller board and call up the AI198 menu system. Enter:

`telnet <hostname_of_the_AISwitch 130>`

**2** Log in as `ai`.

**Reference:** See the "System Configuration by Menu" chapter of the *AI198 System Manager/User's Manual* for information on menu navigation and menu descriptions.

**3** Enter **menu** and the Main Menu is displayed.

```
>menu
Main Menu
01+Configure options affecting the system as a whole
02+Create, delete, or modify a destination name
03+Display all destination names
04+Configure cards
05+Set or remove connection restrictions based on port numbers
06+Display all connection restrictions
07+Configure slot density
08+Configure the alias translation table
09+Display the list of alias translation entries
10+Configure the BOOTP table

21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

**4** Configure each of the AI296 cards.

- Select `4` to advance to "Configure cards" menu.

- Enter baseport of the card to edit; enter `1 0` for the first AI296 card, `1 16` if you have a second AI296 card and `1 32` if you have three AI296 cards.
- Enter `2` to advance to “Configure as AI296 network interface card” menu
- Enter `11` to advance to “Configure as AI296 network interface card” menu
- Enter `12` to advance to “Link Setup”

**Result:** You should now be at the following menu:

```
Menu 4.2.11.12
01 Link number (1-16)-----------------------------------------------------01
02*Link Type (Async, X25, HDLC, SyncPPP, AsyncPPP, MLT)---------------- X.25
03 Link Description------------------------------ Async link 1
04*Link state (Enabled, Disabled)------------------------------------- Enabled
05*Link mode (Normal, Passive, Extended)------------------------------ Normal
06 Port speed (0 - 128000 bps, 0 is external clocking)-------------------009600
07+X25 LAPB Parameters
08+X25 Parameters
09+Virtual Circuits
10*Hardware Interface (RS232,RS530,V.35)----------------------------------RS232
11+BX25 Configuration
12 Auto Disable Error Limit (0-1000000)-----------------------------------0000000
13*Passive Link with Clocking (Enabled, Disabled)----------------------Disabled


20 Save the changes made
21 Exit this menu with no changes
   Enter item number and optional ",value" then push <CR> key
   >
```

**5** Enter `1` followed by the link number to enter each link on the AI296 card’s data

**6** Enter `2`, *`Link Type (Async, X25)`*, until you see X25 on the right hand side of that line.

**7** Enter `4`, Link state (Enabled, Disabled), until you see `Enabled`

**8** Enter `5`, Link mode (Normal, Passive, Extended), until you see `Normal`

**9** Enter `6`, Port speed (0-128000 bps, 0 is external clocking) and the correct speed, probably `9600`.

**10** Enter `10`, Hardware interface (RS232, RS530, V.35), until you see the `RS232` interface.

**11** Enter `7` to advance to “X25 LAPB Parameters” (most of these defaults should apply, only item 1, interface mode may need to be changed to “`DCE`’).

```
                                                          Menu 4.2.11.12.7
01*Interface mode (DTE or DCE)-------------------------------------------DTE
02*Frame level disconnect (Active, Passive, Other)---------------------- Active
03 Frame Window size (1 - 7)---------------------------------------------3
04 N2 retry count (0 - 255)----------------------------------------------020
05 T1 ack timer (1 - 25500 ms)-------------------------------------------03000
06 T2 ack delay timer (1 - 25500 ms)-------------------------------------00400
07 T4 idle timer (0 - 200000 ms)-----------------------------------------025000


20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

**12** Enter `20` to save changes

**13** Enter `8` to advance to “X25 Parameters” (many of these defaults will apply).

```
                                                          Menu 4.2.11.12.8
01*X25 Facilities negotiation--------------------------------------------OFF
02*Max packet size (128, 256, 512)---------------------------------------256
03 Packet window size (1-7)----------------------------------------------007
04 X121 local address (0-15 decimal digits)------------------------------------
05 T20 restart timer (0-3200000ms)---------------------------------------0180000
06 T21 call timer (0-3200000ms)------------------------------------------0200000
07 T22 reset timer (0-3200000ms)-----------------------------------------0010000
08 T23 clear timer (0-3200000ms)-----------------------------------------0180000
09 T24 window timer (0-3200000ms)----------------------------------------0075000
10 T25 data retransmission timer (0-3200000ms)---------------------------0150000
11 T26 interrupt timer (0-3200000ms)-------------------------------------0180000
12 T28 registration timer (0-3200000ms)----------------------------------0180000
13 R20 restart count (0 - 255)-------------------------------------------001
14 R22 reset transmission count (0 - 255)--------------------------------001
15 R23 clear retransmission  count (0 - 255)-----------------------------001
16 R28 registration retransmission count (0 - 255)-----------------------001
17*Protocol version (1980, 1984, 1988)-----------------------------------1984
```

```
20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

**14** Enter `3` and set the Packet window size to `3`.

**15** Enter `4` and set the x.121 address assigned to the `4ESS, 5ESS or DMS SVC`.

**16** Enter `20` to save changes

**17** Enter `9` to advance to “Virtual Circuits” (enter information based on your setup, Permanent Virtual Circuit (PVC) or Switched Virtual Circuit (SVC): with the AISwitch no PVCs are required, enter “`0`” for items 1 and 2; one two-way SVC is required. Enter “`1`” each for items 5 and 6.

```
                                                          Menu 4.2.11.12.9
01 Number of PVCs (0 - 1024)-----------------------------------------------0003
02+PVC configuration
03 Incoming only SVC low (0 - 4095)----------------------------------------0000
04 Incoming only SVC high (0 - 4095)---------------------------------------0000
05 Two-way SVC low (0 - 4095)----------------------------------------------0000
06 Two-way SVC high (0 - 4095)---------------------------------------------0000
07 Outgoing only SVC low (0 - 4095)----------------------------------------0000
08 Outgoing only SVC high (0 - 4095)---------------------------------------0000


20 Save the changes made
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
>
```

**18** Enter `20` to save changes

**19** Enter `20`. Repeat until you are back at the main menu.

**20** Enter `21` to exit the menu system.

**21** Reboot the AISwitch by pressing the “boot” button as shown in the AISwitch Hardware Manual or by entering the `reset` command at the AI system prompt.

END OF STEPS

□

# Adding a new switch to the AISwitch

### Purpose

The AI296 uses aliases to route calls across the backplane of the AISwitch. Each incoming call's routing information must match an entry in the alias table. If the information does not match, the AI296 rejects the call. The switch must be defined in the alias translation table before protocol conversion will occur.

### Before you begin

The AISwitch for interface to *4ESS, 5ESS, DMS* will have the following basic parameters:

- 4ESS virtual circuit connection uses a two-way SVC. 5ESS and DMS use PVC connection.
- SVC number 1 used (low, medium and high channel both == 1)
- PVC number (allowed values from 1 to 3)
- NTM initiates the call request (calling address)
- 4ESS, 5ESS, DMS is the server (called address)
- This will be a "SLC Routing Translation"

  **Important!** The string ="", double quote, double quote, is used as "Called Protocol"; the ="" on line 10 forces no called protocol. Certain protocol options are automatically copied from one line to the other and this special string is to insure that no protocol will be used other than the default X.25 for this link.
- Applied Innovation "AEPN" AISwitch protocol is used as "Callers Protocol"
- "Alias name" will be in the form "NNN.nnn.sss.hhh#pppp";
  where:
  - NNN.nnn.sss.hhh is the AI296 interface card IP address. This IP address is configured in *"/etc/hosts"* file as the office IP address to which NTM will connect.
  - pppp is the port number defined on NTM for access to the 4ESS, 5ESS, and DMS.
- "Called Address" value. Default is PVC.
- "Call data" will be in form X25.L.PVC where:
  - L is the AI296 link number (i.e. 1 (one))
  - PVC is the PVC number (from 1 to 3)

From the Main Menu, choose menu item 8, "Configure the alias translation table".

**Result:** Menu 8 appears.

```
Menu 8
01 Alias name ------------------------------------------------135.111.87.92#6000
```

```
02+SLC routing translation
03 Destination -
04 Called address ------------------------------------------------------------PVC
05 This alias is visible in the destination menu-----------------------------NO
06 Link number is (1..16) -
07 Caller's address -
08 Call data -----------------------------------------------------------X25.6.1
09 App. string -
10 Called protocol -
11 Caller's protocol ---------------------------------------------------------AEPN
12 Alternate routing alias -

14+Test macros
15 Show entire alias
16 Show the first entry in the alias translation table
17 Show the previous entry in the alias translation table
18 Show the next entry in the alias translation table
19+Delete the above alias translation entry
20 Save the changes made (20b: to the beginning, 20e: to the end)
21 Exit this menu with no changes
Enter item number and optional ",value" then push <CR> key
```

# Deleting a switch from the AISwitch

## Purpose

Use this procedure to delete a switch from the AISwitch.

**Reference:** See the AI (Applied Innovation's) Web Site at: http://www.aiinet.com/ for more information on the AI switch and "Deleting a switch" (p. 27) to delete a switch from the AISwitch.

## Instructions

Follow these steps:

1. Telnet to the AI198 Controller board and call up the AI198 menu system. Enter:

   `telnet <hostname_of_the_AISwitch 130>`

2. Log in as `ai`. Bring up the menu system, enter:

   `menu`

   **Reference:** See the "System Configuration by Menu" chapter of the *AI198 System Manager/User's Manual* for information on menu navigation and menu descriptions.

3. From the Main Menu, enter `8` to advance to the alias translation table

4. Display the first entry in the alias translation table. Enter:

   `17`

5. Enter `18` to display each alias in the alias translation table until you find the aliases you wish to delete. Each switch requires 3 aliases. When you find the first alias to delete, enter `19`. Enter `18` again to find the second alias to delete. Once you find it, enter `19`. Keep entering `18` until you find the third and final alias to delete for this switch. Enter `19`. Enter `20` to save your changes.

6. Enter `9` to advance to "Display the list of alias translation entries" from the main menu as a summary view of your changes.

   **Result:** The output should not show the deleted values like the following:

```
                                                                  Menu 9
01 The following alias translation entries have been defined

Alias                Destination  Visible  Trans.   Calling String
                                           Type
135.7.29.22#1001                     Y       8    X25.1.6302456
135.7.29.22#1002                     Y       8    X25.1.6302456
135.7.29.22#1003                     Y       8    X25.1.6302456
135.7.29.22#2001                     Y       8    X25.2.7409747629
135.7.29.22#2002                     Y       8    X25.2.7409747629
135.7.29.22#2003                     Y       8    X25.2.7409747629
135.111.87.92#6000                   N       8    PVC
135.111.87.92#6001                   N       8    PVC
135.111.87.92#6002                   N       8    PVC

<CR> Show more alias translation entries
21 Return to Main Menu
Enter item number and optional ",value" then push <CR> key
>
```

**7** Enter `21` to return to the main menu.

**8** Enter `21` to exit the main menu.

**9** Enter `bye` to exit or terminate the telnet session.

**10** Reboot the AISwitch by pressing the “boot” button as shown in the AISwitch Hardware Manual or by entering the `reset` command at the AI system prompt.

END OF STEPS

□

# 6 Loading NTM on the Host

## Overview

### Purpose

This chapter discusses the processes and procedures to load NTM on the host.

### Introduction

Before getting into the detailed procedures of loading NTM on the host a brief high-level introduction to the process may be beneficial.

There are two key components that must be in place for a successful load process. First, at this point it is assumed that the host has been loaded with the appropriate version of Red Hat Enterprise Linux, if not please see the "Red Hat Enterprise Linux 5 Installation" (p. 14) section. And that the installer has system administration privileges and root user access to the host.

The second key component for a successful installation or upgrade is the disk and filesystem configuration. See Chapter 8, "Database Administration" in the *System Administration Guide* for details on these needs.

To aid the installer in determining system readiness for installation or upgrade an NTM check configuration tool has been created. This tool checks key aspects of the host and will alert the user to potential issues before NTM application installation begins. The intention is for this tool to be provided to the customer site ahead of the planned

installation date to allow analysis of the host and identify areas to be addressed prior to application installation. For how to use the tool, please see section "CKNTM Tool" (p. 2). Once the foundation for installation is in place (operating system and disk configuration are completed) the NTM application can be loaded. Loading of the application consists of the following high-level steps:

1. Installing the 3rd Party Software from the supplied DVD.
2. Installing the NTM application software from the supplied CD.
3. Install the customer feature and generic locking files.
4. Run the installation script to place the necessary NTM framework in place.
5. Build databases, configure users, etc.

Once the application is installed the user configures the recordbase with the necessary network element reference data utilizing any additional feature ability purchased and installs the recordbase into the NTM system. The system is then ready to be started, allowing the user to audit, control, and/or view periodic data for the network elements.

The procedures that follow provide the details for the high-level steps presented above.

### Purchasable features

If you have purchased optional features, there may be steps in the procedure(s) in this chapter that address installation of those features on the NTM host.

### Recommended sequence and time allotment for procedures

This table details the frequency and time required for each of the procedures in this chapter.

| Procedure | Approximate Time Required | Should be Performed... | Initial Load | Upgrade |
|---|---|---|---|---|
| "NTM Disk and File System Configuration" (p. 4) | 1 hour | When required by a new NTM release | X | X |
| "Third Party Software Installation" (p. 7) | Up to 1 hour | When required by a new NTM release | X | X |
| "Loading the NTM application" (p. 11) | Up to 2 hours | When required by a new NTM release | X | X |
| "Comparing new and user-changed system files" (p. 14) | 20 minutes | When required by a new NTM release | | X |

| Procedure | Approximate Time Required | Should be Performed... | Initial Load | Upgrade |
|---|---|---|---|---|
| "Building the databases" (p. 16) | Up to 3 hours | Usually every release, or when NTM issues an *RHEL* patch | X | X |
| "Updating NTM software" (p. 21) | Up to 2 hours | When required by a new NTM release | | X |
| "Configuring your browser" (p. 25) | 30 minutes | When required by a new NTM release | X | X |
| "Configuring SSH for NTM" (p. 30) | 10 minutes | When required by a new NTM release | X | X |
| "Creating client user keys" (p. 33) | 10 minutes | When required by a new NTM release | X | X |

## Contents

This chapter contains the following topics:

# NTM Disk and File System Configuration

## Purpose

While the NTM application is largely independent of the layout and size of the typical Linux file systems, it does expect some space be made available in certain file systems and, possibly, within a volume group.

The `cktm` tool will expect that a certain amount of free space is available in the *`root (/)`* file system. It does not impose any requirements on others, such as */usr* and */home*. Some space will be used for configuration files in */etc*, for example, but the only typical *Linux* file system that will significantly effected by the application in */var*. The table below lists the recommended free space for the *root (/)* and */var* files systems.

Please note that the application does not require that */etc, /var, /home*, and other typical *Linux* directories, live in their own file system. It is perfectly acceptable for them to all exist in the root file system as long as there is sufficient free space and the administrator is aware that the file system utilization will grow for a period of time.

Aside from the typical *Linux* file systems, NTM requires a number of directories (possibly within their own file systems) for its operation. In addition, the NTM application requires a set of logical volumes that are used to store daily real-time data. Finally, for performance reasons, the Oracle database data is typically stored in its own volume groups.

The ideal disk configuration would utilize 3 volume groups. It is recommended that `vg00` be a RAID 1 volume and `vgdb1` and `vgdb2` be RAID 5 volumes.

### Required configuration

NTM requires the following configuration:

**Table 1 Required disk and file system configuration**

| Volume Group | Logical Volume | Mount Point | FS | Minimum Size | Notes |
|---|---|---|---|---|---|
| vg00 | /dev/vg00/root | / | ext3 | 32GB | All standard Linux directories could live here, as well as the "vg00" required ones listed below if space is added as indicated in each row |
| | /dev/vg00/home | /home | ext3 | As needed | Optional |
| | /dev/vg00/var | /var | ext3 | 32GB | Recommended |
| | /dev/vg00/tmp | /tmp | ext2 | 8GB | Recommended |
| | /dev/vg00/musr | /musr | ext3 | 10GB | Required |
| | /dev/vg00/nm | /nm | ext3 | 5GB | Required |
| | /dev/vg00/orasw | /opt/orasw | ext3 | 10GB | Required |
| | /dev/vg00/rawdata | /rawdata | ext2 | 64GB | Required |
| | /dev/vg00/tempdb | /rawdata/tempdb | ext2 | 5GB | Required |
| vgdb1 | /dev/vgdb1/rdbdata1 | /rdbdata1 | ext2 | 420GB | Required |
| vgdb2 | /dev/vgdb2/rdbdata2 | /rdbdata2 | ext2 | 420GB | Required |
| | /dev/vgdb2/tuxdata | /tuxdata | ext2 | 50GB | Required |
| user defined | user defined | user defined | ext3 | 64GB | Recommended. Chosen location should be specified in *arcmanager.conf* (`HISTBACKUP` variable). To be used by arcmanager for storing disk backups. |

# Recommended list of files to be restored

### Table

Table 2 lists all the files that need to be restored from the full file system back-up. This table also suggests what needs to be done with each of the restored files. All files in Table 2 should be restored to the *"/var/crash/"* directory.

**Table 2 Files to be restored**

| File | What needs to be restored | Comments |
|---|---|---|
| /etc/passwd | Copy the user entries from the old password file, /var/adm/crash/etc/passwd to the current file. | Save the existing *"/etc/passwd"* file. |
| /etc/group | Copy the user entries from the old group file, /var/adm/crash/etc/group to the current file. | Save the existing *"/etc/group"* file. |
| /etc/cron.*/ntm-* | | |
| /etc/cron.allow | Any user specific entries from the old file in the /var/adm/crash/var/adm directory should be copied to the new file in the /etc/cron directory. | |
| /nm/etc/permissions | Copy the old file from /var/adm/crash/etc directory to the /etc directory. | |
| /etc/motd | | |
| /etc/hosts.equiv | | |
| /etc/resolv.conf | | |
| /etc/nsswitch.conf | | |
| /etc/hosts | Any user specific entries from the old file in the /var/adm/crash/etc directory should be copied to the new file in the /etc directory. | |
| /etc/services | | |
| /musr/nmadm/ntmldap.ldif | /nm/web/sup_soft/ldap/bin/ldif2dbm /musr/nmadm/ntmldap.ldif<br>**Notes: If during an upgrade host names were changed, the host names within this file will need to be changed accordingly.** | This file should be restored before proceeding to the Chapter 7, "Configuring Web Servers for NTM" |

# Third Party Software Installation

### Purpose

Before NTM installaton, it is necessary to include all the latest patches and Third party software. Follow this procedure to prepare the system for the proper NTM installation.

### Before You Begin

Mount the 3rdparty DVD. A recommended setup is to create a directory */mnt/dvd* and place a line in */etc/fstab* containing:

```
/dev/dvd /mnt/dvd udf,iso9660 user,exec,noauto,ro 0 0
```

### Instructions

Follow these steps to install third party software:

1. Follow the */mnt/dvd/README.txt* file to install all RPMs. When finished unmount the 3rdparty DVD.

2. Setup a repo for the CD and mount the RHEL DVD (the procedure assumes it mounts on */mnt/dvd*).

3. Create a file, */etc/yum.repos.d/localmedia.repo*, containing the following:

```
[rhel-local]
name=Red Hat Enterprise Linux $releasever - $basearch
baseurl=file:///mnt/dvd/Server
enabled=1
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
```

4. If your machine is registered with Red Hat Network, then go to Step 7.

5. Check the output from the `cknt m` tool.

   *Hint: For more information, see "CKNTM Tool" (p. 2).*

6. Unmount the RHEL DVD.

**7** To install Oracle 11g use the NTM 3rd Party DVD. Mount the DVD and follow the README.txt to install Oracle. Mount the DVD using the following command:

```
mount /dev/dvd
```

**Result:** This will mount the DVD on */mnt/dvd*.

**8** Unmount and Eject 3rd party DVD.

END OF STEPS

# Third Party Software Upgrade

### Before You Begin

The installation of a package upgrade may require the installation of other package upgrades as well. You can choose to upgrade the package along with its dependencies, or not install the package at all.

**Important!** You cannot use the `force` option to install a third party software package. It can break all dependencies.

**Important!** Before upgrade, backup all the necessary customized files for the given third party software packages.

**Important!** Before starting an upgrade of any third party software, contact your Alcatel-Lucent customer engineer to ensure that this activity is not going to affect the NTM software.

### Instructions

Execute one of the following steps to upgrade third party software. Choose appropriate method for your system:

**1** If your machine is registered and connected to Red Hat Network simply execute command:

```
yum update <packagename>
```

**2** If you have defined a local repo that can be reached within your local network, then create a repo definition in */etc/yum.repos.d* and then run:

```
yum update <packagename>
```

**3** If you have the updates downloaded into a local directory (ftp, flash drive, etc). Then go to the update directory (`cd /<update directory>`) and execute one of the following commands:

```
yum --nogpgcheck localinstall *
rpm --nosignature -Uvh *
```

*Hint: If you need to install only a subset of the packages in the directory, then you have to use the full path name(s) in place of the "*" in the above commands example.*

END OF STEPS

# Loading the NTM application

### Before you begin

This procedure assumes that the user is familiar with *RHEL* install commands. Only the significant prompts have been detailed here. It is assumed that the user can fill in all other information, tab through various screens.

Before beginning the installation ensure you have the necessary media to complete the installation. The media required are:

- 8920 Network Traffic Management software Software and Documentation CD
- Media containing the customer specific feature and generic locking files. Note, this is typically in the form of a CD, but may be delivered electronically in some cases.

**Important!** The third party software must be installed before installing the application software. Also, ensure that none of the predefined user IDs and group IDs are used before installing NTM.

**Reference:** See the "Third Party Software Installation" (p. 7) procedure in this guide and the System Security, User Groups, and Group Permissions in the *System Administration Guide*.

### Instructions

Follow these steps to load the NTM application:

**1** Log in as `root`

**2** Insert the "8920 Network Traffic Management software and Documentation" CD into the host CD/DVD drive.

**3** Add CD content as a `yum` repository.

**Example:** This is an example of */etc/yum.repos.d/ntm.repo* file:

```
[ntm]
name=NTM Package Repository
baseurl = file:///media/dvd
enabled = 1
protect = 0
gpgcheck = 0
```

4 Execute the following commands and address any issues that are reported:

```
/opt/ckntm/ckntm
/opt/ckntm/ckntm oracle
```

*Hint: For more information, see* "CKNTM Tool" (p. 2).

**Important!** In case `ckntm` returns some errors, the following scripts from the *os_config* directory can assist in resolving them:

```
filesystem_cfg.sh
kernel_param.sh
services.sh
users_groups.sh
```

In case `ckntm oracle` returns errors or warnings, follow the instructions in the command output to find more information. If necessary, contact Alcatel-Lucent support for assistance.

When finished, rerun the `ckntm` command or commands that failed to verify all issues have been addressed.

5 Execute `yum clean all` to clear `yum` cache.

6 To start installation of the NTM software execute `yum install ntm`

**Result:** The screen will then display installation progress of the various files and packages.

*Hint: If failures are encountered contact Alcatel-Lucent support for assistance.*

7 Install the feature and generic locking files into the */nm/etc* directory. As follows:

```
cp <feature file> /nm/etc/.fg
cp <generic file> /nm/etc/.gf
```

*Hint: If system size needs to be adjusted, such as for a lab environment, then have Alcatel-Lucent Support Services adjust the feature set at this point.*

8 If migrating from HP-UX or replacing hardware see Chapter 2, "HP to Linux Migration".

9 Execute `/nm/sys/ntm_init` to start post installation configuration.

**10** When configuration is finished log in again to reset your environment.

**11** Run `/opt/ckntm/ckntm oracle_inst` to verify that the Oracle database instance is running and that NTM can connect to the database.

*Hint: For more information, see* "CKNTM Tool" (p. 2).

**Important!** If errors or warnings are reported, follow the instructions given in the command output to find more information. If necessary, contact Alcatel-Lucent support for assistance.

**12** See the *System Administration Guide* for additional procedures and administration tasks that apply to installed systems.

END OF STEPS

□

# Comparing new and user-changed system files

### Purpose

This procedure is performed after installing NTM. The installation process loads default versions of system files. Some of these files may have been changed by users. The changed files are stored in *"/musr/load_diffs"* (for NTM).

For example, *"/etc/passwd"* is loaded as part of the installation process. If the *"/etc/passwd"* file had been changed, the changed version is stored in *"/musr/load_diffs/etc/passwd"*.

It is important to compare the newly loaded files with the files in *"/musr/load_diffs"* to determine whether there is information in the new files that should be moved to the user-changed files. For example, the new default *"/etc/passwd"* file may have a new system password.

### Instructions

Follow these steps to compare the default files with changed files.

**1** Log in as `root`

**2** Enter `cd /musr/load_diffs`

If there are no files in *"/musr/load_diffs"*. ***STOP. YOU HAVE COMPLETED THIS PROCEDURE.***

**3** Use the `diff` command to list any differences between the files in *"/musr/load_diffs"* and the new system files.

```
Example: diff /musr/load_diffs/etc/passwd /etc/passwd
```

This lists differences between these two versions of the *"passwd"* file.

**4** If there is information in the file in *"/musr/load_diffs"* that should be in the new version of the file, add that information.

For example, if there are passwords in *"/musr/load_diffs/etc/passwd"* that are needed and do not exist in the new version of *"/etc/passwd"*, add the information to *"/etc/passwd"*.

END OF STEPS

□

# Building the databases

### Instructions

Follow these steps to create the database:

1. Log in as `nmadm`.

   *Hint: If this is an initial load, obtain the* `nmadm` *password from the system administrator.*

2. Enter `export PATH=$PATH:/nm/rdb/dbinst/bin`

3. Enter `install_rdb` to build the relational database.

4. Log off and log back in as `root`.

5. Enter `export PATH=$PATH:/nm/rdb/dbinst/bin`

6. Enter `install_rdb_root` This updates the cron and rc scripts to include rdb.

7. If using Feature 130, “Capacity and Usage Reporting”, turn off "perf" in "/etc/inittab". Save the file and execute:

   `init q`

   *Hint: You can do this by changing the field from "respawn" to "off". You must use root login to edit the "/etc/inittab" file*

8. Log in as `nmadm`

9. Enter `/nm/web/other-bin/stop_n_o_server`

10. Enter `/nm/dbutil/build_db` to build the new databases.

**Important!** This step takes up to 15 minutes to complete.

**11** Login as `root`

**12** Enter `cd /`

**13** Reboot the system by executing:

```
shutdown -r -y <grace_period>
```

**14** Log in as `nmadm`

**15** If you have Feature 3, "Management of Record Base Partitions and Subnetworks", enter `snw_info` to verify the correct subnetwork configuration.

If modification or additions are necessary, enter `snw_admin` to build the subnetworks.

**16** The record base must be set up before you proceed with Step 20 through Step 28. If this is a new installation, set up the record base before proceeding.

**17** Execute steps described in chapter Configuring Web Servers for NTM.

**18** If you have Feature 436, "UDDM/UDNEI" run `/nm/sys/CreateUDDM` to configure UDDM tables for UDNEI data collectors.

**19** If you have the Feature 455, "Support for NexTone Session Border Controller Outbound Call Limiting" execute the following steps:

- run `/nm/sys/create_ocl` script.
- Follow the instructions listed by the `create_ocl` script, being sure to execute the necessary steps.
- Execute the `manage_uddm -j` command to load OCL related joins to the database. For more information about this command refer to the NTM online documentation.

- Create a new cron job file in the `/etc/cron.d` directory and add the following line to this file to synchronize NTM ratelimitpolicies with the switches:

```
'mm HH * * *       . /etc/nm.env; echo quit |
   $NMSDIR/cmdbin/preplan ratelimitpolicy.plan vld >
   /musr/log/rlp.out 2>&1; echo quit | $NMSDIR/cmdbin/preplan
   ratelimitpolicy.plan add >> /musr/log/rlp.out 2>&1'
Where:
HH - the hour the preplan will be executed
mm - the minute the preplan will be executed
```

  **Note:** The name of the file in `/etc/cron.d` containing a cron job does not matter. However, it is advisable to add an `'ntm-'` prefix to the cron jobs which are run by `nmadm`. For example, in this case, the name of the file could be "`ntm-oclconfig`".

**20** If you have defined or migrated any UDDM objects then the appropriate UDDM commands must be executed in order to properly install and use these objects.

**21** Edit the *"/nm/ubin/start.all"* file and update if necessary, the DCOL configuration for TDMS/DCOS/FEP.

**Important!** This will be automatically done when upgrading from NTM Release 10.1, or later, to this release of NTM.

**22** Enter: `dbtest all`

**23** Correct any errors in the record base before going further.

**Reference:** dbtest command (5-17) in the *Input Commands Guide*

**24** If you have Feature 8, "Disaster Recovery (Duplex)" and Feature 40, "Enhanced Disaster Recovery", enter `/nm/sys/bdr_deact` to deactivate BDR.

**25** Enter: `create rspte`

**26** Enter: `create all`

**27** Enter `installdb rspte now`

**28** Enter: `installdb all now`

**29** Enter `/nm/rdb/dbutil/analyze_tabs`

**30** If using Feature 130, “Capacity and Usage Reporting”, turn on "perf" in "/etc/inittab". Save the file and execute:

```
init q
```

*Hint: You can do this by changing the field from "off" to "respawn". You must use root login to edit the "/etc/inittab" file*

**31** If you have Feature 8, “Disaster Recovery (Duplex)” and Feature 40, “Enhanced Disaster Recovery”, enter `/nm/sys/bdr_act` to activate BDR.

**32** Enter `startsys` to start the system.

**Reference:** Chapter 4, “Starting and Stopping the System” in the *System Administration Guide*

**33** For existing customers with Feature 8, “Disaster Recovery (Duplex)” and Feature 40, “Enhanced Disaster Recovery”, it is recommended that you perform a backup of your system before returning operations to the BDR host.

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

**34** For existing customers with Feature 8, “Disaster Recovery (Duplex)” and Feature 40, “Enhanced Disaster Recovery”, run `bdr_switchbk` to return data collection for a DCC, office, or the entire system.

***OR***

New customers should proceed with adding Network Elements.

**Reference:** bdr_switchbk command (3-11). in the *Input Commands Guide*; Chapter 9, “Adding and Removing Network Elements” chapter in the *System Administration Guide*.

**35** Enter `act` to activate each of the network elements and initiate data collection.

**36** For existing customers with Feature 86, "Local Audit Data Restoration", enter `local_audit`

**Result:** The `local_audit` command populates the database using the *Linux* system audit result files that have been backed up from the primary host. `local_audit` does not access any of the entities or other hosts.

*Hint: The audit information for a backup entity is populated in the database only if the Linux audit result files for the entity exist on this host.*

**37** Run `audit all all` to ensure that all data is synchronized with the data in the offices.

**38** Enter `/nm/web/other-bin/start_n_o_server`

**39** Execute the `/nm/rdb/dbutil/repairuser -a` command.

**Result:** This command is used to quickly add the set of user's found in the */etc/passwd* file as Oracle users. You will be shown the list of users to be added and confirm the addition.

END OF STEPS

# Updating NTM software

### Instructions

Follow these steps to upgrade the NTM software to new full release:

1 Backup the system.

2 Log in as `nmadm`.

3 Run `stopsys`.

4 Log in as `root`

5 Setup the NTM `yum` repository to provide new NTM version you are about to install and execute `yum clean all` to clear `yum` cache.

6 Execute `yum update cktm`

**Result:** `cktm` tool will install in the */opt/cktm* directory.

7 Execute the following commands to check system configuration:

```
/opt/cktm/cktm upgrade
/opt/cktm/cktm oracle
```

*Hint: For more intformation, see "CKNTM Tool" (p. 2).*

**Important!** In case `cktm` returns some errors, the following scripts from the *os_config* directory can assist in resolving them:

```
filesystem_cfg.sh
kernel_param.sh
services.sh
users_groups.sh
```

In case `ckntm oracle` returns errors or warnings, follow the instructions in the command output to find more information. If necessary, contact Alcatel-Lucent support for assistance.

When finished, rerun the `ckntm` command or commands that failed to verify all issues have been addressed.

**8** Execute `yum update ntm`

**Result:** The system will be updated to version delivered with new rpms.

**9** Execute `/nm/sys/ntm_init`

**10** Follow the special instructions in the Release Notes.

**11** Log in as `nmadm` and run `startsys`.

*Hint: In order to downgrade the* NTM *software, setup the* NTM `yum` *repository to provide desired* NTM *version, and use standard* `yum downgrade` *mechanism.*

**12** Run `/opt/ckntm/ckntm oracle_inst` to verify that the Oracle database instance is running and that NTM can connect to the database.

*Hint: For more information, see* "CKNTM Tool" (p. 2).

**Important!** If errors or warnings are reported, follow the instructions given in the command output to find more information. If necessary, contact Alcatel-Lucent support for assistance.

□

# Uninstalling the NTM full release

### Instructions

Follow these steps to uninstall full release:

**1** Log in as `nmadm`.

**2** Run `stopsys`.

**3** Log in as `root`

**4** Execute the following:

```
yum remove "ntm*"
```

**Result:** The NTM software will be uninstalled.

**5** Remove all files in */nm* directory: `rm -rf /nm/*`

*Hint: After uninstallation of the NTM software the NTM users, groups, and files in /musr directory will be still present on the machine. The administrator must remove them manually.*

□

# Configuring your browser

## Overview

### Purpose

Certain files need to be downloaded and installed in order for various aspects of your NTM system to function properly.

### Finding the download file

The GUI launch page has a link for an user administration. From this page users can select various downloads found under the “Client Download” icon. Among those are:

- Java Runtime Environments — This is required to operate the Network Views and the Alerts Tables.
- Extra Jar Files — Miscellaneous files used for specific versions of Internet Explorer and other browsers.

**Important!** Users must have permission to download and install these files.

### Instructions

Follow the instructions on the GUI download page. Platform and browser specific instructions are given to install the correct files.

□

# Secure shell for BDR

## Overview

### Overview

To establish secure connection between BDR hosts, NTM uses OPENSSH Version 3.9 patch 1. It is recommended that the SSH is configured to use RSA and shared public keys so that BDR does not prompt for the password whenever a file is copied or command is run on the backup BDR host.

### Purpose

It is recommended that users perform BDR functions using Secure Shell (SSH) when transferring information between hosts during the BDR process.

### Contents

This section contains the following topics:



### Local configurations

Any deviation from the recommended package or installation should be promptly reported to Alcatel-Lucent Customer Support prior to setting up BDR in Secure Shell environment.

### Installation assistance

If customer needs assistance in configuring the Alcatel-Lucent supplied SSH software, they should either contact their internal IT organization and/or Alcatel-Lucent Customer Support.

### Possible Conflicts

If you use another security package that creates a pseudo- shell of nmadm or uses a TCP/IP wrapper, NTM does not guarantee that OPENSSH will work. Alcatel-Lucent Customer Support should be contacted prior to turning on the SSH_BDR feature to determine if BDR can be configured to support the pseudo- shell of nmadm or TCP/IP wrapper.

### Features

Secure shell is used in conjunction with Feature 8, “Disaster Recovery (Duplex)” and Feature 40, “Enhanced Disaster Recovery”.

### Prerequisites to using SSH with BDR

The secure shell server must be configured and the server started prior to the initiating of BDR procedures.

□

# Configuring and starting the Open SSH server

### Overview

OPENSSH provides the default script to configure and start the SSH server. In addition to generating the keys needed to use the SSH protocol, it will also attempt to start the SSH server on the host.

### When running local versions of SSH

**Important!** If you are already running a local version of SSH, skip this section and proceed to the Server configuration section to verify the ciphers and message digests.

**CAUTION**

**If you are using your own version of SSH which is installed in a directory other than** */usr/bin/ssh*, **then the path string defined in the** */nm/sys/bdr_confssh* **file: "***ssh:/usr/bin/ssh***" needs to be modified to reflect the path to your version of ssh.**

### Keys

Keys generated by the `/etc/rc.d/init.d/sshd` script will be placed in the */etc/sshd* directory. Keys will be generated for both protocol versions 1 and 2 and will create DSA and RSA key types.

**Important!** Sshd provided by OPENSSH is by the default configured to work with protocol version 2. To enable protocol 1 version 1 change the following lines in the */etc/ssh/sshd* config file:

```
#Protocol 2,1
Protocol 2
```

to:

```
Protocol 2,1
#Protocol 2
```

Execute the service sshd restart command to re-read configuration file.

# Configuring SSH for NTM

### Initial configuration of SSH

To use sshd version provided with RHEL and recommended by the NTM, perform the following procedure.

1. Log in as root on the NTM server.

2. Execute `/sbin/chkconfig sshd on` to enable sshd startup.

3. From a client window for a host you wish to run SSH, execute the service `sshd` start command to configure and start the SSH server.

   **Important!** In the future, SSHD will be started automatically when the system is rebooted.

END OF STEPS

□

# Server configuration

### Default server configuration

OPENSSH provides a default configuration file.

### Systems with existing secure shell installed.

If your current system is already configured to use a SSH server, use these recommendations for ciphers and message digests.

### Ciphers

Confirm that the ciphers are tried in the following order:

1. arcfour
2. aes128-cbc
3. aes128-ctr
4. blowfish-cbc
5. cast128-cbc
6. aes192-cbc
7. aes192-ctr
8. 3des-cbc
9. aes256-cbc
10. aes256-ctr

### Message digests

Confirm that the message digests are tried in the following order:

1. hmac-sha1-96
2. hmac-md5-96
3. hmac-md5
4. hmac-sha1
5. hmac-ripemd160

□

# Client user keys

### Overview

NTM uses public or private keys without password protection on the keys. Client user keys are created using the "Creating client user keys" (p. 33).

Client user keys that are generated by ssh-keygen procedure are stored in the directory *~/.ssh*.

Typically key files in the *~/.ssh* directory are named:

- id_rsa – rsa private keys
- id_rsa.pub – rsa public keys
- id_dsa – protocol version 2 private keys
- id_dsa.pub – protocol version 2 public keys

### Uncontested log in

To be able to log in without being contested by passwords, users give their public key to the remote user. This involves the user copying their public key to the remote user who places it into their authorized_keys file. An example of this would be: copy the content of *~/.ssh/id_rsa.pub* file to the *~/.ssh/authorized_keys* file on the backup host:

```
# cat ~/.ssh/id_rsa.pub | ssh remote_host "cat >>
  ~/.ssh/authorized_keys"
```

### Client Trust

The SSH clients will not automatically trust remote machines which they have not interacted with previously. When a SSH client encounters a machine which it has not encountered previously, it will request the user to confirm the signature of the public key from the remote server. Enter 'yes' at the prompt if you wish to accept the signature:

```
The authenticity of host '[some host]' can't be established.
RSA key fingerprint is [key fingerprint].
Are you sure you want to continue connecting (yes/no)?
```

# Creating client user keys

### Creating user keys

Use the ssh-keygen program to create client user keys.

Users running in SSH mode and issuing either the `dbtest` or `create` commands are required to have client user keys.

1 Login to the SSH server (NTM host)

2 To generate RSA key enter: `/usr/bin/ssh-keygen -t rsa`

**Important!** Directories using the client keys need *UNIX* permissions of 700.

3 Select enter for the remaining prompts

END OF STEPS

□

# 7 Configuring Web Servers for NTM

## Overview

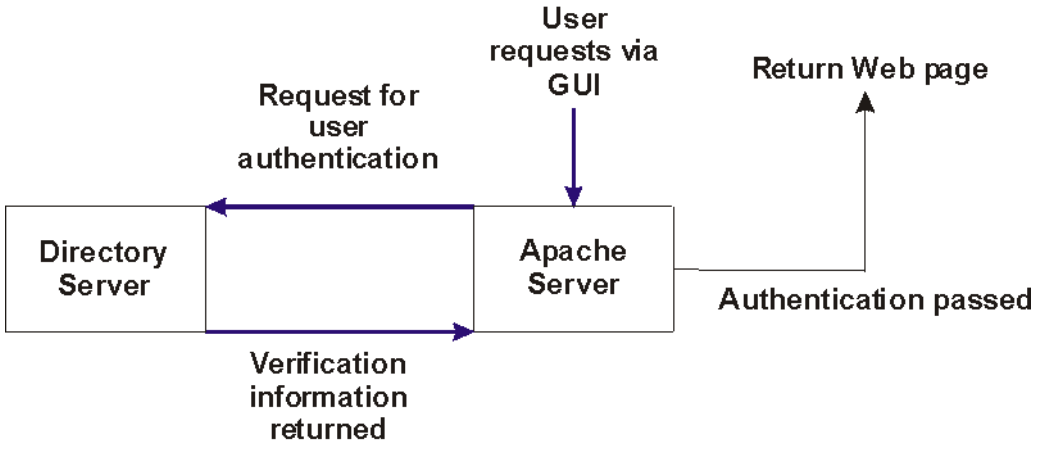
### Purpose

In order to use the NTM GUI (Graphical User Interface), each user must have an entry in the Directory Server containing the user authentication information (for example, password). Each time you request a web page, your identity will be verified. If you do not have an appropriate authentication, or if it is invalid, you will not be granted access.

Two separate servers ensure security for the system:

- ***OpenLDAP Directory Server*** stores each user's authentication information and preferences, as well as other reference data.
- ***Apache Web Server*** serves web pages. Before it grants access to a web page, the server will send a request to the Directory Server to retrieve your authentication information (i.e. ID and password). The user-supplied authentication information is verified against what is stored in the Directory Server. If all checks pass, access is granted.

**Figure 1 Server relationships**




**Important!** When using Alcatel-Lucent Technologies Navis IDentity Software, see "Performing the initial upload to the Navis ID server" (p. 8) in the *System Administration Guide* for more information about authentication using RADIUS servers.

### Recommended sequence and time allotment for procedures

This table details the frequency and time required for each of the procedures in this chapter.

| Procedure | Approximate Time Required | Should be Performed... | Initial Load | Upgrade |
|---|---|---|---|---|
| "Configuring the "base_config.pl" file" (p. 8) | 5 minutes | | X | X |
| "Installing directory server entries — initial" (p. 9) | 15 minutes | When required by a new NTM release | X | |
| "Upgrading directory server entries" (p. 11) | 5 minutes | | | X |
| "Breaking replication" (p. 14) | 10 minutes | | | X |
| "Setting up replication" (p. 16) | 15 minutes | Anytime as needed | X | X |
| "Verifying changes are being made to the directory server" (p. 19) | 5 minutes | Anytime as needed | X | X |

## Contents

This chapter contains the following topics:

# Server information

### Table

Table 1 identifies port numbers and software installation directories for the web server and directory server.

**Table 1 Server information**

| Server | Port Number | Software Installation Directory |
|---|---|---|
| Web Server | 80 | Defaulf OS Location |
| Web Server (SSL) | 443 | Defaulf OS Location |
| Directory | 389 | Defaulf OS Location |

### Installation location

Both the Web Server and Directory Server are installed in each location. When a customer has more than one site and wants to have a common web authentication capability across the sites, then the Directory Servers must be configured using a supplier-consumer model. The supplier is the “master” Directory Server, a consumer is a copy of the supplier. Typically, the Directory Server at the first site becomes a ***supplier*** and the Directory Server(s) at the second (and consecutive) site(s) or other applications become ***consumer(s)***.

- If this is the first site for a customer, perform all procedures in this chapter EXCEPT “Setting up replication” (p. 16).
- If this is a second site for a customer and they wish to have common web authentication, perform “Setting up replication” (p. 16).

□

# Before you begin installation

## Overview

In the procedures in this chapter, ***terminal*** refers to the telnet session on the host machine where the ***web*** server software is installed. ***Browser*** refers to an *Internet Explorer* or *Navigator* client running on any workstation or PC that has access to the host. Before the servers are installed (system tape is loaded), you must:

- Make sure the user IDs 101 to 105 are not used ("/etc/passwd")
- Make sure that the group IDs 101 to 105 are not used ("/etc/group")
- Determine availability of Domain Name Service (DNS)

**Table 2 Determine availability of Domain Name Service (DNS)**

| IF the host … | THEN … |
|---|---|
| Uses DNS Service | **On the host:**<br>Make sure the contents of the *"/etc/resolv.conf"* file are correct. For example:<br>`domain <domain name>`<br>`nameserver <IP address or hostname>` |
| does not use DNS Service | **On the host:**<br>• Make sure that the *"/etc/resolv.conf"* file does not exist.<br>• Edit the *"/etc/hosts"* file. The entry in the *"/etc/hosts"* file should be:<br><IP Address> <IP Address> <host name><br>**Important!** Notice that the IP address is entered twice. |
| | **On a client on which the browser application exists:**<br>• If this is an *IBM* PC or Clone PC: A hosts file needs to be created in the C:\windows directory with the IP address and the name of the NTM host machine. This file should not have any "." extension to its name.<br>• If this is a *Linux* Workstation: The *"/etc/hosts"* file needs to be updated with the IP address and the name of the NTM host machine. |
| | ***Netscape* browser**<br>Select: **Edit -> Preferences ->Advanced -> Proxies -> Manual Proxy Configuration -> View.** In the "`No Proxy for`" field, add the name of the machine that you want to access with the browser in a comma separated list.<br><br>***Internet Explorer* browser**<br>Select: **Tools -> Internet Options … -> Connections -> LAN Settings … -> Advanced.** In the "`Exceptions`" field, add the name of the machine that you want to access with the browser in a comma separated list. |

# Modifying directory server entries

## Overview

### Purpose

Three subprocedures are involved in initializing/configuring directory server entries.

**Important!** When modifying server entries it will become necessary to stop the n_o server. You may wish to notify users that temporary interruptions to the NTM GUI functions may occur while changes are being made.

### Contents

This section contains the following topics:

# Configuring the “base_config.pl” file

### Instructions

Follow these steps to configure the *“base_config.pl”* file:

1 Log into the system as `root`.

2 Enter:

```
cd /nm/web/site
```

3 Edit the *base_config.pl* file and remove all lines except for the line containing:

```
1;
```

4 Enter:

```
cd /nm/web/defs
```

5 Edit the *base_config.pl* file and fill-in the host names (in double quotes) for the NTM Host and the Stand-Alone Report Writer or STM hosts (if applicable) in the arrays provided. For example:

```
$hosts{“NTM”}=[“HostNMA”, “HostNMB”];
$hosts{“RPT”}=[“Hostabc”];
$hosts{“STM”}=[“Hostxyz”];
```

If the Report Writer or STM Hosts does not exist, leave it blank. There should be ***no*** space inside the brackets. An example of a blank entry would be:

```
$hosts{“RPT”}=[ ]:
```

> **Important!** In a replication environment the names of all hosts participating in replication must be entered.

END OF STEPS

□

# Installing directory server entries — initial

### Purpose

This procedure is performed when installing the NTM web GUI for the first time on the host.

**CAUTION**

**If you are upgrading from NTM Release 10 or later to a newer release, do NOT follow this procedure. Use Upgrading directory server entries.**

### Before you begin

Before performing this procedure, you must have completed "Configuring the "base_config.pl" file" (p. 8).

### Instructions

Follow these steps to perform an initial installation of the directory server entries:

1 Log into the system as `root`.

2 To initialize the Directory Server data, execute:

```
/nm/sys/init_ldapdata
```

**Important!** This command executes a number of perl scripts whose output is captured in the */tmp/init_ldapdata.out* file. When the init_ldapdata script execution has completed, examine the */tmp/init_ldapdata.out* file. If any errors are detected, please contact Alcatel-Lucent Support.

3 Restart Apache server executing:

```
/nm/web/sup_soft/http/bin/reload-server
```

4 Check with Alcatel-Lucent field support to determine the existence of site-specific files that need to be loaded to define maps and nodes for each customer. An example is

map.ldif. If such files exist, these files need to be loaded now according to the procedures that accompany the files.

**Important!** Do NOT continue with "Upgrading directory server entries" (p. 11).

**5** Log in as `nmadm`.

**6** Enter:

```
/nm/web/other-bin/stop_n_o_server
/nm/web/other-bin/start_n_o_server
```

**7** Log as `root`.

**8** Enter:

```
cd /nm/web/sup_soft/ldap/bin
```

**9** Save an initialized version of the directory by entering:

```
./ldbm2ldif <filename>
```

END OF STEPS

□

# Upgrading directory server entries

## Purpose

This procedure is performed if you are upgrading the web GUI software on the host from a previous version of NTM.

**CAUTION**

**If this is a completely new installation of the NTM GUI, use Installing directory server entries — initial.**

## Before you begin

Before performing this procedure, you must have completed “Configuring the “base_config.pl” file” (p. 8).

## Instructions

Follow these steps to upgrade the directory server entries:

1 Log into the system as `root`.

2 To upgrade the Directory Server data, execute:

```
/nm/sys/upg_ldapdata
```

**Important!** This command executes a number of perl scripts whose output is captured in the */tmp/upg_ldapdata.out* file. When the upg_ldapdata script execution has completed, examine the */tmp/upg_ldapdata.out* file. If any errors are detected, please contact Alcatel-Lucent Support.

END OF STEPS

□

# Replication

## Overview

### Purpose

Multiple procedures are needed to break, set up, and verify replication.

### Contents

This section contains the following topics:

# Breaking replication

### Purpose

When operating in a multi-host environment, LDAP replication is used to keep all hosts in sync with the latest GUI updates made on any of the hosts in the network. Prior to upgrading NTM on a host in the network, excluding the host that is being upgraded, replication must be broken on all the other hosts.

### Instructions

Follow these steps to break LDAP replication.

**1** Log in as `nmadm`

**2** Execute:

```
cd /nm/web/sup_soft/ldap/conf
```

**3** Enter:

```
cp slapd.conf slapd.conf.<date>
```

**4** Enter:

```
cp slapd.conf.standalone slapd.conf
```

**5** Enter:

```
cd ../bin
./stop
```

**6** Verify the slapd has stopped by executing:

```
ps -ef | grep slapd
```

**7** If the process failed to stop, execute:

```
kill -9 <pid>
```

**8** Restart the process in a standalone mode by executing:

```
./start
```

END OF STEPS

# Setting up replication

### Purpose

Replication is only needed when operating in a multi-host environment. In this configuration, all servers involved are of the OpenLDAP type. The Directory Server (DS) configuration steps involve identifying which DS host is the supplier and which will be consumer(s). Usually, the DS that was first deployed and configured is used as the supplier, since (if it has been in operation for a period of time) it is likely to already have users and their preferences already defined and it is this user's information (or other information stored in the DS) that is to be shared.

### Before you begin

The following steps assume that the supplier DS has been initialized. Also, this procedure will cause all consumers LDAP databases to be overwritten with that of the supplier, so any consumer LDAP information will be lost once all steps have been completed.

**WARNING**

**During the period a Directory Server is stopped:**

- Web GUI access will fail
- Auto-updating pages may stop
- Links from maps to tabular pages will fail

### Instructions

Follow these steps to configure the OpenLDAP DS Supplier for OpenLDAP DS Consumer Replication.

1 Determine supplier and consumer host(s) and coordinate the DS downtime with customer needs.

**Important!** It is necessary for the Supplier and Consumer hosts to recognize each other's IP addresses and Fully Qualified Domain Names. With NTM hosts, two network cards can be used with two different IP addresses and Fully Qualified Domain Names. Each of these items, should be recognized by the other host.

2 Save a copy of the current *"slapd.conf"* DS configuration file on the supplier and consumer host(s) to a unique name.

*Hint: The file is found in the "/nm/web/sup_soft/ldap/conf" directory.*

**Important!** This is just a precautionary measure.

3 Create an LDIF copy of the supplier's DS data by performing the following on the supplier host:

```
cd /nm/web/sup_soft/ldap/bin
./start
```

**Important!** The server may already be running.

```
cd /usr/bin
./ldapsearch -x -LLL -b "o=NetMinder" "objectclass=*" >
   /nm/web/sup_soft/ldap/db_ntm/ldif/supplier.ldif
```

4 Copy the *"supplier.ldif"* file to the *"/nm/web/sup_soft/ldap/db_ntm/ldif"* directory on the consumer host(s).

5 On the `supplier` host, perform the following:

```
cd /nm/web/sup_soft/ldap/conf
cp slapd.conf.supplier slapd.conf
vi slapd.conf
```

6 Replace the text on approximately line 44, "CONSUMER_HOST_IP_ADDRESS" with the appropriate consumer host's IP address. If you have multiple consumer hosts, then replicate the line CONSUMER_HOST_IP_ADDRESS, adding the IP addresses for additional hosts.

**Important!** The dots (.) in the IP address must be preceded by the "\" character.

**Example: IP=127\.0\.0\.1**

7 Follow the comments on how to specify each consumer host (approx. line 63), and write the file.

8 On the `consumer(s)` host perform the following:

```
cd /nm/web/sup_soft/ldap/conf
cp slapd.conf.consumer slapd.conf
vi slapd.conf
```

**9** Replace the text on approximately line 45, “SUPPLIER_HOST_IP_ADDRESS” with the appropriate supplier host’s IP address.

**Important!** The dots (.) in the IP address must be preceded by the “\” character

**Example: IP=127\.0\.0\.1**

**10** Follow the comments on how to specify the referral to the supplier host (approx. line 68), and write the file.

```
cd ../bin
./stop
```

**Important!** It may already be stopped.

```
sed -i 's/SUPLIER_SHORT_HOSTNAME/CONSUMER_SHORT_HOSTNAME/g'
   /nm/web/sup_soft/ldap/db_ntm/ldif/supplier.ldif
./ldif2dbm /nm/web/sup_soft/ldap/db_ntm/ldif/supplier.ldif
./init_updatedir
./start
```

**Result:** `start` should report that the “`slapd`” started and the “`slurpd`” did ***NOT*** start.

**11** On the `supplier` host, initialize the supplier's OpenLDAP DS with the supplier LDIF and start supplier server. Enter:

```
cd /nm/web/sup_soft/ldap/bin
./stop
./ldif2dbm /nm/web/sup_soft/ldap/db_ntm/ldif/supplier.ldif
./start
```

**Important!** `start` should report that both the “slapd” and “slurpd” processes started.

**Result:** Replication is now configured and active between the given `supplier` and `consumer` host(s).

END OF STEPS

□

# Verifying changes are being made to the directory server

### Instructions

When you've completed the procedures in this chapter, verify that changes are being made to the Directory Server.

1 Enter the following on the Consumer host terminal window:

```
cd /nm/web/sup_soft/ldap/logs
tail -f ldap_log
```

END OF STEPS

### Additional information

This allows you to observe the changes that are being made to the local host Directory Server.

A simple way to verify the modification capability is to initiate an update to an LDAP entry using the Web User Administration page. You can either modify or create a user entry and verify the change appears. If you are running in a supplier-consumer (replication) environment, perform the change using a consumer host. If problems occur, see the Directory Server log mentioned above for possible details. If replication is being used, check both the supplier and consumer host logs.

□

# SSL support for the browser-based GUI

## Overview

### Purpose

Feature 391, "SSL Support for the Browser-based GUI" is required. This feature configures the web server on the NTM host to provide (Secure Socket Layer) SSL encrypted communication between itself and a browser using the http protocol. This encrypted communication is accessed by prefixing the URLs for the browser-based GUI with "https://" rather than "http://".

SSL support is implemented using the standard mod-ssl module for the *Apache* web server.

One of two methods can be used to enable SSL support for the browser-based GUI.

### Contents

This section contains the following topics:

# Creating a new certificate

### Instructions

If certificates for a Certifying Authority (CA) and for the NTM host do not exist and need to be created, follow these steps to create a new certificate.

**1** Log in to the system as `root`.

**2** Enter:

```
cd /nm/web/sup_soft/http/bin
```

**3** Execute:

```
./set-up-ssl.sh
```

**4** Execute:

```
/sbin/service ntm_webserver restart
```

END OF STEPS

□

# Using an existing certificate

### Purpose

The private key and certificate are assumed to be in separate files.

The common name (CN) of the certificate must be the fully qualified domain name used by the web server for the host.

A private key is assumed to be a PEM formatted, RSA private key. The certificate is assumed to be a PEM formatted, X.509 structured, V3 certificate. Figure 2 is an example of a certificate in the expected format.

### Recommendations

It is highly recommended that the private key and certificate be decrypted, so that web server can start without a password being supplied. If the private key or certificate is encrypted, requiring a password to be supplied, the web server will not be able to restart automatically after a reboot. You will need to start the web server manually.

### Instructions

Follow these steps to use an existing certificate:

1. Log in to the system as `root`.
2. Copy your existing private key to "*/nm/web/site/ssl.key/server.key"*
3. Copy your existing certificate to *"/nm/web/site/ssl.crt/server.crt"*
4. For *server.key* and *server.crt* files, verify and change if necessary:
   - ownership to root
   - group ownership to root
   - permissions to 0400

5 Execute:

```
/sbin/service ntm_webserver restart
```

END OF STEPS

## Figure

Figure 2 provides an example of a certificate in the expected format.

**Figure 2 SSL certificate — example**

```
Data:
Version: 1 (0x0)
Serial Number: 1 (0x1)
Signature Algorithm: md5WithRSAEncryption
Issuer: C=US, O=An Organization, CN=Sample Certifying Authority
Validity
Not Before: Dec 4 19:00:21 2002 GMT
Not After : Dec 1 19:00:21 2012 GMT
Subject: C=US, O=An Organization, CN=sample.company.com
Subject Public Key Info:
Public Key Algorithm: rsaEncryption
RSA Public Key: (1024 bit)
Modulus (1024 bit):
00:91:a7:dd:74:b4:54:35:64:58:b7:a4:bb:c6:91:
12:34:7c:85:03:d6:9f:7f:0b:26:54:13:6e:8a:e3:
42:ed:2c:25:84:fc:c5:b3:4e:43:1d:79:61:9f:e3:
19:77:02:df:98:63:71:4f:a3:6e:45:f7:ff:2a:c6:
0e:a2:58:69:b5:78:97:49:ab:b3:3d:1f:a2:ef:c4:
3d:d2:ca:c2:51:3f:72:fb:6a:15:1b:25:87:bc:ff:
e8:fa:8d:c4:1f:b5:e4:b7:7c:24:d2:d7:37:cf:2f:
ff:7e:cf:62:0d:b8:7f:09:d8:be:73:a8:f7:0c:de:
d1:5c:50:e8:3c:ba:bb:7b:1f
Exponent: 65537 (0x10001)
Signature Algorithm: md5WithRSAEncryption
a5:a5:19:8e:c7:be:9f:7d:ae:b3:08:30:4b:97:64:be:dd:43:
55:4c:30:c3:12:27:b2:b2:4d:cc:29:32:36:ad:08:33:41:d4:
ea:04:85:9d:d9:d7:7e:21:1a:ec:d9:f6:7a:6c:c7:e1:f9:c3:
1c:77:6b:01:f0:91:c0:27:6b:17:94:01:bb:21:03:0c:f1:d6:
6f:64:90:75:fb:55:f0:b1:58:b2:bc:f8:28:3e:b7:a8:08:48:
47:a3:fe:61:c6:0e:75:88:7b:bf:7c:79:da:b9:db:1a:f9:50:
83:25:ef:d3:df:09:a8:20:99:45:64:b5:1e:df:9e:d3:ca:07:
ae:a9
```

# Disabling non-SSL access

### Purpose

By default, non-SSL access will remain available when SSL is enabled.

### Instructions

Follow these steps to disable non-SSL access.

1. Log into the system as `root`.
2. Enter: `cd /nm/web/site`
3. Edit *"ssl.sh"* and remove the "#" before the line "SSLFLAG="SSL_ONLY"
4. Save and exit the *"ssl.sh"* file.
5. Execute:
   `/sbin/service ntm_webserver restart`

END OF STEPS

□

# Disabling SSL

### Before you begin

The remove-ssl.sh script removes all private keys and certificates in /nm/web/site/ssl.crt and /nm/web/site/ssl.key. Back up any private keys or certificates you want to save before performing this procedure.

### Instructions

Follow these steps to disable SSL:

1. Log into the system as `root`.
2. Enter:
   ```
   cd /nm/web/sup_soft/http/bin
   ```
3. Execute:
   ```
   ./remove-ssl.sh
   ```
4. Execute:
   ```
   /sbin/service ntm_webserver restart
   ```

END OF STEPS

□

# Cleaning up temporary files

### Instructions

Follow these steps to clean up temporary files when upgrading NTM:

**1** Enter:

```
cd /nm/web/tmp
rm *Demand
```

END OF STEPS

# 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 (5-21) 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. 68) 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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