NORTEL NETWORKS

Preside Multiservice Data Manager

Network Configuration Database for DPN

Administrator Guide

241-6001-308

Preside Multiservice Data Manager

Network Configuration Database for DPN

Administrator Guide

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About this document

This document describes how to use the Network Configuration Database (NCD)

The following topics are discussed in this section:

- "Who should read this document and why" (page 11)

- "What you need to know" (page 11)

- "How this document is organized" (page 11)

- "What's new in this document" (page 12)

- "Text conventions" (page 12)

- "Related documents" (page 14)

Who should read this document and why

This guide is intended for administrators and users who will be using the Network Configuration Database (NCD) in their DPN networks.

What you need to know

Before using NCD, you should be familiar with the Network Reporting System (NRS), module provisioning, and have a working knowledge of UNIX.

How this document is organized

This document provides an overview of NCD, and describes its operational model and the NCD Server architecture. Subsequent sections describe the tools for NCD administration, populating the NCD database with DPN

provisioning data and configuring DPN module provisioning sessions to access NCD. The final section describes the factors to take into consideration before deploying NCD.

241-6001-308 *Preside MDM Network Configuration Database for DPN Administrator Guide*contains the following sections:

- "Network Configuration Database" (page 15) gives an overview of NCD and the components that are supported.

- "Installation" (page 19) describes the installation requirements for NCD.

- "Operational model" (page 21) describes the operational model and administration functions for NCD.

- "NCD Server" (page 27) describes the NCD Server architecture and how it is used in the network.

- "NCD toolset" (page 33) describes the tools used to administer NCD.

- "NCD Populator" (page 39) describes the NCD Populator and database.

- "Module provisioning" (page 57) describes how to configure NCD database access during module provisioning sessions.

- "Deployment considerations" (page 61) describes issues that should be considered before deploying NCD in the network.

What's new in this document

There are no changes in this document for this release.

Text conventions

This document uses the following text conventions:

- `nonproportional spaced plain type`

  Nonproportional spaced plain type represents system generated text or text that appears on your screen.

- **nonproportional spaced bold type**

  Nonproportional spaced bold type represents words that you should type or that you should select on the screen.

- *italics*

  Statements that appear in italics in a procedure explain the results of a particular step and appear immediately following the step.

  Words that appear in italics in text are for naming.

- `[optional_parameter]`

  Words in square brackets represent optional parameters. The command can be entered with or without the words in the square brackets.

- `<general_term>`

  Words in angle brackets represent variables which are to be replaced with specific values.

- UPPERCASE,lowercase

  In MDM, uppercase and lowercase letters that appear in UNIX commands and parameters must be matched exactly. The system matches upper and lowercase characters differently.

- |

  This symbol separates items from which you may select one; for example, ON|OFF indicates that you may specify ON or OFF. If you do not make a choice, a default ON is assumed.

- ...

  Three dots in a command indicate that the parameter may be repeated more than once in succession.

The term absolute pathname refers to the full specification of a path starting from the root directory. Absolute pathnames always begin with the slash (/) symbol. A relative pathname takes the current directory as its starting point, and starts with any alphanumeric character (other than /).

Related documents

See the following documents for related information:

- 241-6001-000 *Preside MDM Documentation Guide*

- 241-6001-022 *Preside MDM Network Reporting System User Guide*

- 241-6001-100 *Preside MDM Installation*

Chapter 1
Network Configuration Database

This chapter describes how NCD can validate certain component types by performing uniqueness and existence checks. See the following sections for more information:

- "About inconsistency checks" (page 15)

- "NCD checks" (page 16)

About inconsistency checks

Within a DPN network, service data inconsistencies can be detected before the service data is activated.

NCD facilitates DPN module provisioning capability, which provides notification of non-unique data values for components that require network-wide uniqueness. In addition, notification of references to non-existent DNAs is provided.

Validation of these components is performed using read-only access to an NCD database, which is populated from existing master configuration files (MCFs) by the NCD Populator (*ncdpop*). Access to the NCD database is provided by the NCD Server (*ncdsvr*).

The figure "DPN Devices Configuration data flow" (page 16) shows the high level view of interactions between DPN Devices Configuration, NCD Server, and the NCD Populator.

Figure 1
DPN Devices Configuration data flow

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NCD checks

NCD provides checks on specific DPN components prior to service data download during module provisioning. Notification is always in the form of a warning. An operation is never blocked as a result of checks.

There are two types of checks, *uniqueness* and *existence*. See the following sections for more information on the two checks:

- "Uniqueness checks" (page 17)

- "Existence checks" (page 17)

Uniqueness checks

A uniqueness check semantically verifies that the service data that defines the existence of a component contains a unique value for that component. It does not apply to the service data that references a component.

Uniqueness checks are performed on supported DPN data during population into NCD. During DPN module provisioning, uniqueness checks are performed only on supported DPN data. The checks are performed against all DPN data stored in the NCD database.

Uniqueness checks are supported on the following DPN component types:

- Module mnemonic

- NAMS ID

- RID

- MID/RoutingZone - MIDs must be unique within a routing zone

- DNA

- VXID

- Gateway ID

- NCS OA

Existence checks

An existence check semantically verifies the service data that references a component by ensuring the referenced component exists.

During DPN module provisioning, existence checks are performed only on supported DPN data.

Existence checks are supported on the following DPN component types:

- Direct Call Remote DNA

- PVC Remote DNA

- Hunt Group Server DNA

- Hunt Group Member DNA

- DORS Server DNA

- Expected calling line ID

- NUI Server DNA

- Dial_Out_Port_DNA

- DNA of data collection system

- Call Redirection Server DNA

- Redirected DNA - source

- Redirected DNA - destination

Chapter 2
Installation

This chapter details the software that must be installed before running NCD.

Network Reporting System

The Network Reporting System (NRS) for DPN must be installed and available for use by the NCD Populator. See 241-6001-022 *Preside MDM Network Reporting System User Guide* for NRS hardware and software requirements. For NRS installation instructions, see 241-6001-100 *Preside MDM Installation*.

Chapter 3
Operational model

This chapter outlines the tasks required to perform NCD functions. Refer to the following sections for more information:

- "View of the network" (page 21)

- "Getting started" (page 22)

- "Populating the NCD database" (page 22)

- "Administration" (page 24)

View of the network

Each NCD database represents a single *view* of the network. Multiple NCDs can be deployed to support multiple views of a network.

A *view* of a network is defined by the collection of modules and a service data view (DPN MCF) for each module.

The *current view* of a network represents the active service data of all modules in the network. The *next view* of a network represents the service data that will be activated next.

The view of the network that an NCD represents is determined by the set of NRS data files that is used to populate the NCD database.

Getting started

An Preside Multiservice Data Manager (MDM) administrator must perform the following tasks to initially configure NCD.

1   Decide on which host to run the NCD Server.

The NCD Server must be accessible via the LAN from the hosts where NCD access will be required. See 241-6001-303 *Preside MDM Administrator Guide* for a description of Mult-Nodal Server Domains (MNSD).

The engineering requirements of the NCD Server must be accounted for. See "Deployment considerations" (page 61).

2   Install MDM. NCD software is installed automatically as part of the MDM software. See 241-6001-100 *Preside MDM Installation*.

3   Create an NCD database. See "NCD database creation" (page 24).

4   Start an NCD Server. See "Managing an NCD Server" (page 24).

Populating the NCD database

NCD database population is a post-download activity following the NRS model and is dependent on NRS data files. The NRS population of a module must be finished before the module can be populated into an NCD database.

Running the NRS and NCD Populators sequentially is recommended. The NCD Populator should be started once the NRS Populator tool finishes populating the NRS data files. This can be achieved by using a *shell* script that performs the following sequentially:

1   Runs the DPN NRS Populators to populate NRS data files. See 241-6001-022 *Preside MDM Network Reporting System User Guide*.

2   Runs the NCD Populator to populate NCD. See "Populating the NCD database" (page 41).

The script can be scheduled to run periodically as a *cron* job.

After an NCD database is initially populated, it will become out-of-date as provisioning data are modified and downloaded. To bring the database up-to-date, it is necessary to re-populate the NRS database and then re-populate the

NCD database incrementally using the new NRS data files. This can be achieved by scheduling the NRS and NCD populators to run sequentially in batch periodically as a *cron* job.

The more frequently the NCD database is updated, the more accurate the data is. However, this also increases the probability of collision with module provisioning clients. During a population of a module, its data is being modified. This may cause unpredictable results when performing uniqueness checks against this data. Therefore, it is recommended that the *cron* job that populates NRS and NCD be started at a time when there is minimal module provisioning activities, for example, every 24 hours, at midnight.

Examine the log files after the *cron* jobs are finished. If necessary, correct any problems and restart population.

Other NRS/NCD population tools

- The NRS/NCD Population Management tool (*popmgr*) can also be used to simplify the population of the NRS and NCD databases. See 241-6001-022 *Preside MDM Network Reporting System User Guide* for more information on the NRS/NCD Population Manager.

- The Service Integrity Audit tool can be used to populate the NRS and NCD databases for DPN modules. See 241-6001-022 *Preside MDM Network Reporting System User Guide* for more information on the Service Integrity Audit tool.

Module provisioning

To access NCD while using a module provisioning tool, perform the following:

1 Configure the user preference. See "Configuring access to the NCD database" (page 57).

2 Ensure the NCD Server is accessible. See 241-6001-303 *Preside MDM Administrator Guide* for a description of Multi-Nodal Name Server Domains (MNSD).

3 Start the module provisioning tool.

Administration

The following sections detail administrative tasks that may need to be performed within NCD. Only super-user *root* is authorized to perform the following tasks.

NCD database creation

After the NCD software is installed, an NCD database must be created. The NCD database can be created from an existing database or it can be created empty.

> *Note:* A new NCD database should be populated by the NCD Populator before it is used for module provisioning.

Creating an NCD database

1   Log in as root.

2   To create an empty NCD database, enter:

   /opt/MagellanNMS/bin/ncd_create -ncd <target_NCD>

   or

   to create an NCD database from an existing database, enter:

   /opt/MagellanNMS/bin/ncd_create -ncd <target_NCD> -from <target_NCD2>

   Once an NCD database has been created, an NCD Server can be started to provide access to the database. See "Starting an NCD Server" (page 29) for more information.

Managing an NCD Server

The NCD Server should be started and stopped using the Server Administration tool. This ensures that the server is automatically restarted after an Preside Multiservice Data Manager (MDM) restart or system failure. See 241-6001-303 *Preside MDM Administrator Guide* for more information on Server Administration tool.

Administration tools

NCD maintenance and administration is facilitated by the following set of tools:

•   *ncd_create* is used to create a new NCD database.

- *ncd_backup* is used to backup an existing NCD database.

- *ncd_restore* is used to restore an NCD backup file to the NCD database.

- *ncd_delete* is used to delete a non-active NCD database.

See "NCD toolset" (page 33) for more information on these tools.

Propagating an NCD database to other NCD hosts

A newly populated NCD database can be propagated to another remote NCD host using the *ncd_backup* and *ncd_restore* commands. The *ncd_backup* command copies a specified NCD database into a compressed *tar* file called *the NCD backup file*. This file can then be transferred to a remote NCD host using a suitable file transfer process, for example, FTP.

Once the NCD backup file is accessible from the remote NCD host, the administrator can use *ncd_restore* to restore the same NCD database on the remote NCD host. The *ncd_restore* command will uncompress a specified NCD backup file, create the corresponding NCD database and extract and copy all the NCD tables into the new NCD database.

In the case where an NCD database exists with the same name on the remote NCD host, the *ncd_restore* command will not delete the NCD database, it will return an error and notify the user that the database to be restored already exists. This database can be either deleted or a different NCD database name can be specified in the *ncd_restore* command line.

NCD host NMS disk partition full

NMS disk usage should be closely monitored by the Preside Multiservice Data Manager (MDM) administrator. If the NMS disk partition containing the NCD database is approaching full, the database must be moved to a disk partition that has sufficient free space. In the situation where the disk partition is full, follow the steps below to relocate the NCD database.

Relocating an NCD database

1   Define a new database location on a disk partition that has sufficient free space for the database.

2   Backup the NCD database using the *ncd_backup* command.

For example, the following command will create an NCD backup file in the current directory containing the NCD database called *test*.

```
/opt/MagellanNMS/bin/ncd_backup -ncd test
```

3   Delete the NCD database using the *ncd_delete* command.

For example, the following command will delete the NCD database called *test*.

```
/opt/MagellanNMS/bin/ncd_delete -ncd test
```

4   Restore the NCD database using the *ncd_restore* command and specify the new location for the database.

For example, the following command will create a new NCD database called *test* in the database location *newloc* and restore the contents of the database from the specified NCD backup file.

```
/opt/MagellanNMS/bin/ncd_restore -ncd test
-from <backup_file>
```

Deleting a module from an NCD database

When a module has been made obsolete, the NCD Populator should be run in *delete* mode to remove the data of the module from the NCD database. See "NCD Populator mode" (page 44) for more information on *delete* mode.

Chapter 4
NCD Server

This chapter explains the purpose of the NCD Server and how to start up and stop it. Refer to the following sections for more information:

- "Overview of the NCD Server" (page 27)

- "Starting an NCD Server" (page 29)

- "Stopping an NCD Server" (page 31)

- "NCD Server concurrent access" (page 32)

- "NCD database" (page 32)

Overview of the NCD Server

The NCD Server provides access to a repository of network-wide service data for networks of DPN modules, such as DNAs, NAMS IDs, GATEWAY-IDs, and IP addresses. The Server stores this data in a database to support network-wide semantic checks.

Clients of the NCD Server are the NCD Populator and module provisioning applications. These clients may be running on a different Preside Multiservice Data Manager (MDM) host than the server facilitating concurrent NCD access. Each NCD Server accesses a single dedicated database and each database has only one dedicated server.

Each NCD database contains a single view of one DPN network. The recommended configuration is a single NCD Server remotely accessible from multiple client MDM workstations. See the figure "Single NCD Server architecture" (page 28) for a configuration diagram. If a single NCD is not

accessible from all desired client workstations, then multiple NCDs can be deployed. See "Multiple NCD Server architecture" (page 29) for a configuration diagram. This may be required for installations that have remote configuration sites and do not have WAN access to a central NCD copy. In this case, one NCD is the master, which is updated by the NCD Populator. The other is a snapshot that exists only to provide NCD access to another set of MDM workstations.

Multiple NCD databases can also be used to support multiple views of the network. When there is a single NCD, it contains the *current* view of the network. When more than one view is required, another database is created and populated using the appropriate service data.

Figure 2
Single NCD Server architecture
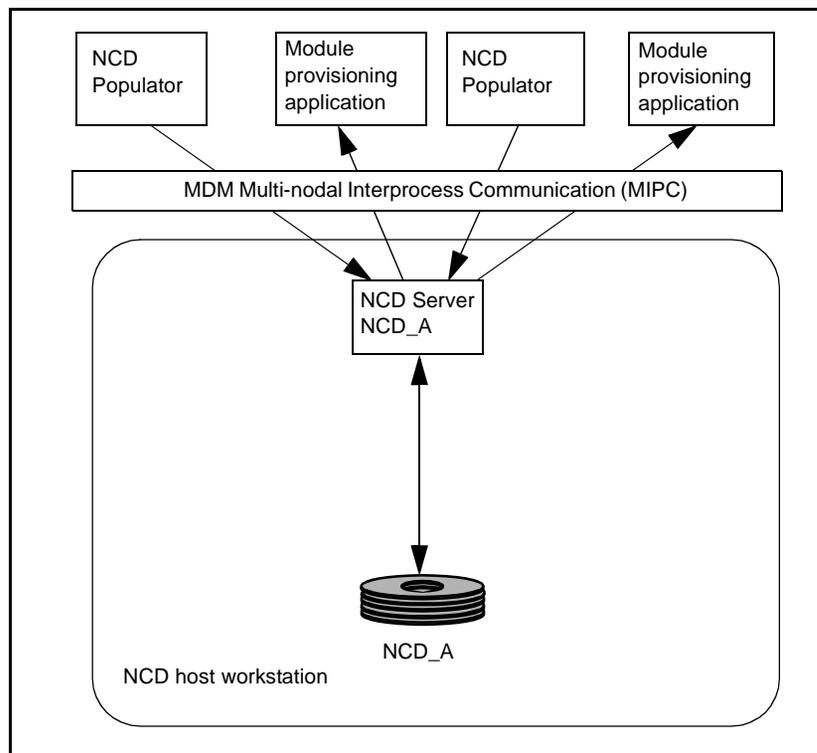
Figure 3
Multiple NCD Server architecture
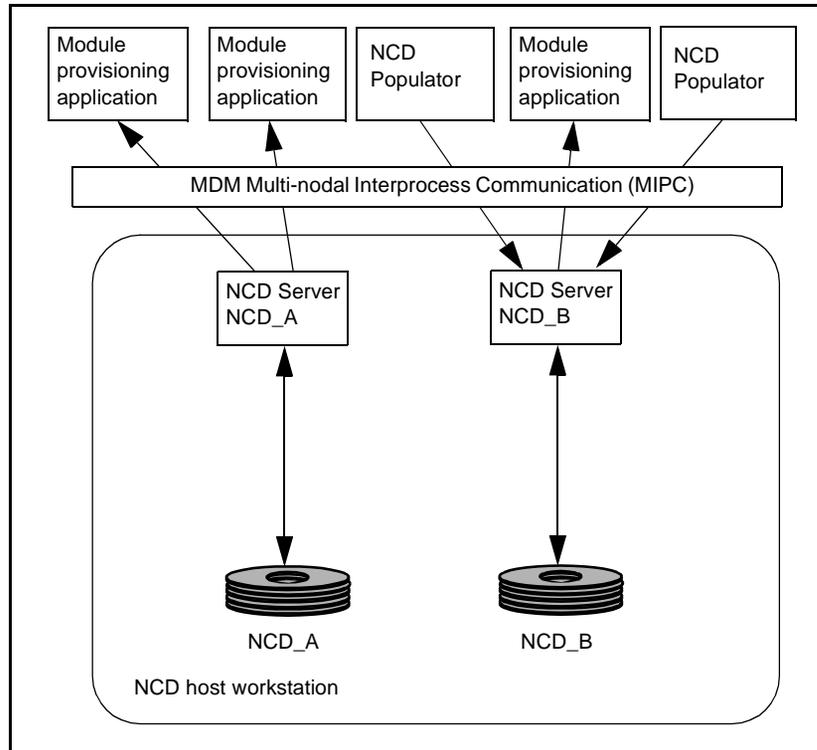
Starting an NCD Server

The *ncdsvr* command is used to start a new NCD Server. Enter the following command syntax as one continuous command.

```
/opt/MagellanNMS/bin/ncdsvr -ncd <target_NCD>
  [-log [<logfile>]] [-debug] [-h]
```

where:

-ncd <target_NCD>   specifies the name (*<target_NCD>*) of the target NCD database for the NCD Server to be started. This is a mandatory parameter and no default is provided. If the NCD database specified is already in use, an error is displayed. No server is started in this case.

-log [<logfile>]   specifies the log file for the NCD Server. The default log file name is *ncdsvr.NCD_<target NCD>.log* unless otherwise specified. The log file contains server monitoring information that can be used for debugging and other administration purposes.

-debug   prints debug messages.

-h   displays command line usage information.

If no parameters or options are specified, the command syntax will be displayed.

During initialization, the NCD Server registers using the service name NCD_<target_NCD>. If this service name has already been registered, the NCD Server will raise an error and then terminate. Once the NCD Server is started successfully, it is now ready to receive requests from its client applications.

The table "ncdsvr exit codes" (page 30) contains a list of exit codes that may be returned from the *ncdsvr* command.

Table 1
ncdsvr exit codes

Exit code	Description
1	Error: command line syntax errors.
2	Error: specified target NCD does not exist.
3	Error: server NCD_<target_NCD> has already been started.
4	Error: cannot open the log file.
5	Error: server's version does not match the target NCD database version.
10	Warning: administrator attention is required.
11	Signal 1 (hangup) received.
(Sheet 1 of 2)	

Table 1 (Continued)
ncdsvr exit codes

Exit code	Description
50	Signal 2 (interrupt), 3 (quit) or 15 (software termination) received.

Note: The server process traps signals 1 (hangup), 2 (interrupt,), 3 (quit), and 15 (software termination) and terminates gracefully. When signal 2 (interrupt), 3 (quit) or 15 (software termination) are received by the NCD Server, it exits with code 50. This exit code indicates to the Server Manager that the NCD Server should not be restarted.

(Sheet 2 of 2)

Server Administration tool configuration

The recommended Server Administration tool parameter settings to run an NCD Server are:

```
Descriptive name: NCD Server <target_NCD>
Startup command:
    /opt/MagellanNMS/bin/ncdsvr -ncd <target_NCD> -log
<log_file>"
Fast restart interval: 2 seconds
Slow restart interval: 5 minutes
Maximum fast restarts: 5
Maximum slow restarts: 10
Stability period: 10 minutes
Automatic startup at reboot time: Yes
```

Stopping an NCD Server

The NCD Server can be terminated using the Server Administration tool or by using the following procedure:

1   Use the *ps* command to find the process id <pid> of the *ncdsvr*.

   ps -def | grep ncdsvr

2   Use the *kill* command to stop the *ncdsvr* process.

   kill -INT <pid>

   This command sends signal 15 to the *ncd*svr process.

NCD Server concurrent access

The NCD Server access policy provides multiple readers (module provisioning applications) and multiple updaters (NCD Populators) concurrent access to an NCD database. The only restriction is that two updaters cannot update the same module at the same time. For example, this policy allows a module provisioning session to access a target module's data to perform uniqueness/existence checks while that data is currently being populated by an NCD Populator. It also allows multiple NCD Populators to concurrently update different module's data.

The advantage of this policy is the very high availability of the NCD database; a module provisioner is never blocked from provisioning and an NCD Populator is only blocked when another NCD Populator is currently populating the same module.

The disadvantage of this policy is that a semantic check performed during population is based on a somewhat inconsistent NCD database. However, as NSIC duplicates all NCD uniqueness checks as well as most existence checks, the subsequent execution of NSIC will resolve most problems.

NCD database

The NCD Server stores each NCD database in a directory within */opt/MagellanNMS/data/ncd.* For example, when the NCD database, *<target_NCD>*, is created, the corresponding database directory, */opt/MagellanNMS/data/ncd/target_NCD*, is created.

Chapter 5
NCD toolset

This chapter describes the four tools that are used for NCD administration. Refer to the following sections for more information:

Using the NCD toolset

To use the tools, the administrator must log on to the NCD host workstation as user *root*.

The tools are accessed from the UNIX command line. They cannot be run against an NCD database that is already being accessed by an NCD Server or by another NCD administration tool.

ncd_create

The *ncd_create* command is used to create a new NCD database. Enter the following command syntax as one continuous command.

```
/opt/MagellanNMS/bin/ncd_create -ncd <target_NCD>
  [-from <target_NCD2>] [-workdir <pathname>] [-h]
```

where:

-from <target_NCD2>   specifies the name (*<target_NCD2>*) of an existing NCD database to be copied to the new NCD database (*<target_NCD>*). If this option is not specified, the new NCD database is created empty.

> *Note:* This option does not allow the creation of a new R10 database using a R9 database as the source.

-h   displays command line usage information.

-ncd <target_NCD>   specifies the name of the target NCD database to be created.

-workdir <pathname>   specifies the name (*<pathname>*) of an accessible directory that the command is to use for the storage of temporary work files. If this parameter is not specified, the default is */tmp*.

If no parameters or options are specified, the command syntax will be displayed.

The table "ncd_create exit codes" (page 34) contains a list of exit codes that may be returned from the *ncd_create* command.

Table 2
ncd_create exit codes

Exit code	Description
0	Normal exit (executed successfully).
1	Error: command line syntax errors.
2	Error: New NCD (<target_NCD>) specified already exists.
3	Error: specified NCD (<target_NCD2>) does not exist.
4	Error: specified NCD <target_NCD2> is an active NCD.
5	Error: unauthorized or unknown user.
11, 12 ...	Warning: administration attention is required.

ncd_backup

The *ncd_backup* command is used to backup an existing NCD database. If the specified NCD database is currently active, an error is raised and the user is advised to stop the associated NCD Server through SVM. If the specified NCD database exists, this command will create a compressed *tar* file under the directory specified. The name of the backup file has the following format:

ncd_<target_NCD>.<yyyy><mm><dd><hh><mm><ss>.<v>.tar.Z

Where *<yyyy><mm><dd><hh><mm><ss>* is the timestamp indicating when the backup file was created and *<v>* is the NCD version number.

Enter the following command syntax as one continuous command.

```
/opt/MagellanNMS/bin/ncd_backup -ncd <target_NCD>
  [-to <pathname>] [-workdir <workpathname>] [-h]
```

where:

-h   displays command line usage information.

-ncd <target_NCD>   specifies the name (*<target_NCD>*) of the NCD database to be backed up. This is a mandatory parameter and no default is provided.

-to <pathname>   specifies a full directory name (*<pathname>*) or a tape device name (for example, /dev/rst0), where the backup of the NCD database is stored. If no path is specified, the current directory is used.

-workdir <workpathname>   specifies the name (*<workpathname>*) of an accessible directory that the command is to use for the storage of temporary work files. If this parameter is not specified, the default is */tmp*.

If no parameters or options are specified, the command syntax will be displayed.

The table "ncd_backup exit codes" (page 36) contains a list of exit codes that may be returned from the *ncd_backup* command.

Table 3
ncd_backup exit codes

Exit code	Description
0	Normal exit (executed successfully).
1	Error: command line syntax errors.
2	Error: specified NCD (<target_NCD>) is an active NCD.
3	Error: specified NCD (<target_NCD>) does not exist.
4	Error: specified pathname (<pathname>) is not a valid pathname.
5	Error: unauthorized or unknown user.
11, 12 ...	Warning: administrator attention is required.

ncd_restore

The *ncd_restore* command is used to restore an NCD backup file to the NCD database. Enter the following command syntax as one continuous command.

```
/opt/MagellanNMS/bin/ncd_restore -from <NCD_backup_file>
  [-ncd <target_NCD>] [-workdir <pathname>] [-h]
```

where:

-from <NCD_backup>   specifies the full path name for an NCD backup file.

-h   displays command line usage information.

-ncd <target_NCD>   specifies the name (*<target_NCD>*) of the NCD database to be restored. The default is indicated by the NCD backup file name.

-workdir <pathname>   Specifies the name (*<pathname>*) of an accessible directory that the command is to use for the storage of temporary work files. If this parameter is not specified, the default is */tmp*.

If no parameters or options are specified, the command syntax will be displayed.

The table "ncd_restore exit codes" (page 37) contains a list of exit codes that may be returned from the *ncd_restore* command.

Table 4
ncd_restore exit codes

Exit code	Description
0	Normal exit (executed successfully).
1	Error: command line syntax errors.
2	Error: specified NCD (<target_NCD>) already exists.
3	Error: cannot create specified NCD <target_NCD>.
4	Error: cannot find <NCD_backup_file>.
5	Error: unauthorized or unknown user.
11, 12 ...	Warning: administrator attention is required.

ncd_delete

The *ncd_delete* command is used to delete a non-active NCD database. When the command is entered you will be prompted to confirm the deletion. Enter the following command syntax as one continuous command.

```
/opt/MagellanNMS/bin/ncd_delete -ncd <target_NCD> [-h]
```

where:

-h   displays command line usage information.

-ncd <target_NCD>   specifies the name (*<target_NCD>*) of the NCD database to be deleted. This is a mandatory parameter and no default is provided.

If no parameters or options are specified, the command syntax will be displayed.

The table "ncd_delete exit codes" (page 38) contains a list of exit codes that may be returned from the *ncd_delete* command.

Table 5
ncd_delete exit codes

Exit code	Description
0	Normal exit (executed successfully).
1	Error: command line syntax errors.
2	Error: specified NCD (<target_NCD>) is an active NCD.
3	Error: specified NCD (<target_NCD>) does not exist.
5	Error: unauthorized or unknown user.
11, 12 ...	Warning: administrator attention is required.

Chapter 6
NCD Populator

This chapter explains how to use the NCD Populator to populate the NCD database with DPN provisioning data. Refer to the following sections for more information:

- "Overview of the NCD Populator" (page 39)

- "Date Convention" (page 40)

- "Populating the NCD database" (page 41)

- "Stopping the NCD Populator" (page 56)

- "Restarting the NCD Populator" (page 56)

Overview of the NCD Populator

The NCD Populator does not upload provisioning data directly from the network. Instead, the data is retrieved from files created and maintained by the Network Report System (NRS). See 241-6001-022 *Preside MDM Network Reporting System User Guide* for more information on NRS.

During population the uniqueness of the data is verified. Duplicate component or attribute values are not stored in the database. Warnings are displayed for non-unique data values indicating administrator intervention is required to resolve them. See "NCD checks" (page 16) for a list of DPN components that are supported by the uniqueness checks.

The NCD Populator can also be used to remove modules that have been made obsolete or to list the modules in the database.

The NCD Populator is intended to be used for initial bootstrap of the NCD database from NRS files and then run periodically to update the NCD database as new MCFs and associated NRS files are created.

Prior to using the NCD Populator to populate the NCD database, the following prerequisites are required.

- The NRS data files must be populated and be accessible.

- The target NCD database must exist.

- The target NCD Server must be accessible via the Preside Multiservice Data Manager (MDM) LAN.

Date Convention

In this chapter you will see dates in the format *yymmdd*. Such dates are used as parameters in certain line commands or appear as part of a file name.

To account for the year 2000 and beyond, NCD interprets 000101 as later than 991231. The base year has been chosen as 1980. This means 800101 precedes 900101 which precedes 000101 which precedes 790101. In other words:

if (yy < 80)
  year = 2000 + yy
else
  year = 1900 + yy

This means:

80 => 1980
90 => 1990
99 => 1999
00 => 2000
10 => 2010
79 => 2079.

Populating the NCD database

The NCD Populator populates DPN data into an NCD database via the NCD Server. This allows the NCD Populator to be run on a different machine than the remote NCD host. Concurrent populations of different modules into the NCD is also possible, reducing the latency period during which the database may not be up-to-date.

The NCD Populator processes one module at a time. If the current module was last populated from a different file than the current input NRS data file, or if the module was not completely populated, then the NCD Populator populates the module. Otherwise, if the current module was last completely populated from the same input file (that is, the same filename), then the NCD Populator skips to the next module, unless the *-force* option is used.

> *Note:* It is assumed that under normal operation, the contents of an NRS module data file does *not* change since the NRS Populator tool does not overwrite existing files and modified service data are downloaded as new bundles, resulting in NRS data files with new names.

Also, if the current module is being updated by another NCD Populator, then the NCD Populator skips to the next module.

Non-unique data handling

The NCD Populator does not store or replace duplicate components. It generates warning messages for components that have not been saved or for duplicate components. After processing all modules, the NCD Populator terminates with a special return code if non-unique data has been detected to indicate that administrative intervention is required to resolve the non-unique data. The table "NCD Populator return codes" (page 42) contains information on return codes.

Table 6
NCD Populator return codes

Return code	Description
0	Success. Normal exit after successful population. All modules are completely populated or deleted.
1	Error. Command line syntax or input file validation error.
2	Error. Cannot connect to NCD Server.
3	Error. Lost connection to NCD Server.
4	NCD Server error.
5	Inter-process communication error.
6	User Abort. The NCD Populator was stopped by user.
7	Internal error.
11, 12 ...	Warning. Administrator intervention is required. The NCD Populator completed, but some modules were partially populated (due to duplicated values) or incompletely populated or skipped (being updated by another user). The number of modules is <return code> - 10. For example, if the return code was 12: 12-10 = 2 modules were partially populated or skipped.

Generally, there are two types of non-unique data during population.

• The non-unique data is *transient* due to the order-dependent nature of NCD population. A component may be non-unique temporarily because the duplicated component (belonging to another module to be populated later in the same run) is out of date and has not been updated yet. For example, this may happen if a DNA is moved from one module to another. This can be avoided by running the NCD Populator in *replace* mode (default), unless the module containing the duplicated component will not be populated in the same run.

- There are *real* non-unique data in the provisioning data. In this case, the user should determine the instance of the duplicated value that is valid, correct the others in the MCF(s) or viewfile(s), re-populate the NRS data for all affected modules, and re-populate these modules into NCD.

The NCD Populator does not perform automatic replacement of the duplicated values. That is, it deletes the old component (that has the duplicated value) and adds the new one, for the following reasons:

- The NCD Populator has no knowledge of the instance of the duplicated value that is valid. There are situations where the previously loaded value is valid and should not be replaced. The real duplications must be resolved by the user at the MCF or viewfile source.

- Automatic replacement would increase the probability of concurrent NCD Populators attempting to update the same module.

Concurrent population

It is possible to run multiple NCD Populators concurrently, on the same or different workstations, to populate the same NCD database.

However, the NCD Populator does *not* allow concurrent updates on the *same* module. If the current module is being updated by another NCD Populator, the NCD Populator skips to the next module.

The NCD Populator is not blocked by module provisioning tools that are connected to the same NCD Server. If a module provisioning tool accesses the NCD database while it is being populated, the semantic checks performed by the provisioning tool will not be based on a consistent snapshot of the database. Therefore, it is recommended that the NCD Populator be run at a time when there is minimal provisioning activity. See "NCD Server concurrent access" (page 32) for more information.

Automatic save

To facilitate concurrent population, each update (create or delete) transaction is saved automatically to the NCD database unless an error is encountered during the update.

The completeness of the data saved for a module in NCD is indicated by a population status that can be *complete*, *partial,* or *incomplete*. The population is *complete* if all the NCD supported data elements for the module were populated successfully. The population is *partial* if some of the data elements were not populated because they were duplicate values at the time of population. The population is *incomplete* if some components were not populated due to errors aside from duplicate values. Partial modules should be re-populated after the non-unique data has been resolved. Incomplete modules should be re-populated.

NCD Populator mode

The NCD Populator can be run in one of the following modes: *update*, *replace*, *delete* or *list*. The modes are specified using the *-mode* option in the *ncdpop* command line.

Update mode
The NCD Populator populates module data into the NCD database. The modules are processed one at a time and the existing data for a module is deleted before the new data is created.

Replace mode
The NCD Populator deletes all modules to be populated before populating them one at a time. Other populators are prevented from updating these modules until the replace is completed. This is the default mode.

Delete mode
Selected module data is deleted from the NCD database.

List mode
The NCD Populator generates an output file which lists the modules, external DNAs, external RIDs and external IP addresses that are in the NCD database.

NCD Populator input

The NCD Populator does not upload provisioning data directly from the network. It retrieves the data from the NRS database and requires an NRS data file for each module to be populated in the NCD database. Therefore, in the command line it is necessary to specify the criteria to be used to determine the files to use.

The NCD Populator accepts the following as input:

- NRS data files

- external DNA file

- external RID file

- external IP address file

NRS data source
The NCD Populator retrieves the values of the NRS symbols, NRS_DATA_DIR and NRS_RDF_DIR from the NRS configuration file. The NRS_DATA_DIR directory contains the NRS data files for the modules. There can be more than one data file per module. The NRS data file names have the format: *<module_type>.<pm>.<namsid>.<bundle/view filename>.<activation_date>.data* where the *<module_type>* is "dpn", "ppc " or "ppe".

<activation_date> is a valid date in the format *yymmdd*. See "Date Convention" (page 40) for more information on the date format.

The NRS_RDF_DIR directory contains the DPN NRS record definition files (RDF) that describe the record layout of the NRS data files. The NCD Populator uses the RDF information to interpret the NRS data files.

NRS file selection
Although multiple NRS files may exist for each module, it is necessary to select only one data file for each module to be populated into the NCD database. This is done by specifying an *<nrs_selector>* in the NCD Populator command line.

Example
The following command selects one module data file, the one with the activation date closest to (without exceeding) the specified date, for every module mnemonic, and populates the NCD database with that file.

```
/opt/MagellanNMS/bin/ncdpop -ncd jan97 -dated 970110
-log
```

NRS data files list

The set of NRS data files to be used for populating the NCD database can also be specified by putting the file names in a file (*<nrs_list_file>*) and running the NCD Populator with the *-nrs_list <nrs_list_file>* option.

The *<nrs_list_file>* contains one NRS data file name per line. The file names are case-sensitive and the complete file path must be specified. The format for NRS data file names is *<module_type>.<pm>.<namsid>.<bundle/view filename>.<activation_date>.data, where <module_type> is "dpn", "ppe" or "ppc"*. Comment lines must start with an # character.

<activation_date> is a valid date in the format *yymmdd*. See "Date Convention" (page 40) for more information on the date format.

There should be only one data file specified for each module mnemonic <pm>. If there is more than one data file specified for the same module mnemonic, a warning will be given and the last data file will be used to populate the NCD database.

Example

The following is an example of an NRS data files list.

```
/localdisk/nrsdata/
   dpn.DPNAM1.3420.99120500.991205.data
/localdisk/nrsdata/
   dpn.DPNRM1.4034.99121200.991212.data
/localdisk/nrsdata/
   dpn.DPNAM2.0320.99120100.991201.data
/localdisk/nrsdata/ppc.PP1.2105.NMS21.991201.data
/localdisk/nrsdata/ppc.PP2.2106.NMS21.991201.data
```

When the NCD Populator is run in *delete* mode, the *<nrs_list_file>* may contain either one module mnemonic per line or one NRS data file name per line. The NCD Populator deletes these modules from the NCD database.

Example

The following is an example of an *<nrs_list_file>* to be used in *delete* mode.

```
# modules to be deleted
DPNAM1
DPNRM1
PP1
/localdisk/nrsdata/ppc.PP2.2105.NMS21.991201.data
```

The NRS Module Filename Lister (*nrslist*) tool is a convenient way of selecting the NRS module data files and creating the <nrs_list_file>. The *nrslist* tool should be invoked with the appropriate option (for example, -*dated*) to select only one file per namsid. For more information on *nrslist*, see 241-6001-022 *Preside MDM Network Reporting System User Guide.*

Example

The following example selects one file for every namsid, if the Preside Multiservice Data Manager (MDM) dated naming convention is used. The file with the activation date closest to (without exceeding) the specified date is selected.

```
/opt/MagellanNMS/bin/nrslist -dated 970110 >
nrs_list_file
```

External DNA file

The external DNA file contains a list of DNAs, in X121 or E164 format, that are external to the network. For example, DNAs of another network or Network Module DNAs. The DNAs are not case-sensitive and comment lines must start with an # character and there can only be one DNA per line. This file is specified by the -*external_dna_file* command option.

In *update* mode, the DNAs listed in this file are added to the NCD database as external DNAs. In *replace* mode, the DNAs listed in this file are added to the NCD replacing all existing external DNAs in the database. In *delete* mode, the external DNAs listed in this file are deleted from the NCD database.

Example

The following is an example of an external DNA file. The name of the file is user-specified.

```
# External DNAs
X30211407214000
X30211407214001
X30213400003100
X30217070490000
```

External RID file

The external RID file contains a list of RIDs that are external to the network, for example, Network Module RIDs and RIDs of another network. RIDs are integers ranging from 1 to 126. Comment lines must start with an # character and there only be one RID per line. This file is specified by the *-external_rid_file* command option.

In *update* mode, the RIDs listed in this file are added to the NCD database as external RIDs. In *replace* mode, the RIDs listed in this file are added to the NCD replacing all existing external RIDs in the NCD database. In *delete* mode, the external RIDs listed in this file are deleted from the NCD database.

Example

The following is an example of an external RID file. The name of the file is user-specified.

```
# External RIDs
1
20
126
98
```

External IP address file

The external IP address file contains a list of IP addresses, one on each line, that are external to the network. This file can also be used to specify a list of reserved IP addresses that should not be provisioned.

In *update* mode, the IP addresses listed in this file are stored into the NCD as external IP addresses. In *replace* mode, the IP addresses listed in this file are stored into the NCD, replaced all existing IP addresses in the NCD. In *delete* mode, the external IP addresses listed in this file are deleted from the NCD database.

Example

The following is an example of an external IP address file.

```
# External IP addresses
47.208.133.55
47.208.133.56
47.208.133.57
```

Specifying an NCD Server and database

When invoking the NCD Populator, a target NCD database must be specified. This is done using the mandatory *-ncd <target_NCD>* option on the command line. The target NCD database may be a previously populated database or a new database that has been created and initialized.

Each NCD database is managed by an NCD Server. This server should be running prior to using the NCD Populator and can be run locally or on a remote host. If the NCD Populator cannot connect to a server, it terminates with an error message.

The *<target_NCD>* syntax can be one of the following:

```
<ncd_name>
<ncd_name>@<hostname>
<ncd_name>@<host_ip_address>
```

where:

<ncd_name>   specifies an NCD Server that runs locally, or runs on the remote host that has a level 2 MNSD to which the local machine reports.

<ncd_name>@<hostname> and *<ncd_name>@<host_ip_address>* explicitly specify the name or IP address of the host where the NCD Server is running.

If NCD Servers with identical *<target_NCD>* names are running on both the local machine and the remote level 2 MNSD machine, then using <ncd_name> may result in either of the servers being used. Therefore, it is recommended that unique NCD database names be used on different machines or *<ncd_name>@<hostname>* be used to specify a specific NCD Server.

Starting the NCD Populator

The NCD Populator can be run from the command line in a UNIX shell. It is recommended that the NCD Populator be run regularly as a *cron* job.

Enter the following command syntax as one continuous command.

```
/opt/MagellanNMS/bin/ncdpop -ncd <target_NCD>
  [-mode update|replace|delete|list
[<listfile_name>]]
  [<nrs_selector> | -nrs_list <nrs_list_file>]
  [-external_dna_file <filename>]
  [-external_rid_file <filename>]
  [-external_ipaddr_file <filename>] [-force]
  [-log [<logfile>]] [-quiet] [-h] [-debug]
```

If no parameters or options are specified, the command syntax will be displayed.

where:

-debug   prints debug messages. For Nortel Networks support use only.

-external_dna_file <filename>   specifies the file (*<filename>*) that contains the list of DNAs external to the network that are to be added to or removed from the NCD database.

-external_rid_file <filename>   specifies the file (*<filename>*) that contains the list of RIDs external to the network that are to be added to or removed from the NCD database.

-external_ipaddr_file <filename>   specifies the file *(<filename>)* that contains the list of IP addresses external to the network that are to be added to or removed from the NCD.

-force   forces modules to be populated even if the supplied NRS data file has the same name as the one that was used for previous population.

-h   displays command line usage information.

-log [<logfile>] specifies that logging is to be turned on. The default log file name is *<target_NCD>*.*<date>*.*log* unless otherwise specified. The *<date>* is in the format *yymmddhhmmss* indicating when the log file was created. See "Date Convention" (page 40) for more information on the date format. If the log file exists, the new log messages will be appended to the existing file.

-mode update | replace | delete | list [<listfile_name>] specifies the mode in which the NCD Populator runs. It can be *update*, *replace*, *delete*, or *list*. The default mode is *replace*. See "NCD Populator mode" (page 44) for more information on modes.

-ncd <target_NCD> specifies the name (*<target_NCD>*) of the target NCD database to be populated. This is a mandatory parameter and no default value is provided.

-nrs_list <nrs_list_file> specifies the file (*<nrs_list_file>*) that lists the NRS data files, one per module mnemonic, to be used to populate the NCD database. This option cannot be used in conjunction with the *<nrs_selector>* option.

<nrs_selector> selects NRS module data files, one per NAMS ID, from the NRS database when the -nrs_list option is not specified. The available parameters are:

```
[-pm <pm>]
[-namsid <namsid>]
[-bundle <bundle> | -viewfile <viewfile name>]
[-activation_date <activation_date>]
[-keyed <key> | -dated <date>]
```

For more information on these parameters, see NRS-based Service Integrity Check in 241-6001-022 *Preside MDM Network Reporting System User Guide*.

One of *-nrs_list* or *<nrs_selector>* is required for update, replace, and delete modes unless the *-external_dna_file* or *-external_rid_file* options are used, or the mode is list.

-quiet specifies that only warning and error messages will be produced. No informational messages will be produced.

Example

The following are examples of NCD Populator command lines.

The following populates the target NCD *jan97*, in default *replace* mode, using NRS data files selected by the *-dated nrs_selector*. External DNAs are specified in file *f2* and external RIDs are specified in file *f3*. Log messages are directed to *run.log* file.

```
/opt/MagellanNMS/bin/ncdpop -ncd jan97 -dated 970110
-log run.log -external_dna_file f2 -external_rid_file
f3
```

The following uses the DPN NRS PM Lister tool to create the nrs_file *f1*. It then populates the target NCD database jan97 in *update* mode, using the NRS data file *f1*. External DNAs are specified in the *f2* and external RIDs are specified in the *f3* file. Logging is turned off.

```
/opt/MagellanNMS/bin/nrslist -dated 970110 >f1

/opt/MagellanNMS/bin/ncdpop -ncd jan97 -nrs_list f1
-external_dna_file f2 -external_rid_file f3
-mode update
```

The following lists the modules in the target NCD database *jan97* and directs them to a file called *jan97.list*.

```
/opt/MagellanNMS/bin/ncdpop -ncd jan97 -mode list
```

The following deletes the modules listed in the file *f1* from the NCD database *jan97*. Log messages are directed to the default log file *nrspop.jan97.<date>.log*.

```
/opt/MagellanNMS/bin/ncdpop -ncd jan97 -nrs_list f1
-mode delete -log
```

NCD Populator output

In addition to populating data into the NCD database, the NCD Populator also produces the following output:

- standard output

- standard error

- log file

- NCD modules list

Standard output

The NCD Populator prints progress messages to the screen. The *-quiet* option can be used to suppress these messages.

Standard error

The NCD Populator prints all warning and error messages to standard error.

Log file

By default, the NCD Populator does not produce a log file. If the *-log* option is specified, all the messages and errors sent to standard output are also printed to the log file.

By default the name of the log file is *ncdpop.<target_NCD>.<date>.log* unless otherwise specified in the command line. If the specified log file exists, the new messages are appended to the file. The NCD Populator locks the log file so that a second NCD Populator cannot write to the file simultaneously.

NCD modules list

When the NCD Populator is run in *list* mode a file is created listing all the modules, external DNAs and external RIDs in the NCD. By default, this file is named *<target_NCD>.list* and is created in the current directory. Alternatively, the name of this file can be specified by the *<listfile_name>* option on the command line. For example, *-mode list <listfile_name>*. If the file exists, it will be overwritten. The NCD Populator locks this file so that a second NCD Populator cannot write to the file simultaneously. Each module is described by a line containing the following fields:

```
<module_mnemonic> <owner> <last_pop_time> <status>
<nrs_data_file>
```

where:

`<module_mnemonic>`   is the mnemonic of the module.

`<owner>`   is the name of the user who populated the module.

`<nrs_data_file>`   is the full path name of the NRS data file used to populate the module.

`<last_pop_time>`   is the time of the last population in the form *yyyy-mm-dd hh:mm:ss*.

<status> is the status of the last population, complete, incomplete or partial.

A *complete* status means that the module was completely populated, that is, all the NCD supported data elements for the module were populated. A *partial* status means that the module was partially populated, that is, some of the data elements were not populated because they were non-unique at the time of population. An *incomplete* status means that some of the data elements were not populated because of problems other than duplicates. Note that some of the components not populated may be non-unique components.

Example

The following is an example of a modules list file.

```
NETWORK CONFIGURATION DATABASE "example":

There are 2 External DNA(s):

X30213420411200
X30213420411205

There are 5 External RID(s):

100
12
126
2
99

There are 2 External IP Address(es):

11.22.33.44
11.22.33.55


There are 6 Modules:

Module Owner   Population Time      Status      NRS data file
A20    ncdad-  1994-07-14 16:23:28 COMPLETE    /localdisk/nrsdata/
       min                                     dpn.A20.1010.TQD00.111230.data
A2002  ncdad-  1994-07-14 16:26:12 PARTIAL     /localdisk/nrsdata/
       min                                     dpn.A2002.1001.18.900918.data
A2006  user1   1994-07-14 16:25:45 INCOMPLETE  /localdisk/nrsdata//localdisk/
                                               nrsdata/dpn.
                                               A2006.7103.WSABRE00.111230.data
R34    user2   1994-07-14 16:24:20 COMPLETE    /localdisk/nrsdata/
                                               dpn.R34.1010.84.010101.data
PP1    user1   1995-10-31 11:42:58 COMPLETE    /localdisk/nrsdata/
                                               ppc.PP1.2105.NMS21.991201.data
PP2    user1   1995-10-31 11:42:46 COMPLETE    /localdisk/nrsdata/
                                               ppc.PP2.2105.NMS21.991201.data


There are 4 completely populated modules.
There are 1 partially populated modules.n.A2002.1001
There are 1 incompletely populated modules.
```

Stopping the NCD Populator

The NCD Populator automatically terminates after processing all modules and administrative intervention is normally not required. However, under some circumstances, it may be necessary to stop the NCD Populator if it appears to be running for a long time without any output. For instance, this may be caused by an NCD Populator or NCD Server internal error.

The module that is being populated when the NCD Populator is stopped may be incomplete and should therefore be re-populated.

An NCD Populator running in the foreground can be stopped by typing *Control-C*.

Use the following steps to stop an NCD Populator running in the background

1   Use the *ps* command to find the process id of the *ncdpop* and *ncdpopex* processes.

     ```
     ps -def | grep ncdpop
     ```

2   Use the kill command to stop the processes.

     ```
     kill <ncdpopex_pid> <ncdpop_pid>
     ```

     This command sends signal 15 to the *ncdpop* and *ncdpopex* processes.

Restarting the NCD Populator

There are certain situations when the NCD Populator will need to be restarted or re-run. For example, the Populator was stopped by a user, the Populator exited abnormally (due to internal or NCD Server problem), or modules were skipped (due to concurrent updaters, or input data missing).

After the NCD Populator terminates, the standard error and the log file should be checked for warnings or errors. Before restarting the populator, correct the problems that caused the previous session to terminate.

To restart the NCD Populator, use the original *<nrs_file>* or *<nrs_selector>*. For each module, if the NCD has already been completely populated with the same NRS data file, then the NCD Populator will skip to the next module. The NCD Populator populates a module only if the NCD module data had not been completely populated with the supplied data file.

Chapter 7
Module provisioning

This chapter explains how to configure DPN module provisioning sessions to access NCD. Refer to the following sections for more information:

- "NCD access" (page 57)

- "Impacts to module provisioning tools" (page 58)

NCD access

If configured, an NCD database is accessed during module provisioning sessions with supported tools. Warnings are provided to users when supported components have invalid values.

If NCD is configured to run during a module provisioning session, it will affect the following DPN module provisioning tools: Global Data Manager, Component Provisioning, Service Data Conversion, and API Provider applications.

By default, all module provisioning tools do not access the NCD database. Access to the NCD database must be set using the *<user home directory/ MagellanNMS/ProvisioningUser.cfg* and */opt/MagellanNMS/cfg/ ProvisioningAdmin.cfg* files. See 241-6001-304 *Preside MDM Configuration Management for DPN Administration* for more information on user preferences.

Configuring access to the NCD database

1 In the *ProvisioningUser.cfg* and *ProvisioningAdmin.cfg* file, modify the following user preference to reflect the name of the target NCD.

```
FIELD_ACCESS NCD_SERVER <target_NCD>
```

Note: For information about valid syntax for <target_NCD>, see "Specifying an NCD Server and database" (page 49).

Removing access to the NCD database

1 Delete the following user preferences from the *ProvisioningUser.cfg* and *ProvisioningAdmin.cfg* files.

```
FIELD_ACCESS NCD_SERVER
```

Impacts to module provisioning tools

It should be noted that the NCD database is not updated during a module provisioning session. Modifications made during the current module provisioning session are not reflected in NCD and therefore semantic checks using NCD data cannot account for these modifications. For example, if the same DNA is added more than once during a module provisioning session, this is not detected by semantic checks executed *during* this module provisioning session. In fact, the same DNA can be added more than once in separate module provisioning sessions before the NCD is updated and this is not detected until the NCD Populator is run. NCD is not accessed for read-only provisioning sessions, for example, Component Provisioning *view* mode.

The following scenarios apply to all module provisioning tools:

•   If NCD access is configured and a connection cannot be made to the specified NCD, a warning is presented and the provisioning session continues. *This does not prevent any module provisioning service data operations.*

•   If the connection to NCD is lost, a warning is presented and the provisioning session continues. *This does not prevent any module provisioning service data operations.*

•   The NCD connection is checked each time an MCF is uploaded. Therefore, if the NCD connection is lost and subsequently the NCD server is restarted, a new connection will be established on the next upload.

Component Provisioning

During a Component Provisioning session you are notified of invalid data values for supported components as follows:

- If it is a field, for example, NAMS ID in the Module_Data component:

  — the check is performed explicitly during an *edit* operation when *Verify and Save* or *Verify* is selected from the edit dialog containing the field. If the value is invalid, a warning is displayed.

  — the check is performed implicitly during a *paste/template* operation. If the value is invalid, a warning is displayed.

- If it is a component, for example, DNA_CUG

  — the check is performed explicitly during an *add* operation when *OK* is selected on the key dialog. If the value is invalid, a warning is displayed.

  — the check will be performed either during a *paste/template* operation or during a subsequent download operation. If the value is invalid, a warning is displayed.

- The checks are performed during a download operation:

  — if the component has been uploaded or created during the session, or

  — if the *Complete MCF* download check option has been selected.

- The checks are not performed during the expand operation. Therefore, navigating the component hierarchy in the Subcomponents area does not produce any of these warnings.

In all cases, these warnings are handled exactly as Component Provisioning handles other warnings.

Global Data Manager

All components in the target MCF are checked prior to a download. Any warnings detected are handled in the same manner as the Global Data Manager handles other warnings.

API Provider

The user is notified of invalid data values for supported components as follows:

- The check is performed when the *Verify* action is selected on either the object itself or on an ancestor of the object. For example, the uniqueness of the value of an ITI DNA object is checked when the *Verify* action is selected on the object itself or any of its ancestors, for example, PO, PI, PE, PM.

- The check is performed when the *Download* action is selected if the component has been either uploaded or created during the provisioning session.

- The check is performed when the *Download* action is selected if the *Check* attribute is set to *Complete*.

In all cases, these warnings are handled in the same manner as the API Provider handles other warnings.

Chapter 8
Deployment considerations

This chapter lists the deployment considerations that must be evaluated before using NCD:

- The NCD database can only be updated by the NCD Populator.

- Only a limited number of components are supported when semantic checks are run.

- NCD access is configurable on a per userid basis, not on a tool instance basis.

- The NCD Server supports a maximum of 100,000 external DNAs. When this limit is reached, the database will continue to be populated and these DNAs will be checked for duplication and existence. However, the module list file created by the NCD Populator will only report on the first 100,000 external DNAs retrieved from the database.

- The NCD Server supports a maximum of 100,000 external IP addresses. When this limit is reached, the database will continue to be populated and these IP addresses will be checked for duplication. However, the module list file created by the NCD Populator will only report on the first 100,000 external IP addresses retrieved from the database.

For information on disk storage, memory requirements and performance, see 241-6001-101 *Preside MDM Engineering Guide*.

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Administrator Guide

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