



Netra™ CT 820 Server System Administration Guide

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Preface

The *Netra CT 820 Server System Administration Guide* contains configuration and administration information for system administrators of the Netra™ CT 820 server. This manual assumes you are familiar with UNIX® commands and networks.

How This Book Is Organized

Chapter 1 contains an introduction to the Netra CT software.

Chapter 2 contains information on configuring your system.

Chapter 3 describes how to administer your system.

Appendix A contains information on error messages from the Processor Management Service application.

Using UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. See the following for this information:

- Software documentation that you received with your system
- Solaris™ operating environment documentation, which is at <http://docs.sun.com>

Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface*	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

* The settings on your browser might differ from these settings.

Related Documentation

The Netra CT 820 server documentation is listed in the following table.

Title	Part Number
<i>Netra CT 820 Server Product Overview</i>	817-2643
<i>Netra CT 820 Server Installation Guide</i>	817-2641
<i>Netra CT 820 Server Service Manual</i>	817-2642
<i>Netra CT 820 Server System Administration Guide</i>	817-2647
<i>Netra CT 820 Server Safety and Compliance Manual</i>	817-2645
<i>Netra CT 820 Server Software Developer's Guide</i>	817-2648
<i>Netra CT 820 Server Documentation Note</i>	817-1907
<i>Netra CT 820 Server Release Notes</i>	817-2646

You might want to refer to documentation on the following products for additional information: the Solaris™ operating environment, the ChorusOS™ environment, OpenBoot™ PROM firmware, and the Netra CP2300 cPSB board.

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Netra CT 820 Server System Administration Guide, part number 817-2647-10

Introduction

This chapter includes the following sections:

- Overview of Netra CT Server Software and Hardware
 - System Administration Tasks
-

Overview of Netra CT Server Software and Hardware

The Netra CT server software can be categorized as follows:

- Operating environments and applications
- Firmware
- Network support

The software is described in TABLE 1-1 and represented logically, with the hardware, in FIGURE 1-1.

TABLE 1-1 Netra CT Server Software for System Administrators

Category	Name	Description
<i>Operating Environments and Applications</i>	Solaris operating environment	The Solaris operating environment runs on the node boards. It is installed by the user.
	ChorusOS operating environment	The ChorusOS operating environment runs on the distributed management cards. It is factory-installed.
	Command-line Interface (CLI)	The CLI is the primary user interface to the distributed management cards.

TABLE 1-1 Netra CT Server Software for System Administrators (*Continued*)

Category	Name	Description
	Managed Object Hierarchy (MOH)	Management application that monitors and manages the field-replaceable units (FRUs) in your system. It provides support for high-availability services and applications.
	Processor Management Service (PMS)	Management application that provides support for high-availability services and applications.
<i>Firmware</i>	OpenBoot PROM firmware	Firmware on the node boards that controls booting. It includes diagnostics.
	Boot control firmware (BCF)	Firmware on the distributed management cards that performs power-on self-test (POST) and controls booting of the distributed management card software.
	Baseboard Management Controller (BMC) firmware	Baseboard Management Controller firmware enables communication over the Intelligent Platform Management Interface (IPMI) on the distributed management cards.
	System Management Controller (SMC) firmware	System Management Controller firmware enables communication over the IPMI controller on node boards.
<i>Network Interfaces</i>	Internal Ethernet networks	The two internal Ethernet networks make up the compact packet-switched backplane (cPSB) bus.
	System management network	The system management network is a communication channel over the cPSB bus. It is used by management software to communicate between the distributed management cards, the node boards, and the switching fabric boards.

The Netra CT 820 system has two distributed management cards. You use the top, *active*, distributed management card (slot 1A) for system-level configuration, administration, and management of most of the components connected to the midplane. The bottom, *standby*, distributed management card (slot 1B) provides a backup for hot-swap signals so that the active distributed management card can be removed without impact to the power for the slots; it cannot be used for configuring, administering, or managing other boards.

The switching fabric boards connect the distributed management card and the node boards internally, and have Ethernet ports on the rear for external connectivity.

The node boards accept and own peripherals, such as disks; they also run user applications. In a Netra CT server, each node board runs its own copy of the Solaris operating environment, and each is therefore considered a server; the distributed management cards, the node boards, the switching fabric boards, and the other system FRUs, make up a system.

The hardware interfaces include the Intelligent Platform Management Interface (IPMI), the compact packet-switched backplane (cPSB) bus, and the network interface on the distributed management cards, the node boards, and the switching fabric boards.

TABLE 1-1 contains a summary of how you can access the various boards. The distributed management card supports 22 sessions (tip and telnet connections) at once.

TABLE 1-2 Netra CT 820 System Board Access Methods

Board	Access Methods
Distributed Management Card (active [slot 1A] and standby [slot 1B])	<ul style="list-style-type: none"> • 1 rear serial port (console) for <code>tip</code> or ASCII terminal connection • 1 front serial port (console) for <code>tip</code> or ASCII terminal connection (Note that either the rear or front serial port can be used, but not both at the same time; if you connect a cable to both ports, the front port will be active.) <ul style="list-style-type: none"> • 1 rear Ethernet port for telnet connection
Switching Fabric Board (slots 2 and 21)	<ul style="list-style-type: none"> • Multiple rear Ethernet ports for telnet connection
Node Board (Sun-supported cPSB-only boards) (slots 3 through 20)	For the Netra CP2300 cPSB board: <ul style="list-style-type: none"> • 2 rear serial ports (console) for <code>tip</code> or ASCII terminal connection • 1 front serial port (console) for <code>tip</code> or ASCII terminal connection • Console command from the distributed management card CLI • Telnet connection through the switching fabric board, specifying the IP address of the node board

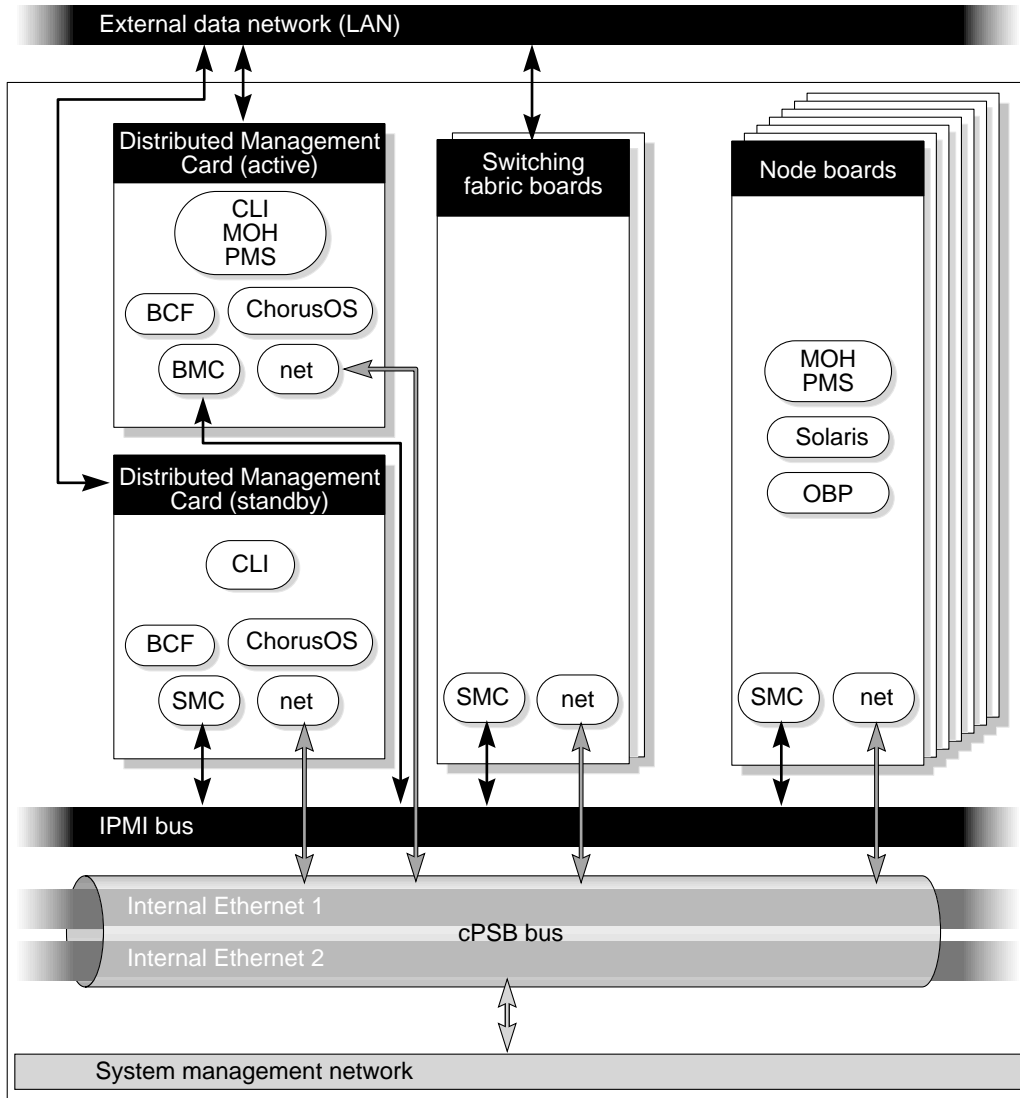


FIGURE 1-1 Logical Representation of Software and the Hardware Interfaces in a Netra CT Server

System Administration Tasks

Netra CT server system administration typically includes installation, configuration, and administration tasks.

Solaris administration on the Netra CT server, including adding Solaris user accounts, is performed by logging into the node board. Netra CT server administration is performed by logging into the distributed management card and using the distributed management card command-line interface. The distributed management card can be used as the single point of entry in the Netra CT system for configuration and administration purposes.

System administration tasks are described in the following chapters.

Configuring Your System

This chapter assumes you have already installed the Solaris operating environment and the required patches on your Netra CT 820 node boards.

You configure the Netra CT 820 system primarily through the active distributed management card command-line interface (CLI). The active distributed management card CLI enables system-level configuration, administration, and management that includes the node boards, the switching fabric boards, the distributed management card, power supplies, and fan trays. The distributed management card CLI interface can be used both locally and remotely.

You configure the distributed management cards first, then the node boards, then the system-wide applications.

This chapter includes the following sections:

- Accessing the Distributed Management Cards
- Configuring the Distributed Management Cards' External Ethernet Ports
- Setting Up User Accounts on the Distributed Management Card
- Specifying Netra CT Server FRU ID Information
- Displaying Netra CT Server FRU ID Information
- Configuring a Chassis Slot for a Board
- Configuring a Node Board as a Boot Server
- Configuring the System Management Network
- Specifying Other FRU ID Information
- Configuring the Node Boards
- Enabling the Managed Object Hierarchy Application
- Enabling the Processor Management Service Application

Accessing the Distributed Management Cards

When you initially access either distributed management card, you must do so over the serial port (console), using an ASCII terminal or the `tip` program. When you first access the distributed management card, log in with the default user account of `netract` and the password `suncl11`. This account is set to full authorization (permissions). This account can not be deleted; however, you should change the password on this account for security purposes, before your Netra CT 820 server is operational.

The next sections provide information on configuring the distributed management cards' external Ethernet ports and setting up user accounts and passwords using the distributed management card command-line interface. For more information on using the distributed management card command-line interface, refer to Chapter 3.

After you configure the external Ethernet port, you can access the distributed management card over:

- The Ethernet port, using `telnet`
- The serial port (console), using an ASCII terminal or the `tip` program. You can use either the front or rear serial port, but you can not use both ports at the same time.

The distributed management card supports 22 sessions (`tip` and `telnet` connections) at once.

Note – The term “distributed management card” as used in this manual refers to the active distributed management card unless otherwise specified.

Configuring the Distributed Management Cards' External Ethernet Ports

Each distributed management card has one external Ethernet port on the rear transition card, labeled SRVC LAN. You configure this port using the following CLI commands:

- `setipmode`
- `setipaddr`
- `setipnetmask`
- `setipgateway`

You must be logged in to the distributed management card with a user account that has full permissions.

When you specify the port number (*port_num*), use 1 to indicate the external Ethernet port.

You must reset the distributed management card (`reset dmc`) for any changes to take effect.

Note – The external Ethernet interface on the distributed management card and the external Ethernet interface on the switching fabric board must be connected to different subnets. If they are configured on the same subnet, `arp` messages will be displayed on the distributed management card console.

▼ To Configure the Distributed Management Cards' External Ethernet Ports

1. Log in to the distributed management card.
2. Set the IP mode:

```
hostname cli> setipmode -b port_num rarp|config|none
```

Choose the IP mode according to the services available in the network (`rarp`, `config`, or `none`). The default is `none`. Set the `ipmode` to `config` to configure the Ethernet port. You must reset the distributed management card for the changes to take effect.

3. Set the IP address:

```
hostname cli> setipaddr -b port_num addr
```

Set the IP address of the distributed management card. The default is 0.0.0.0. This command is only used if the `ipmode` is set to `config`. You must reset the distributed management card for the changes to take effect.

4. Set the IP netmask:

```
hostname cli> setipnetmask -b port_num addr
```

Set the IP netmask of the distributed management card. The default is 0.0.0.0. This command is only used if the `ipmode` is set to `config`. You must reset the distributed management card for the changes to take effect.

5. Set the IP gateway:

```
hostname cli> setipgateway addr
```

Set the IP gateway of the distributed management card. The default is 0.0.0.0. You must reset the distributed management card for the changes to take effect.

6. Reset the distributed management card.

Setting Up User Accounts on the Distributed Management Card

User accounts are set up using the distributed management card command-line interface. The default user account is `netract` and the password is `suncli1`. This account is set to full authorization (permissions). This account can not be deleted; however, you should change the password on this account for security purposes, before your Netra CT 820 server is operational.

The distributed management card supports 16 accounts with passwords.

▼ To Set Up a User Account

1. Log in to the distributed management card.
2. Add a user:

```
hostname cli> useradd username
```


3. Add a password for that user:

```
hostname cli> userpassword username
```

By default, new accounts are created with read-only permission. Permission levels can be changed using the `userperm` command; refer to “CLI Commands” on page 38 for more information about permissions and the `userperm` command.

Username Restrictions

The username field has a maximum length of 16 characters; it must contain at least one lowercase alphabetic character, and the first character must be alphabetic.

Valid characters for *username* include:

- Alphabetic characters
- Numeric characters
- Period (.)
- Underscore (_)
- Hyphen (-)

Password Restrictions

Passwords have the following restrictions:

- They must contain at least six characters but not more than eight characters (only the first eight characters are considered if the password is longer than eight characters).
- They must contain at least two alphabetic characters and at least one numeric or special character. Alphabetic characters can be both uppercase and lowercase; special characters include printable characters, such as ! @ # \$ % ^ & and *.
- They must differ from the user’s login name and any reverse or circular shift of that login name; for comparison purposes, uppercase and lowercase letters are equivalent.
- The new password must differ from the old by at least three characters; for comparison purposes, uppercase and lowercase letters are equivalent.

Specifying Netra CT Server FRU ID Information

A field-replaceable unit (FRU) is a module or component that can typically be replaced in its entirety as part of a field service repair operation.

The Netra CT system FRUs include:

- Node boards
- Distributed management cards
- Switching fabric boards
- Power supplies
- Fan trays
- Midplane

All FRUs except power supplies contain *FRU ID* (identification) information that includes FRU manufacturing and configuration data. This information can be displayed through the distributed management card CLI (see TABLE 2-2). The Netra CT 820 system supports two FRU ID formats:

- The Sun FRU ID format, available on the distributed management cards and on the node board (Netra CP2300 cPSB board)
- The industry standard IPMI format, available on the midplane, switching fabric boards, and fan trays conforming to the PICMG 2.9 specification

In addition, you enter certain FRU ID information, through the distributed management card CLI, that is stored in the midplane. (Note that you can also enter FRU ID information through the MOH application; refer to the *Netra CT Server Developer's Guide* for instructions.) FRU ID information includes:

- Allowable plug-in boards (a default exists) and boot devices (a default exists in OpenBoot PROM) for the slots
- The system management network configuration (a default exists)
- System location information, customer data information, and user label information (there are no defaults; these are optional entries)

Some of this information is used by the MOH application to audit board insertions and prevent misconfigurations, and to display information; some is used by the system management network.

The format of the information to be specified is:

```
hostname cli> setfru fru_target fru_instance fru_field value
```

The FRU instance is a logical number; it matches the slot number only for the slot FRU target. The FRU field is case-insensitive.

TABLE 2-1 shows the FRU ID information that can be specified with the CLI `setfru` command.

TABLE 2-1 FRU ID Information Specified Using the `setfru` Command

FRU Target	FRU Instance	FRU Field	Value	Description
midplane	1	SysmgmtbusIPSubnet	<i>IP subnet address (hexadecimal)</i>	Specify the IP subnet address for the system management network. The default is 0xc0a80d (192.168.13).
midplane	1	SysmgmtbusIPSubnetMask	<i>IP subnet mask (hexadecimal)</i>	Specify the IP subnet mask for the system management network. The default is 0xffffffe0 (255.255.255.224).
midplane	1	Location	<i>text description</i>	A description of the location (for example, the number on the chassis label) of the Netra CT system. This description is used in the MOH application. The text can be up to 80 characters in length.
midplane	1	User_Label	<i>text description</i>	Any customer-supplied information. The text can be up to 10 characters in length.
dmc	1 or 2	Cust_data	<i>text description</i>	Any customer-supplied information. The text can be up to 80 characters in length. FRU instance 1 is the DMC in slot 1A; FRU instance 2 is the DMC in slot 1B.
slot	2 to 21	Acceptable_Fru_Types	<i>vendor:partnumber</i>	First, specify the chassis slot number to be configured (Slots are numbered starting from the left.) Second, specify the allowable plug-in board(s) for that slot, where the value is the vendor name and part number (separated by a colon) of the board. Use the <code>showfru</code> command to display this information. Multiple boards may be specified, separated by a semi-colon (;). The default is to allow all boards.

TABLE 2-1 FRU ID Information Specified Using the `setfru` Command (Continued)

FRU Target	FRU Instance	FRU Field	Value	Description
slot	3 to 20	Boot_Devices	<i>boot_device_list</i>	First, specify the chassis slot number to be configured (Slots are numbered starting from the left.) Second, specify the alias(es) listing the devices and/or full device path names the board in this slot will boot from. The <i>boot_device_list</i> can be up to 16 characters in length. When the board in this slot is powered up, this information overwrites the entry in the OpenBoot PROM <code>boot-device</code> NVRAM configuration variable. Specifying "" (the null string) will default to the OpenBoot PROM NVRAM setting.
slot	3 to 20; all	Boot_Mask	true or false	First, specify the chassis slot number to be configured (slots are numbered starting from the left) or <code>all</code> to refer to all configurable slots. Second, specify whether the board in this slot is a boot server for the system. The default is false, which means that the board is not a boot server. Refer to "Configuring a Node Board as a Boot Server" on page 20 for instructions on setting the boot mask for a slot.
slot	3 to 20	Cust_Data	<i>text description</i>	First, specify the chassis slot number to be configured (Slots are numbered starting from the left.) Second, specify any customer-supplied information. The text can be up to 80 characters in length.

Changes to FRU ID fields through the CLI `setfru` command require you to completely power the system off and on for the changes to take effect. It is recommended that you enter all necessary FRU ID information, then power the system off and on.

Displaying Netra CT Server FRU ID Information

FRU ID information entered during the manufacturing process and through the distributed management card CLI `setfru` command can be displayed using the `showfru` command.

TABLE 2-2 shows the FRU ID information that can be displayed with the CLI `showfru` command. Use the FRU field to specify the information you want; the FRU field is case-insensitive.

TABLE 2-2 FRU ID Information Displayed Using the `showfru` Command

FRU Target	FRU Instance	FRU Field	Description
midplane	1	Sun_Part_No	Display the part number for the midplane.
midplane	1	Sun_Serial_No	Display the serial number for the midplane.
midplane	1	SysmgtbodyIPSubnet	Display the system management network IP subnet address in hexadecimal format for this system.
midplane	1	SysmgtbodyIPSubnetMask	Display the system management network IP subnet mask in hexadecimal format for this system.
midplane	1	Vendor_Name	Display the vendor name for the midplane.
midplane	1	Fru_Shortname	Display the FRU short name for the midplane.
midplane	1	Location	Display any customer-supplied text specified for the Location of this system.
midplane	1	User_Label	Display any customer-supplied text for this field.
dmc	1 or 2	Sun_Part_No	Display the part number for the distributed management card in a particular slot. FRU instance 1 is the DMC in slot 1A; FRU instance 2 is the DMC in slot 1B.
dmc	1 or 2	Sun_Serial_No	Display the serial number for the distributed management card in a particular slot. FRU instance 1 is the DMC in slot 1A; FRU instance 2 is the DMC in slot 1B.

TABLE 2-2 FRU ID Information Displayed Using the `showfru` Command (Continued)

FRU Target	FRU Instance	FRU Field	Description
dmc	1 or 2	Vendor_Name	Display the vendor name for the distributed management card in a particular slot. FRU instance 1 is the DMC in slot 1A; FRU instance 2 is the DMC in slot 1B.
dmc	1 or 2	Fru_Shortname	Display the FRU short name for the distributed management card in a particular slot. FRU instance 1 is the DMC in slot 1A; FRU instance 2 is the DMC in slot 1B.
dmc	1 or 2	Initial_HW_Dash_Level	Display the initial hardware dash level of the distributed management card in a particular slot. FRU instance 1 is the DMC in slot 1A; FRU instance 2 is the DMC in slot 1B.
dmc	1 or 2	Initial_HW_Rev_Level	Display the initial hardware revision level of the distributed management card in a particular slot. FRU instance 1 is the DMC in slot 1A; FRU instance 2 is the DMC in slot 1B.
dmc	1 or 2	Cust_Data	Display any customer-supplied text for this field for the distributed management card in a particular slot. FRU instance 1 is the DMC in slot 1A; FRU instance 2 is the DMC in slot 1B.
slot	3 to 20	Sun_Part_No	Display the part number for the board in a particular slot.
slot	3 to 20	Sun_Serial_No	Display the serial number for the board in a particular slot.
slot	2 to 21	Acceptable_Fru_Types	Display the allowable plug-in boards for a particular slot.
slot	3 to 20	Boot_Devices	Display the boot devices for a particular slot.
slot	3 to 20	Boot_Mask	Display whether or not the board in a particular slot is a boot server for the system.
slot	3 to 20	Vendor_Name	Display the vendor name for the board in a particular slot.
slot	3 to 20	Fru_Shortname	Display the FRU short name for the board in a particular slot.
slot	3 to 20	Initial_HW_Dash_Level	Display the initial hardware dash level of the board in a particular slot.
slot	3 to 20	Initial_HW_Rev_Level	Display the initial hardware revision level of the board in a particular slot.
slot	3 to 20	Cust_Data	Display any customer-supplied text for this field for the board in a particular slot.

TABLE 2-2 FRU ID Information Displayed Using the `showfru` Command (Continued)

FRU Target	FRU Instance	FRU Field	Description
switch	1 or 2	Sun_Part_No	Display the part number for the specified switching fabric board. FRU instance 1 is the switch in slot 2; FRU instance 2 is the switch in slot 21.
switch	1 or 2	Sun_Serial_No	Display the serial number for the specified switching fabric board. FRU instance 1 is the switch in slot 2; FRU instance 2 is the switch in slot 21.
switch	1 or 2	Vendor_Name	Display the vendor name for the specified switching fabric board. FRU instance 1 is the switch in slot 2; FRU instance 2 is the switch in slot 21.
switch	1 or 2	Fru_Shortname	Display the FRU short name for the specified switching fabric board. FRU instance 1 is the switch in slot 2; FRU instance 2 is the switch in slot 21.
fantray	1 to 3	Sun_Part_No	Display the part number for the specified fan tray.
fantray	1 to 3	Sun_Serial_No	Display the serial number for the specified fan tray.
fantray	1 to 3	Vendor_Name	Display the vendor name for the specified fan tray.
fantray	1 to 3	Fru_Shortname	Display the FRU short name for the specified fan tray.

▼ To Display FRU ID Information

1. Log in to the active distributed management card.
2. Enter the `showfru` command:

```
hostname cli> showfru fru_target fru_instance fru_field
```

Refer to TABLE 2-2 for allowable information for each variable. For example, if you want to display the part number FRU ID information for fan tray 1, enter the following:

```
hostname cli> showfru fantray 1 Sun_Part_No
```

Use the FRU target “slot” to display information for the node boards. For example, to display part number FRU ID information for a board in slot 8, enter the following:

```
hostname cli> showfru slot 8 Sun_Part_No
```

The next several sections describe the configurations you can set by entering FRU ID information.

Configuring a Chassis Slot for a Board

You can specify the type of board that is allowed in a given chassis slot using the distributed management card CLI. The slot usage information is used by the distributed management card software to audit board insertions and prevent misconfigurations. You can also specify the boot device for the slot, that is, the path to the device the board in the slot will boot from. When the board is powered on, the FRU boot device information overwrites the entry in the OpenBoot PROM `boot-device` NVRAM configuration variable on that board. The chassis slot information can be changed at any time if desired using the distributed management card CLI.

By default, slots are configured to accept Sun-supported cPSB-only board FRUs unless you specifically set an allowable plug-in for a specific slot. The exceptions are: for a Netra CT 820 server, the distributed management cards must be in slot 1A and 1B and the switching fabric boards must be in slots 2 and 21.

To set allowable plug-ins for a particular slot, you need the vendor name and the part number of the board. This FRU ID information can be displayed using the CLI `showfru` command; see “Displaying Netra CT Server FRU ID Information” on page 15 for more information.

▼ To Configure a Chassis Slot for a Board

1. **Log in to the active distributed management card.**

2. Set the acceptable FRUs for the slot:

```
hostname cli> setfru fru_target fru_instance fru_field value
```

Refer to TABLE 2-1 for allowable information for each variable. For example, if you want to set chassis slot 5 to allow only a Sun Microsystems (vendor 003E) particular CPU board (part number 595-5769-03), enter the following:

```
hostname cli> setfru slot 5 Acceptable_Fru_Types 003E:595-5769-03
```

Multiple boards can be specified for one slot. Separate the boards with a semi-colon. You can also use the asterisk (*) as a wild card in the part number to allow multiple boards. For example, if you want to set chassis slot 4 to allow only boards from three particular vendors, with multiple board part numbers from one vendor, enter the following:

```
hostname cli> setfru slot 4 Acceptable_Fru_Types 003E:*;0004:1234-5678-1;0001:8796541-02
```

3. Set the boot device for the slot:

```
hostname cli> setfru fru_target fru_instance fru_field value
```

Refer to TABLE 2-1 for allowable information for each variable. For example, if you want to set chassis slot 5 to boot from a device on the network, enter the following:

```
hostname cli> setfru slot 5 Boot_Devices boot_device_list
```

where *boot_device_list* is the alias(es) specifying the boot devices (limit is 25 bytes), for example, *disk net*.

4. Completely power off and on the system by locating the power switch at the rear of the Netra CT 820 server; press it to the Off (O) position, then press it to the On (I) position.

Configuring a Node Board as a Boot Server

You can configure a node board (Sun-supported cPSB-only boards) to be a boot server for the Netra CT 820 system. To do this, you use the `Boot_Mask` field in the midplane FRU ID. When the system is powered on, the distributed management card looks at the `Boot_Mask` field; if a boot server has been specified, the distributed management card powers on that node board first. There can be any number of boot servers per Netra CT 820 system. If multiple boot servers are specified, all boot servers are powered on simultaneously.

▼ To Configure a Node Board as a Boot Server

1. Log in to the distributed management card.
2. Specify which slot contains a node board boot server by setting the `Boot_Mask`:

```
hostname cli> setfru fru_target fru_instance fru_field value
```

Refer to TABLE 2-1 for allowable information for each variable. For example, if you want to specify chassis slot 3 as a node board boot server, enter the following:

```
hostname cli> setfru slot 3 Boot_Mask true
```

To specify all slots (3 to 20) as boot servers, enter the following:

```
hostname cli> setfru slot all Boot_Mask true
```

To clear all slots (3 to 20) as boot servers, enter the following:

```
hostname cli> setfru slot all Boot_Mask false
```

3. Completely power off and on the system by locating the power switch at the rear of the Netra CT 820 server; press it to the Off (O) position, then press it to the On (I) position.

Configuring the System Management Network

The system management network provides a communication channel over the midplane. It can be used to communicate between the distributed management card, the node boards, and the switching fabric boards. It appears as any other generic Ethernet port in the Solaris operating environment. The system management network is configured by default on Solaris and on the distributed management card. The system management network is used by the applications and features, such as MOH, PMS, and console connections from the distributed management card to node boards.

Choosing the IP Address for the System Management Network

The IP address of the system management network on the node boards is formed as follows: the midplane FRU ID field `SysmgtbusIPSubnet` contains the value `IP_subnet_address.slot_number`. The default IP subnet address is `c0a80d00` (192.168.13.00) and the default IP subnet mask is `0xffffffe0` (255.255. 255.224). When you power on the Netra CT server, and if you have not made any changes for the system management network in the midplane FRU ID, the IP address of a board installed in slot 3 will be configured to 192.168.13.3; if you then move that board to slot 4, the IP address for that board will be configured to 192.168.13.4.

The IP address of the system management network on the active distributed management card is always the midplane FRU ID field `SysmgtbusIPSubnet` value `IP_subnet_address.22`.

Note – If you configure multiple Netra CT 820 systems in the same subnet, make sure each system has a different system management network IP subnet.

For example, if your network configuration includes four Netra CT 820 systems connected to one external switch or router, you must configure a different system management network IP subnet for each system; otherwise, applications, such as MOH, will not work correctly. A sample configuration using the 192.168.13 subnet is as follows:

Netra CT 820 System	System Management Network IP Subnet	IP Address Range for Boards
System #1	192.168.13.0	192.168.13.1 to 192.168.13.30
System #2	192.168.13.32	192.168.13.33 to 192.168.13.62
System #3	192.168.13.64	192.168.13.65 to 192.168.13.94
System #4	192.168.13.96	192.168.13.97 to 192.168.13.126

FIGURE 2-1 illustrates this sample configuration.

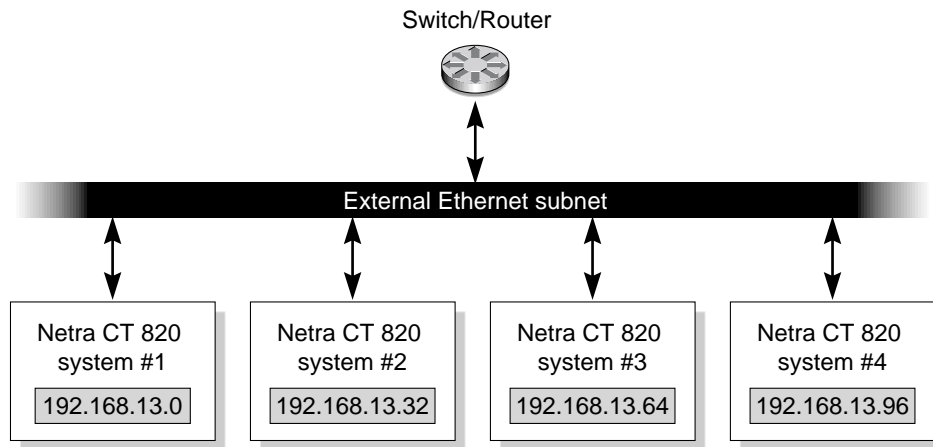


FIGURE 2-1 System Management Network Subnet Configuration with Multiple Systems

▼ To Configure the System Management Network

1. Log in to the active distributed management card.
2. Set the FRU ID for the system management network:

```
hostname cli> setfru fru_target fru_instance fru_field value
```

Refer to TABLE 2-1 for allowable information for each variable. You must set both the system management network IP subnet address and the subnet mask in hexadecimal format. For example, to set the subnet address to 192.168.16.00 and the subnet mask to 255.255.255.224, enter the following:

```
hostname cli> setfru midplane 1 SysmgtbusIPSubnet c0a81000  
hostname cli> setfru midplane 1 SysmgtbusSubnetMask fffffffe0
```

3. Completely power off and on the system by locating the power switch at the rear of the Netra CT 820 server; press it to the Off (O) position, then press it to the On (I) position.

Checking the System Management Network Configuration for the Solaris Environment

After you boot the Solaris operating environment, you can check to see that the system management network has been configured by using the `ifconfig -a` command. You should see output for the `dmfe0:1` interface similar to the following:

```
# ifconfig -a  
...  
eri0: flags=10000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4>mtu 1500  
index 1  
inet 192.168.207.64 netmask fffffff0 broadcast 192.168.207.255  
ether 8:0:20:a9:4d:1d  
lo0: flags=1000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4>mtu 1500  
index 2  
inet 127.0.0.1 netmask ff000000  
dmfe0:1: flags=10000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4>mtu  
1500  
index 3  
inet 192.168.16.1 netmask fffffff0 broadcast 192.168.16.255  
ether 8:0:20:a9:4d:1d
```

To test for actual communication, use the `ping -s` command. You should see output similar to the following:

```
# ping -s 192.168.16.3
PING 192.168.13.3: 56 data bytes
64 bytes from 192.168.16.3:icmp_seq=0,time=1,ms
64 bytes from 192.168.16.3:icmp_seq=1,time=0,ms
64 bytes from 192.168.16.3:icmp_seq=2,time=0,ms
...
----192.168.16.3 PING statistics----
14 packets transmitted, 14 packets received, 0% packet loss
round-trip (ms) min/avg/max=0/0/1
```

The `dmfe0:1` interface should be plumbed and have a valid IP address assigned to it.

Note – This is a required interface. Never unplumb or unconfigure the system management network.

Checking the System Management Network Configuration on the Distributed Management Card

After you configure the system management network, you can check to see that it has been configured by using the CLI `shownetwork` command. You should see output similar to the following:

```
hostname cli> shownetwork
Netrtract network configuration is:

ethernet ports
ip_addr :192.168.207.130
ip_netmask : 0xffffffff00
mac_address : 00:03:ba:13:c4:dc

ip_addr :192.168.13.22
ip_netmask : 0xffffffff00
mac_address : 00:03:ba:13:c4:dd
hostname cli>
```

Specifying Other FRU ID Information

You can use the FRU fields `Location`, `Cust_Data`, and `User_Label` to enter any customer-specific information about your system. These are optional entries; by default, there is no information stored in these fields. Information entered in the `Location` field is displayed through the MOH application.

You might want to use the `Location` FRU field to enter specific, physical location information for your system. For example, you might enter the number on the chassis label, to indicate the location of the system.

▼ To Specify Other FRU ID Information

1. Log in to the active distributed management card.
2. Specify other FRU ID information for the Netra CT server:

```
hostname cli> setfru fru_target fru_instance fru_field value
```

Refer to TABLE 2-1 for allowable information for each variable. For example, if you want to set the location information to reflect a chassis label that reads 12345-10-20, enter the following:

```
hostname cli> setfru midplane 1 Location 12345-10-20
```

3. Completely power off and on the system by locating the power switch at the rear of the Netra CT 820 server; press it to the Off (O) position, then press it to the On (I) position.

Configuring the Node Boards

You should verify that you can log in to the node boards. Any Solaris configuration needed for your environment should be done, such as modifying OpenBoot PROM variables. Refer to the Solaris documentation, the OpenBoot PROM documentation, or to the specific node board documentation if you need additional information. Chapter 3 contains additional information on node boards.

Enabling the Managed Object Hierarchy Application

The Managed Object Hierarchy (MOH) is an application that runs on the distributed management card and the node boards. It monitors the field-replaceable units (FRUs) in your system.

Software Required

The MOH application requires the Solaris 8 2/02 or compatible operating environment, and additional Netra CT platform-specific Solaris patches that contain packages shown in TABLE 2-3.

TABLE 2-3 Solaris Packages for the MOH Application

Package	Description
SUNW2jdrct	Java™ Runtime Java Dynamic Management Kit (JDMK) package
SUNWctmgx	Netra CT management agent package
SUNWctac	Distributed management card firmware package that includes the Netra CT management agent

Download Solaris patch updates from the web site:

<http://www.sunsolve.sun.com>. (For current patch information, refer to the *Netra CT Server Installation Guide*.)

Install the patch updates using the `patchadd` command. After these packages are installed, they reside in the default installation directory,

`/opt/SUNWnetract/mgmt3.0/`.

The MOH application is always started on the distributed management card; the application requires a configuration file to be started on the Solaris operating environment on the node boards.

The MOH Configuration File

The MOH application requires a configuration file that contains a Simple Network Management Protocol (SNMP) access control list (ACL). The file lists:

- The SNMP management applications that can access the information maintained by the MOH. The control is based on the IP address and the community of the host on which the management application is running. Access can be either read-write or read-only.
- The node boards that can receive SNMP traps, or event notifications. There are several types of SNMP traps. MOH uses the ACL file to determine where to send *coldStart* (initial) traps. A *coldStart* trap is sent to the system when MOH starts. For other types of traps or notifications, such as hardware status changes, MOH maintains a table which specifies where traps should be sent.

The format of this file is specified in the JDMK documentation. An ACL file template that is part of the JDMK package is installed by default in `/opt/SUNWjdmk/jdmk4.2/etc/conf/template.acl`.

An example of a configuration file is:

```
acl = {
  {
    communities = trees
    access = read-only
    managers = oak, elm
  }
  {
    communities = birds
    access = read-write
    managers = robin
  }
}

trap = {
  {
    trap-community = lakes
    hosts = michigan, mead
  }
}
```

In this example, `oak`, `elm`, `robin`, `michigan`, and `mead` are hostnames. If this is the ACL file specified, when the MOH starts, a *coldStart* trap will be sent to `michigan` and `mead`. Management applications running on `oak` and `elm` can read (`get`) information from MOH, but they cannot write (`set`) information. Management applications running on `robin` can read (`get`) and write (`set`) information from MOH.

The ACL file can be stored anywhere on your system. When you start the MOH application and you want to use an ACL file you created, you specify the complete path to the file.

Refer to the JDMK documentation (<http://www.sun.com/documentation>) for more information on ACL file format.

▼ To Enable the Managed Object Hierarchy on the Node Boards

1. **Log in to the server.**
2. **Verify that the Solaris packages SUNW2jdrct, SUNWctmgx, and SUNWctac are installed:**

```
# pkginfo -l SUNW2jdrct SUNWctmgx SUNWctac
...
PKGINST: SUNW2jdrct
...
```

3. **Create a configuration file in the format of a JDMK ACL configuration file.**

Refer to the section “The MOH Configuration File” on page 26 for information on the configuration file and format.

4. As root, start the MOH application.

```
# cd /opt/SUNWnetract/mgmt3.0/bin
# ./ctmgx start [option]
```

If you installed the Solaris patches in a directory other than the default directory, specify that path instead.

Options that can be specified with `ctmgx start` when you start the MOH application include:

TABLE 2-4 `ctmgx` Options

Option	Description
<code>-rmiport portnum</code>	Specify the Remote Method Invocation (RMI) port number. The default is 1099.
<code>-snmpport portnum</code>	Specify the Simple Network Management Protocol (SNMP) port number. The default is 9161.
<code>-snmpacl filename</code>	Specify the SNMP ACL file to be used. The full path to <i>filename</i> must be specified.
<code>-showversion</code>	Print the system version number.

The MOH application starts and reads the configuration file using one of these methods, in this order:

- a. If the command `ctmgx start -snmpacl filename` is used, MOH uses the specified file as the ACL file.**
- b. If the file `/opt/SUNWjdmk/jdmk4.2/etc/conf/jdmk.acl` exists, MOH uses that file as the ACL file when the command `ctmgx start` is used.**

If the ACL cannot be determined after these steps, SNMP applications will have read-write access and MOH will send the coldStart trap to the local node only.

Once MOH is running, it interfaces with your SNMP or RMI application to *discover* network elements, monitor the system, and provide status messages.

Refer to the *Netra CT Server Software Developer's Guide* for information on writing applications to interface with the MOH application.

Enabling the Processor Management Service Application

The Processor Management Service (PMS) is a management application that provides support for high-availability services and applications. It provides both local and remote monitoring and control of a cluster of node boards. It monitors the health of node boards, takes recovery actions, and notifies partner nodes if so configured. It provides the state of the resources, such as hardware, operating system, and applications.

This section describes:

- Starting and stopping the PMS application on node boards.
- Stopping and restarting the PMS application on the distributed management card; the application starts automatically but can be restarted manually with various options.
- Setting the IP address by which the distributed management card monitors and controls a node board in a particular slot in the same system.
- Adding IP addresses by which a local node board monitors and controls node boards in local or remote systems.

You use the distributed management card PMS CLI commands to control PMS services, such as fault detection/notification, and fault recovery. The recovery administration is described in “Using the PMS Application for Recovery and Control of Node Boards” on page 60. You can also use the PMS API to configure partner lists (tables of distributed management card and node board information relating to connectivity and addressing; the distributed management card and the node boards in a partner list must be in the same system). Refer to the `pms` API man pages, installed by default in `/opt/SUNWnetract/mgmt3.0/man`, for more information on partner lists.

▼ To Start or Stop the PMS Application on a Node Board

1. **Log in as root to the server that has the Solaris patches installed (see “Software Required” on page 26).**

2. Create a Solaris script to start, stop, and restart PMS, as follows:

```
#!/sbin/sh
# Start/stop/restart processes required for PMS

case "$1" in
'start')
    /opt/SUNWnetract/mgmt3.0/bin/pmsd start -e force_avail
    ;;
'stop')
    /opt/SUNWnetract/mgmt3.0/bin/pmsd stop
    ;;
'restart')
    /opt/SUNWnetract/mgmt3.0/bin/pmsd stop
    /opt/SUNWnetract/mgmt3.0/bin/pmsd start -e force_avail
    ;;
*)
    echo "Usage: $0 {start | stop | restart }"
    exit 1
    ;;
esac
exit 0
```

3. Save the script to a file.

4. Start, stop, or restart the PMS application by typing one of the following:

- *filename start*
- *filename stop*
- *filename restart*

where *filename* is the name of the file in which you saved the script.

You can also save this script in the `/etc/rc*` directory of your choice to have PMS automatically start at boot time.

Stopping and Restarting the PMS Daemon on the Distributed Management Card

The PMS daemon (`pmsd`) starts automatically on the distributed management card. However, you can manually stop and restart the PMS daemon on the distributed management card, specifying these optional parameters:

- The port number `pmsd` listens on for servicing clients (default is port 10300).

- The *state* `pmsd` will be started in: available or unavailable (default is to start in the unavailable state, unless a previous and different operating state exists in persistent storage).
- Whether to reset persistent storage to the default values on the distributed management card (default is to use existing persistent storage).

You specify the port number for `pmsd` using the parameter *port_num*.

You specify the state in which to start `pmsd` using the parameter *server_admin_state*. This parameter may be set to *force_unavail* (force `pmsd` to start in the unavailable state); *force_avail* (force `pmsd` to start in the available state); or *vote_avail* (start `pmsd` in the available state, but only if all conditions have been met to make it available; if all the conditions have not been met, `pmsd` will not become available).

You specify whether to reset persistent storage to the default values on the distributed management card using the `-d` option. Data in persistent storage remains across reboots or power on and off cycles. If you do not specify `-d`, `pmsd` is started using its existing persistent storage configuration; if you specify `-d`, the persistent storage configuration is reset to the defaults for `pmsd`. The `-d` option would typically be specified only to perform a bulk reset of persistent storage during initial system bring up or if corruption occurred.

▼ To Manually Stop the Processor Management Service on the Distributed Management Card

1. Log in to the distributed management card.
2. Stop the PMS daemon with the `stop` command:

```
hostname cli> pmsd stop [-p port_num]
```

where *port_num* is the port number of the currently running `pmsd` you want to stop. The default is port 10300.

▼ To Manually Start the Processor Management Service on the Distributed Management Card

1. Log in to the distributed management card.

2. Start the PMS daemon with the `start` command:

```
hostname cli> pmsd start [-p port_num] [-e server_admin_state] [-d]
```

where *port_num* is the port number for `pmsd` to listen on, *server_admin_state* can be `force_unavail`, `force_avail`, or `vote_avail`, and `-d` resets the persistent storage to the defaults for `pmsd`.

Setting the IP Address for the Distributed Management Card to Control Node Boards in the Same System

The `pmsd slotaddressset` command is used to set the IP address by which the distributed management card controls and monitors a node board in a particular slot. The command establishes the connection between `pmsd` running on the distributed management card and `pmsd` running on a node board. The distributed management card and the node board must be in the same system.

You specify the slot number of the node board and the IP address to be configured. The default IP address for all slots is 0.0.0.0; therefore, control is initially disabled.

▼ To Set the IP Address for the Distributed Management Card to Control Node Boards in the Same System

1. Log in to the distributed management card.
2. Set the IP address with the `slotaddressset` command:

```
hostname cli> pmsd slotaddressset -s slot_num -i ip_addr
```

where *slot_num* can be a slot number from 3 to 20, and *ip_addr* is the IP address to be configured.

Printing IP Address Information

The `pmsd slotaddressshow -s slot_num|all` command can be used to print IP address information for the specified slot or all slots. If the IP address information is not 0.0.0.0 for a given slot, PMS is configured to manage the node board in this slot using this IP address.

Adding Address Information for a Local Node Board to Control Node Boards in Local or Remote Systems

You can use the PMS CLI application to enable local node boards to remotely monitor and control node boards in the same system or in other Netra CT systems. One use for this capability is in a high availability environment. For example, if a high availability application fails on a controlled node board, PMS notifies the controlling node board of the failure, and the controlling node board (through a customer application) notifies another controlled node board to start the same high availability application.

The `pmsd slotrndaddressadd` command is used to configure a local node board to control and monitor another node board by specifying the IP addresses and slot information for the node board to be controlled, using the parameters shown in TABLE 2-5.

TABLE 2-5 `pmsd slotrndaddressadd` Parameters

Parameter	Description
<code>-s <i>slot_num</i> all</code>	Specifies the slot number of the node board that is being configured in the local system to monitor or control other local or remote node boards
<code>-n <i>ip_addr</i></code>	Specifies the IP address of the node board in the local or remote system to be monitored or controlled by the local node board
<code>-d <i>ip_addr</i></code>	Specifies the IP address of the distributed management card in the same local or remote system of the node board to be monitored or controlled by the local node board
<code>-r <i>slot_num</i></code>	Specifies the slot number of the node board in the local or remote system to be monitored or controlled by the local node board

Each local node board can control and monitor 16 local or remote node boards. Each local node board being managed must have already had its IP address set using the `pmsd slotaddressset` command.

▼ To Add Address Information for a Local Node Board to Control Node Boards in Local or Remote Systems

1. Log in to the distributed management card.
2. Add the address information with the `slotrndaddressadd` command:

```
hostname cli> pmsd slotrndaddressadd -s slot_num|all -n ip_addr -d ip_addr -r slot_num
```

where `-s slot_num` is the slot number in the same system of the local node board you want to use to control other local or remote node boards, and `all` specifies all slots containing node boards in the local system; `-n ip_addr` is the IP address of the node board to be controlled; `-d ip_addr` is the IP address of the active distributed management card in the system of the node board to be controlled; and `-r slot_num` is the slot number of the node board to be controlled.

When you add address information with the `slotrndaddressadd` command, an index number is automatically assigned to the information. You can see index numbers by using the `slotrndaddressshow` command and use the index numbers to delete address information with the `slotrndaddressdelete` command, described below.

Deleting Address Information

The `pmsd slotrndaddressdelete -s slot_num|all -i index_num|all` command can be used to delete address information from the controlling node board. The `-s slot_num|all` parameter specifies whether the address information will be deleted on a single slot number or on all slots containing node boards in the local system. The `-i index_num|all` parameter specifies whether the address information will be deleted for a single address entry or for all address entries; `index_num` can be 1 to 16. Before using this command, it is advisable to print the current address information using the `pmsd slotrndaddressshow` command, so you know the index number to use.

Printing Address Information

The `pmsd slotrndaddressshow -s slot_num|all -i index_num|all` command can be used to print address information. The `-s slot_num|all` parameter specifies whether the address information will be printed for a single slot number or for all

slots containing node boards in the local system; *index_num* can be 1 to 16. The *-i index_num|all* parameter specifies whether the address information will be printed for a single address entry or for all address entries.

Administering Your System

You administer your system using the distributed management card command-line interface, and through the MOH and PMS applications.

The distributed management card CLI works with the MOH and PMS applications, and supports Simple Network Management Protocol (SNMP) and Remote Method Invocation (RMI) interfaces. MOH provides the SNMP and RMI interfaces to manage the system and send out events and alerts. CLI provides an overlapping subset of commands with MOH and also provides commands for the distributed management card itself; sending out events and alerts is not a function of the CLI.

This chapter contains the following sections:

- Using the Distributed Management Card Command-Line Interface
- Updating the Distributed Management Card Flash Images
- Setting the Date and Time on the Distributed Management Card
- Booting Node Boards
- Connecting to Node Board Consoles from the Distributed Management Card
- Using the PMS Application for Recovery and Control of Node Boards
- Monitoring Your System

Using the Distributed Management Card Command-Line Interface

The distributed management card command-line interface provides commands to control power of the system, control the node boards, administer the system, show status, and set configuration information. (See “Accessing the Distributed Management Cards” on page 8 for information on how to access the distributed management card.)

All CLI commands can be used on the active distributed management card; a subset of CLI commands can be used on the standby distributed management card.

CLI Commands

TABLE 3-1 lists the active distributed management card command-line interface commands by type, command name, default permission required to use the command, and command description. TABLE 3-2 lists the subset of the CLI commands available for the standby distributed management card.

Default permission levels are:

- c (console permission; authorized to connect to other server console)
- u (user administration permission; authorized to use commands that can add, delete, and change permission of users)
- a (administration permission; authorized to change the state of the CLI configuration variables)
- r (reset/poweron/poweroff permissions; authorized to reset, poweron, and poweroff any of the node boards)
- blank (permission not required).

The permission level for a user can be changed with the `userperm` command.

A `-h` option with a command indicates that help is available for that command.

TABLE 3-1 Active Distributed Management Card Command-Line Interface Commands

Command Type	Command	Permission	Description
Status	<code>showenvironment</code>		Display a summary of current environmental information, such as fantray and power supply status.
	<code>shownetwork</code>		Display the current network configuration of the distributed management card.
	<code>showipmode</code> <code>-b port_num</code>		Display the value of <code>ip_mode</code> for the specified port number.
	<code>showipaddr</code> <code>-b port_num</code>		Display the value of <code>ip_addr</code> for the specified port number.
	<code>showipnetmask</code> <code>-b port_num</code>		Display the value of <code>ip_netmask</code> for the specified port number.
	<code>showipgateway</code>		Display the value of <code>ip_gateway</code> for the distributed management card.
	<code>showdate</code>		Display the system date.

TABLE 3-1 Active Distributed Management Card Command-Line Interface Commands (Continued)

Command Type	Command	Permission	Description
	showntpserver		Display the IP address of the NTP server.
	showfru <i>target instance field</i>		Display FRU ID information. Refer to “Displaying Netra CT Server FRU ID Information” on page 15 for more information.
	showhostname		Display the value of the hostname used in the CLI prompt.
	showservicemode		Display the value of the distributed management card service mode.
	showcpustate		Display the board type, power state, and boot state for each slot in the system. Refer to “Displaying Board State Information” on page 49 for more information.
Power control	poweroff <i>cpu_node</i>	r	Power off the specified node slot, where <i>cpu_node</i> can be 2 through 21.
	poweron <i>cpu_node</i>	r	Power on the specified node slot, where <i>cpu_node</i> can be 2 through 21.
	powersupply <i>n</i> on off	r	Switch on or off the specified power supply unit, where <i>n</i> can be 1 through 8.
CPU control	console <i>cpu_node</i>	c	Enter console mode and connect to the specified node board, where <i>cpu_node</i> can be 3 through 20.
	break <i>cpu_node</i>	c	Put the server in debug mode, where <i>cpu_node</i> can be 3 through 20.
	reset [-h] [dmc 1A <i>cpu_node</i>] [-x <i>cpu_node</i>]	r	Reset (reboot) a specified node. reset [dmc 1A <i>cpu_node</i>] produces a soft reset (reboots the operating system), where dmc is the top distributed management card; 1A is the top distributed management card; and <i>cpu_node</i> can be 3 through 20. reset -x produces a hard reset (resets the board), where <i>cpu_node</i> can be 2 through 21.
	setpanicdump [all <i>cpu_node</i>] [true false]	a	Set whether a panic dump is generated when a node is reset, where all means all nodes 3 through 20, and <i>cpu_node</i> can be a specific node 3 through 20.
	showpanicdump [all <i>cpu_node</i>]		Show whether or not a panic dump has been set for all nodes 3 through 20 or for a specific node 3 through 20.
	setescapechar <i>value</i>		Set the escape character to end a console session. The default is a ~ (tilde).

TABLE 3-1 Active Distributed Management Card Command-Line Interface Commands (Continued)

Command Type	Command	Permission	Description
	showhealth [-b <i>cpu_node</i>]		Show the healthy information of a node, where <i>cpu_node</i> can be 0 through 21.
	pmsd	a	Display help information on starting, stopping, and controlling the PMS daemon on the distributed management card. Refer to “Enabling the Processor Management Service Application” on page 30 and to “Using the PMS Application for Recovery and Control of Node Boards” on page 60 for more information.
Administration	useradd [-h] <i>username</i>	u	Add a user account. The default user account is <i>netract</i> . The distributed management card supports 16 accounts.
	userdel [-h] <i>username</i>	u	Delete a user account.
	usershow [-h] [<i>username</i>]		Show user accounts.
	userpassword [-h] <i>username</i>	u	Set or change the password of a specified user account.
	userperm [-h] <i>username</i> [c u a r]	u	Set or change the permission levels for a specified user account.
	logout		Log out of the current session.
	password [-h]	u	Change the existing password.
	flashupdate -d <i>cmsw</i> <i>bcfw</i> <i>bmcfw</i> <i>rpdf</i> <i>scdf</i> -f <i>path</i>	a	Flash update the distributed management card software, where <i>cmsw</i> represents the chassis management software; <i>bcfw</i> represents the boot control firmware; <i>bmcfw</i> represents the BMC firmware; <i>rpdf</i> represents the system configuration repository; and <i>scdf</i> initializes the system configuration variables to their defaults. Refer to “Updating the Distributed Management Card Flash Images” on page 46 for more information.
	setdefaults	a	Initialize the distributed management card system configuration variables, for example, the external Ethernet port variables, to the defaults.
	help		Display a list of supported commands.
	version		Display the versions of various software and firmware.
	setdate [-h] <i>mmddHHMMccyy</i>	a	Set the current date.

TABLE 3-1 Active Distributed Management Card Command-Line Interface Commands (Continued)

Command Type	Command	Permission	Description
	<code>setntpserver <i>addr</i> none</code>	a	Configure the distributed management card to be an NTP client. The NTP server IP address must be on the same subnet as the distributed management card. The default is none.
	<code>setfru [-h] <i>target instance field value</i></code>	a	Set FRU ID information. Refer to “Specifying Netra CT Server FRU ID Information” on page 12 for more information.
	<code>showescapechar</code>	a	Show the escape character used to end a console session.
Configuration (Ethernet ports)	<code>setipmode -b <i>port_num</i> rarp config none</code>	a	Set the IP mode of the specified Ethernet port. Choose the IP mode according to the services available in the network (<i>rarp</i> , <i>config</i> , or <i>none</i>). The default for the external Ethernet port is <i>none</i> ; the default for the internal Ethernet port is <i>none</i> , that is, no services are available on this port. You must reset the server for the changes to take effect.
	<code>setipaddr -b <i>port_num addr</i></code>	a	Set the IP address of the specified Ethernet port. The default is 0.0.0.0. This command is only used if the <i>ipmode</i> is set to <i>config</i> . You must reset the server for the changes to take effect.
	<code>setipnetmask -b <i>port_num mask</i></code>	a	Set the IP netmask of the specified Ethernet port. The default is 0.0.0.0. This command is only used if the <i>ipmode</i> is set to <i>config</i> . You must reset the server for the changes to take effect.
	<code>setipgateway <i>addr</i></code>	a	Set the IP gateway of the distributed management card. The default is 0.0.0.0. You must reset the server for the changes to take effect.
Configuration (Other)	<code>sethostname <i>hostname</i></code>	a	Set the hostname to be used in the CLI prompt. The default is <i>netract</i> . The maximum length is 32 characters.
	<code>set servicemode true false</code>	a	Set whether MOH and PMS services are started automatically on the distributed management card after a reboot. The default is <i>false</i> , meaning that these services are automatically started.
PMS daemon control	<code>pmsd start [-p <i>port_num</i>] [-e <i>server_admin_state</i>] [-d]</code>	a	Start PMS on the distributed management card.
	<code>pmsd stop [-p <i>port_num</i>]</code>	a	Stop PMS on the distributed management card.
	<code>pmsd slotaddressset -s <i>slot_num -i ip_addr</i></code>	a	Set the IP address for the distributed management card to control and monitor a node board.

TABLE 3-1 Active Distributed Management Card Command-Line Interface Commands (Continued)

Command Type	Command	Permission	Description
	<code>pmsd slotaddressshow -s <i>slot_num</i> all</code>	a	Print the IP address set with the <code>pmsd slotaddressset</code> command.
	<code>pmsd slotrndaddressadd -s <i>slot_num</i> all -n <i>ip_addr</i> -d <i>ip_addr</i> -r <i>slot_num</i></code>	a	Add address information for a node board to control other node boards.
	<code>pmsd slotrndaddressdelete -s <i>slot_num</i> all -i <i>index_num</i> all</code>	a	Delete address information added with the <code>pmsd slotrndaddressadd</code> command.
	<code>pmsd slotrndaddressshow -s <i>slot_num</i> all -i <i>index_num</i> all</code>	a	Print address information added with the <code>pmsd slotrndaddressadd</code> command.
	<code>pmsd operset -s <i>slot_num</i> all -o maint_config oper_config none_config graceful_reboot</code>	a	Enable automatic recovery of a node board.
	<code>pmsd infoshow -s <i>slot_num</i> all</code>	a	Print PMS system information.
	<code>pmsd historyshow -s <i>slot_num</i> all</code>	a	Print a log of PMS system events and time stamps.
	<code>pmsd recoveryoperset -s <i>slot_num</i> all -o pc rst rstpc pd rb</code>	a	Manually recover a board in case of fault.
	<code>pmsd recoveryautooperset -s <i>slot_num</i> all -o pc rst rstpc pd rb rbpc none trg [-d <i>startup_delay</i>] [-f on off] [-r <i>retries</i>] [-n <i>inter_op_delay</i>] [-p <i>reset_power-cycle_delay</i>]</code>	a	Automatically recover a board in case of fault.
	<code>pmsd recoveryautoinfoshow -s <i>slot_num</i> all</code>	a	Print the configuration information affected by the <code>recoveryautooperset</code> command.

TABLE 3-1 Active Distributed Management Card Command-Line Interface Commands (Continued)

Command Type	Command	Permission	Description
	<code>pmsd hwoperset -s slot_num all -o powerdown powerup reset mon_enable mon_disable [-f]</code>	a	Perform operations on a node board hardware.
	<code>pmsd hwinfoshow -s slot_num all</code>	a	Print PMS system information on the hardware.
	<code>pmsd hwhistoryshow -s slot_num all</code>	a	Print a log of PMS hardware events and time stamps.
	<code>pmsd osoperset -s slot_num all -o reboot mon_enable mon_disable [-f]</code>	a	Perform operations on a node board operating system.
	<code>pmsd osinfoshow -s slot_num all</code>	a	Print PMS system information on the operating system.
	<code>pmsd oshistoryshow -s slot_num all</code>	a	Print a log of PMS operating system events and time stamps.
	<code>pmsd appoperset -s slot_num all -o force_offline vote_active force_active</code>	a	Perform operations on a node board applications.
	<code>pmsd appinfoshow -s slot_num all</code>	a	Print PMS system information on the applications.
	<code>pmsd apphistoryshow -s slot_num all</code>	a	Print a log of PMS application events and time stamps.
	<code>pmsd version</code>	a	Print the PMS version.
	<code>pmsd usage</code>	a	Print a synopsis of the <code>pmsd</code> commands.

Information on configuring distributed management card ports, setting up user accounts, specifying FRU ID information, and starting the PMS daemon using the distributed management card CLI is provided in Chapter 2. The PMS daemon commands are described in “Using the PMS Application for Recovery and Control of Node Boards” on page 60.

TABLE 3-2 Standby Distributed Management Card Command-Line Interface Commands

Command Type	Command	Permission	Description
Status	shownetwork		Display the current network configuration of the distributed management card.
	showdate		Display the system date.
	showhostname		Display the value of the hostname used in the CLI prompt.
	showipmode -b <i>port_num</i>		Display the value of <i>ip_mode</i> for the specified port number.
	showipaddr -b <i>port_num</i>		Display the value of <i>ip_addr</i> for the specified port number.
	showipnetmask -b <i>port_num</i>		Display the value of <i>ip_netmask</i> for the specified port number.
	showipgateway		Display the value of <i>ip_gateway</i> for the distributed management card.
	showservicemode		Display the value of the distributed management card service mode.
CPU control	reset [-h] [dmc 1B]	r	Reset (reboot) the distributed management card, where <i>dmc</i> is the bottom distributed management card and <i>1B</i> is the bottom distributed management card.
Administration	logout		Log out of the current session.
	password [-h]	u	Change the existing password.
	flashupdate -d cmsgw bcfw bmcfw rpdf scdf -f <i>path</i>	a	Flash update the distributed management card software, where <i>cmsgw</i> represents the chassis management software; <i>bcfw</i> represents the boot control firmware; <i>bmcfw</i> represents the BMC firmware; <i>rpdf</i> represents the system configuration repository; and <i>scdf</i> initializes the system configuration variables to their defaults. Refer to “Updating the Distributed Management Card Flash Images” on page 46 for more information.
	help		Display a list of supported commands.
	version		Display the versions of various software and firmware.

TABLE 3-2 Standby Distributed Management Card Command-Line Interface Commands (Continued)

Command Type	Command	Permission	Description
	setdate [-h] <i>mmddHHMMccyy</i>	a	Set the current date.
Configuration (Ethernet ports)	setipmode -b <i>port_num</i> rarp config none	a	Set the IP mode of the specified Ethernet port. Choose the IP mode according to the services available in the network (<i>rarp</i> , <i>config</i> , or <i>none</i>). The default for the external Ethernet port is <i>none</i> ; the default for the internal Ethernet port is <i>none</i> , that is, no services are available on this port. You must reset the server for the changes to take effect.
	setipaddr -b <i>port_num addr</i>	a	Set the IP address of the specified Ethernet port. The default is 0.0.0.0. This command is only used if the <i>ipmode</i> is set to <i>config</i> . You must reset the server for the changes to take effect.
	setipnetmask -b <i>port_num mask</i>	a	Set the IP netmask of the specified Ethernet port. The default is 0.0.0.0. This command is only used if the <i>ipmode</i> is set to <i>config</i> . You must reset the server for the changes to take effect.
	setipgateway <i>addr</i>	a	Set the IP gateway of the distributed management card. The default is 0.0.0.0. You must reset the server for the changes to take effect.
Configuration (Other)	sethostname <i>hostname</i>	a	Set the hostname to be used in the CLI prompt. The default is <i>netract</i> . The maximum length is 32 characters.
	set servicemode <i>true false</i>	a	Set whether MOH and PMS services are started automatically on the distributed management card after a reboot. The default is <i>false</i> , meaning that these services are automatically started.

Security Provided

A remote command-line session or a console session automatically disconnects after 10 minutes of inactivity.

Security is also provided through the permission levels and passwords set for each account.

Updating the Distributed Management Card Flash Images

The primary boot device for the distributed management card is always the flash. You can update the distributed management card flash images over the network using `nfs` or `tftp`. TABLE 3-3 shows the distributed management card flash options.

TABLE 3-3 Distributed Management Card Flash Options

Option	Description
<code>cmsw</code>	Updates the chassis management software, which includes the Chorus operating system, the MOH application, and the PMS application.
<code>bcfw</code>	Updates the boot control firmware.
<code>bmcfw</code>	Updates the BMC firmware.
<code>rpdf</code>	Updates the system configuration repository, which contains information used internally by the CLI in the flash, reinitializes it to a default minimum, and resets the distributed management card.
<code>scdf</code>	(Optional) Initializes the system configuration variables, for example, the external Ethernet port variables, to the defaults.

There is no required sequence for flashing the distributed management card, although the following order is recommended: `cmsw`, `bcfw`, `bmcfw`, and `rpdf`. You can update individual images if you want.

During a flash update of the BMC firmware, the BMC is not able to respond to communication requests, and the following messages may display on the console:

```
ysif_xfer_msg: kcs driver xfermsg returns -1
read_evt_buffer: sysif_xfer_msg returns -1
poll_evt_handler: read_evt_buffer returns -1
listener_thread: poll_evt_handler returns -1
```

▼ To Update All the Distributed Management Card Flash Images

1. Log in to the distributed management card.

2. Flash update the distributed management card images:

Note – The `sddf` option is not mandatory. Use it only if you want to initialize the system configuration variables to the defaults.

```
hostname cli> flashupdate -d cmsw -f path
hostname cli> flashupdate -d bcfw -f path
hostname cli> flashupdate -d bmcfw -f path
hostname cli> flashupdate -d sddf
hostname cli> flashupdate -d rpdf -f path
```

where *path* can be `nfs://nfs.server.ip.address/directory/filename` or `tftp://tftp.server.ip.address/directory/filename` where the software to use in the flash is installed.

After you update `rpdf`, the distributed management card resets itself. If you do not update `rpdf`, you must reset the distributed management card manually.

▼ To Update an Individual Distributed Management Card Flash Image

1. Log in to the distributed management card.
2. Flash update a distributed management card image:

```
hostname cli> flashupdate -d option
hostname cli> reset dmc
```

where *option* can be `cmsw -f path`, `bcfw -f path`, `bmcfw -f path`, or `sddf`, and *path* can be `nfs://nfs.server.ip.address/directory/filename` or `tftp://tftp.server.ip.address/directory/filename` where the software to use in the flash is installed. If you update `rpdf`, the distributed management card will reset itself after finishing the `rpdf` update.

Setting the Date and Time on the Distributed Management Card

The distributed management card does not support battery backup time-of-day because battery life cannot be monitored to predict end of life, and drift in system clocks can be common. To provide a consistent system time, set the date and time on the distributed management card using one of these methods:

- Manually, using the CLI `setdate` command. The date and time must be reset after any power cycle.
- Configuring the distributed management card to be an NTP client, using the CLI `setntpserver` command. The Network Time Protocol (NTP) provides the correct timestamp for all systems on a network by synchronizing the clocks of all the systems. A Solaris server, called `xntp`, sets and maintains the timestamp. Refer to the online `man` pages for the `xntpd`, `ntpq`, and `ntpdate` commands for more information about NTP.

▼ To Set the Distributed Management Card Date and Time Manually

1. Log in to the distributed management card.
2. Set the date and time manually:

```
hostname cli> setdate mmddHHMMccyy
```

where *mm* is the current month; *dd* is the current day of the month; *HH* is the current hour of the day; *MM* is the current minutes past the hour; *cc* is the current century minus one; and *yy* is the current year.

▼ To Set the Distributed Management Card Date and Time as an NTP Client

1. Log in to the distributed management card.

2. Set the date and time as an NTP client:

```
hostname cli> setntpserver addr
```

where *addr* is the IP address of the NTP server.

Displaying Board State Information

Board information, including type of board, power state of the board, and boot state of the board can be displayed for each slot in the system using the CLI `showcpustate` command.

Sample output from this command is:

```
hostname cli> showcpustate
-----
Slot No      : Board Type      : Power_State : Boot_State
-----
1A           : DMC Board           : On          : Ready
1B           : DMC Board           : On          : Ready
2            : SWITCH Board       : On          : Ready
3            : CPU Board           : Off         :
4            : Empty               :             :
5            : CPU Board           : On          : Ready
6            : CPU Board           : On          : Offline
7            : CPU Board           : On          : Offline
8            : CPU Board           : On          : Ready
9            : CPU Board           : On          : Offline
10           : CPU Board           : On          : Unknown

Press 'q' + Return to quit, hit Return to continue
```

TABLE 3-4 contains the various state descriptions.

TABLE 3-4 Board State Information

State	Value	Description
Power_State	On	The slot is powered on
Power_State	Off	The slot is powered off
Boot_State	Online	The board boot sequence has started

TABLE 3-4 Board State Information (Continued)

State	Value	Description
Boot_State	Ready	The board boot sequence has finished, and the board is ready to use
Boot_State	Offline	The board may be running its power-on self-test (POST), the board may be at the OpenBoot PROM level, or the boot may have failed
Boot_State	Unknown	The distributed management card can not determine the current boot state of the board

Booting Node Boards

Node boards can boot from a local disk or over the network.

Board Power-on Sequence

When you power on the Netra CT 820 system by pressing the power switch on the rear of the system to the On (I) position, the boards power on in this sequence:

1. The two distributed management cards are powered on; the top card in slot 1A is designated as the active distributed management card, and the bottom card in slot 1B is designated as the standby distributed management card. Once the cards have booted and are ready for use, the “Ready” LED is solid green on the active card and blinking green on the standby card.
2. The active distributed management card powers on the switching fabric boards in slots 2 and 21. While the switching fabric boards are powering on, the blue LED state is solid; once the boards have booted and are ready for use, the blue LED is off.
3. The active distributed management card looks at the Boot_Mask field in the midplane FRU ID for boot servers.
 - a. If one or more boot servers are designated in the Boot_Mask field, the active distributed management card powers on the boot servers first; once the boards have booted and are ready for use, the active distributed management card powers on the rest of the node boards together; these boards boot from the boot servers. The method of booting depends first on the value in the Boot_Devices field in the midplane FRU ID or secondly on the value in the

OpenBoot PROM NVRAM `boot_device` configuration variable. After a board has booted and is ready for use, “Ready” LED is solid green and the blue LED is off.

or

- b. If no boot server is designated in the `Boot_Mask` field, the active distributed management card powers on all the node slots together. Once the node boards are powered on, the method of booting depends first on the value in the `Boot_Devices` field in the midplane FRU ID or secondly on the value in the OpenBoot PROM NVRAM `boot_device` configuration variable. After a board has booted and is ready for use, the “Ready” LED is solid green and the blue LED is off.

A midplane FRU ID fault is a system fault, and no boards can be powered on.

Boot Device Variables

By default, the OpenBoot PROM NVRAM `boot-device` configuration variable is set to `disk net`, `disk` being an alias for the path to the local disk, and `net` being an alias for the path of the primary network. You can set the boot device for node boards through the distributed management card CLI `setfru` command. Refer to “Configuring a Chassis Slot for a Board” on page 18 for information on using the `setfru` command to specify a boot device for a board.

For example, you might want to change the node board in slot 3 to boot first from its PMC disk. To do this, check the current OpenBoot PROM `boot-device` variable:

```
ok printenv boot-device
boot-device =      disk net
ok
```

On the distributed management card, check and change the `boot_devices` setting:

```
hostname cli> showfru slot 3 boot_devices
showfru: Boot_Devices:
hostname cli> setfru slot 3 boot_devices pmc0/disk net
hostname cli> showfru slot 3 boot_devices
showfru: Boot_Devices: pmc0/disk net
hostname cli>
```

After you power cycle the system, check the OpenBoot PROM `boot-device` variable:

```
ok printenv boot-device
boot-device =      pmc0/disk net
ok
```

When a node board is hot swapped, power cycled, rebooted, or reset, the OpenBoot PROM firmware checks with the distributed management card for a boot device for that slot. The distributed management card sends the value from the `Boot_Devices` field in FRU ID to the OpenBoot PROM firmware; the value is either the boot device list for that slot you set using the `setfru` command or a null string if you did not set a boot device list for that slot. The value overwrites the NVRAM `boot-device` value. The board will boot from the value in the `boot-device` variable if its `diag-switch?` variable is set to `false` (the default); the board will boot from the value in the `diag-device` variable (the default is `net`) if its `diag-switch?` variable is set to `true`.

In the event of a distributed management card fault, a node board hot swap, power cycle, reboot or reset will cause the OpenBoot PROM firmware to default to the value set in the `boot-device` variable.

Booting with a DHCP Server

You can configure Netra CT node boards to boot over DHCP. This process includes setting the node board boot device for DHCP, forming the node board DHCP *client ID*, and configuring the DHCP server.

On the Netra CT system, the DHCP client ID is a combination of the system's midplane Sun part number (7 bytes), the system's midplane Sun serial number (6 bytes), and the board's geographical address (slot number) (2 bytes). The parts are separated by a `:` (colon).

▼ To Configure a Node Board to Boot Over DHCP

1. **Log in to the distributed management card.**

2. Set the boot device for the board to dhcp with the `setfru` command:

```
hostname cli> setfru slot fru_instance Boot_Devices network_devicename:dhcp
```

where `fru_instance` is the slot number of the board to be configured for DHCP and `network_devicename` is a path or alias to a network device. For example, to set the boot device to dhcp for the node board in slot 4, enter the following:

```
hostname cli> setfru slot 4 Boot_Devices net:dhcp
```

3. Get the Netra CT system part number and the system serial number with the `showfru` command:

```
hostname cli> showfru midplane 1 Sun_Part_No
...
hostname cli> showfru midplane 1 Sun_Serial_No
...
```

4. Form the three-part client ID by using the system part number, the system serial number, and the slot number, separated by colons. Then, convert the client ID to ASCII.

For example, if the output from the `showfru` commands in Step 3 is 375-4335 (Sun part number) and 000001 (Sun serial number), and you want to form the client ID for the node board in slot 4, the client ID is: 3754335:000001:04.

Translate the client ID to its ASCII equivalent. For example:

Client ID part	ASCII Representation
3754335	33 37 35 34 33 33 35
:	3A
000001	30 30 30 30 30 31
:	3A
04	30 34

Thus, the example client ID in ASCII is:

33 37 35 34 33 33 35 3A 30 30 30 30 30 31 3A 30 34.

5. Configure the DHCP server.

Refer to the *Solaris DHCP Administration Guide* on the web site `docs.sun.com` for information on how to configure the DHCP server for remote boot and diskless boot clients.

The client ID is retained across a node board power cycle, reboot, or reset; the distributed management card updates the client ID during a first-time power on or a hot swap of a node board. In the event of a distributed management card fault, a node board reboot or reset will retrieve the previously written client ID.

Connecting to Node Board Consoles from the Distributed Management Card

The Netra CT system provides the capability to connect to node boards and open console sessions from the active distributed management card.

You begin by logging in to the distributed management card through either the serial port or the Ethernet port. Once a console session with a node board is established, you can run Solaris system administration commands, such as `passwd`, read status and error messages, or halt the board in that particular slot.

Configuring Your System for Multiple Console Use

To enable your system to use multiple consoles, you set several variables, either at the Solaris level or at the OpenBoot PROM level. Set these variables on each node board to enable console use.

▼ To Configure Your System for Multiple Consoles

1. **Log in as root to the node board, using the on-board console port `ttya`.**

2. Enter either set of the following commands to enable multiple consoles:

From the Solaris level:

```
# eeprom "multiplexer-output-devices=ttya ssp-serial"
# eeprom "multiplexer-input-devices=ttya ssp-serial"
# eeprom input-device=input-mux
# eeprom output-device=output-mux
# reboot
```

or

From the OpenBoot PROM level:

```
ok setenv multiplexer-output-devices ttya ssp-serial
ok setenv multiplexer-input-devices ttya ssp-serial
ok setenv input-device input-mux
ok setenv output-device output-mux
ok reset-all
```

Establishing Console Sessions Between the Distributed Management Card and Node Boards

Once you have configured your system for multiple console use, you can log in to the distributed management card and open a console for a slot. The Netra CT system allows four console users per node board slot.

TABLE 3-5 shows the distributed management card CLI console-related commands that can be executed from the current login session on the distributed management card.

TABLE 3-5 Distributed Management Card CLI Console-Related Commands

Command	Description
<code>console <i>cpu_node</i></code>	Enter console mode and connect to a specified node board, where <i>cpu_node</i> can be 3 through 20.

TABLE 3-5 Distributed Management Card CLI Console-Related Commands (Continued)

Command	Description
<code>break <i>cpu_node</i></code>	Put the specified node board in debug mode, where <i>cpu_node</i> can be 3 through 20. Debug mode can use OpenBoot PROM or <code>kadb</code> , depending on server configuration.
<code>setescapechar <i>value</i></code>	Set the escape character to be used in all future console sessions. The default is <code>~</code> (tilde). Refer to TABLE 3-6 for escape character use.
<code>showescapechar</code>	Show the current escape character.

Most node board consoles use the system management bus, but a board at the OpenBoot PROM level connects over the IPMI bus. There can be only one console user on the IPMI bus at any one time.

For example, if the board in slot 4 is at the OpenBoot PROM level, the user opening a console session will connect to it over the IPMI bus. This will cause the IPMI bus to be fully occupied and no other users can connect over that bus. If they try, an error message displays. However, other users can connect to boards in other slots over the system management bus. The system management bus is faster than the IPMI bus, while the IPMI bus is typically a more stable communication channel than the system management bus.

Once you have a console connection with a node board, you can issue normal Solaris commands. There are several escape character sequences to control the current session. TABLE 3-6 shows these sequences.

TABLE 3-6 Node Board Console-Related Escape Character Sequences

Sequence	Description
<code>~b</code>	Break from the Solaris level and enter the OpenBoot PROM (debug) level.
<code>~.</code>	End the console session.
<code>~g</code>	Determine the status (system management bus or IPMI) of the current console.
<code>~t</code>	Toggle between system management bus and IPMI.

▼ To Start a Console Session from the Distributed Management Card

1. Log in to the distributed management card.

You can log in to the distributed management card through a terminal attached to either the serial port connection or the Ethernet port connection.

2. Open a console session to a board in a slot:

```
hostname cli> console cpu_node
```

where *cpu_node* is 3 through 20. For example, to open a console to the board in slot 4, enter the following:

```
hostname cli> console 4
```

You now have access to the board in slot 4. Depending on the state of the board in that particular slot, and whether the previous user logged out of the shell, you see one of several prompts:

- console login% (Solaris level)
- # (Solaris level, previous user logged in as root, and did not log out before disconnecting from the console)
- ok (OpenBoot PROM level, previous user did not log out before disconnecting from the console)

▼ To Determine the Status of the Current Console

- Enter the escape sequence `~g` at the start of a new line:

```
~g
```

A message displays, indicating the current state of the console connection. The message is either:

```
Console mode is IPMI
```

This means the console is in Solaris mode or OpenBoot PROM mode.

Or the message might be:

```
Console mode is NET
```

This means the console is in Solaris mode.

▼ To Toggle Between the System Management Bus and IPMI

Toggling between the system management bus and IPMI could be useful for troubleshooting. For example, if the console stops working for some reason, you could try toggling to IPMI (the more reliable communication channel).

1. **If the node board is in Solaris mode, enter the escape sequence `~t`:**

```
# ~t
New console mode is IPMI
#
```

The console switches between the system management bus and IPMI mode. The console now fully occupies the IPMI bus. No other console may be at the OpenBoot PROM level at the same time. If another user attempts to access a board that is occupying the IPMI bus, the console connection will fail.

2. **To return to the system management bus mode, enter `~t` again and press enter:**

```
# ~t
New console mode is NET
#
```


▼ To Break into OpenBoot PROM from the Console

- At the Solaris prompt, enter the escape sequence `~b`:

```
# ~b
```

The console mode switches to IPMI:

```
New console mode is IPMI
Type 'go' to resume
ok
```

You can now debug from the OpenBoot PROM level.

▼ To End the Console Session

1. (Optional) Log out of the Solaris shell.
2. At the prompt, disconnect from the console by entering the escape sequence `~.` (tilde period):

```
prompt ~.
hostname cli>
```

Disconnecting from the console does not automatically log you out from the remote host. Unless you log out from the remote host, the next console user who connects to that board sees the shell prompt of your previous session.

▼ To Show the Current Escape Character

- At the distributed management card prompt, enter the following command:

```
hostname cli> showescapechar
```

The current escape character is displayed:

```
hostname cli> escape_char: value
```

▼ To Change the Default Escape Character

- At the distributed management card prompt, enter the following command:

```
hostname cli> setescapechar value
```

where *value* is any printable character. For example, to change the default escape character from ~ (tilde) to # (pound sign), enter the following:

```
hostname cli> setescapechar #
```

The pound sign is now the escape character for all future console sessions.

Using the PMS Application for Recovery and Control of Node Boards

This section describes specifying recovery operations and controlling node boards through the distributed management card PMS CLI commands.

Recovery Configuration of a Node Board From the Distributed Management Card

You specify the recovery configuration of a node board by using the command `pmsd operaset -s slot_num|all` (a single slot number or all slots in the Netra CT system containing a node board) and the recovery mode for the specified slot(s).

The recovery configuration can be maintenance mode, operational mode, or none mode. *Maintenance mode* means the distributed management card's automatic recovery of a node board is disabled, and PMS applications are started in an offline state, so that you can use manual maintenance operations. *Operational mode* means the distributed management card's automatic recovery of a node board is enabled; the distributed management card will recover the node board in the event of a monitoring fault, and start PMS applications in an active state. *None mode* means the distributed management card's automatic recovery mode may be manually enabled or disabled; PMS application states are not enforced.

The mode is stored in persistent storage. You specify the operation to be performed on the specified slot by using the option `-o` with the parameter `maint_config` (set the hardware, operating system, and applications into maintenance mode), `oper_config` (set the hardware, operating system, and applications into operational mode), `none_config` (set the hardware, operating system, and applications into no enforcement mode), or `graceful_reboot` (bring the applications offline if needed and then reboot the operating system).

▼ To Specify the Recovery Configuration of a Node Board

1. Log in to the distributed management card.
2. Configure the automatic recovery mode with the `operset` command:

```
hostname cli> pmsd operset -s slot_num|all -o  
maint_config|oper_config|none_config|gracefulreboot
```

where `slot_num` can be a slot number from 3 to 20, and `all` specifies all slots containing node boards. For example, to make PMS' recovery operational for the entire Netra CT server, enter:

```
hostname cli> pmsd operset -s all -o oper_config
```

Printing PMS Recovery Configuration Information

The `pmsd infoshow -s slot_num|all` command can be used to print the recovery configuration and alarm status for the recovery configuration.

The `pmsd historyshow -s slot_num|all` command can be used to print a recovery configuration and runtime message log. The log is printed to the ChorusOS terminal performing the operation.

Detailed Recovery of a Board in Case of Fault

You can perform detailed, manual recovery operations on a board or instruct PMS to perform detailed, automatic recovery operations on a board using the CLI. The operations are performed across the hardware, the operating system, and the applications.

For manual recovery, use the `pmsd recoveryoperset -s slot_num|all` command. This command can only be run when the board is in *maintenance mode* or *none mode* (PMS applications are offline). You specify the recovery operation to be performed on the specified slot by using the option `-o` with the parameters: `pc` (power cycle), `rst` (reset), `rstpc` (reset, then power cycle), `pd` (power down), or `rb` (reboot).

For automatic recovery, use the `recoveryautooperset -s slot_num|all` command. This command instructs PMS what to do in response to a fault when the board is in *operational mode* (PMS applications are active).

You specify the automatic recovery operation to be performed on the specified slot by using the option `-o` with the parameters: `pc` (power cycle), `rst` (reset), `rstpc` (reset, then power cycle), `pd` (power down), or `rb` (reboot), `rbpc` (reboot, then power cycle), `none` (no recovery), or `trg` (manually simulate a fault to trigger a recovery). Optional parameters for automatic recovery include: `-d startup_delay` (the time in deciseconds between a fault occurrence and the start of a recovery operation; default is 0 deciseconds), `-f off|on` (whether a power down operation will occur if the recovery operation fails; `on` specifies power down will occur and `off` specifies that power down will not occur; the default is `off`), `-r retries` (the number of times a recovery operation can occur and fail before it is terminated; the default is one try), `-n inter_op_delay` (the time in deciseconds between one and the next operation for an operation with multiple retries; the default is 0 deciseconds [1 decisecond equals 10 milliseconds]; you should change the default to a number other than 0, for example, 4000 [equals 40 seconds], to allow time between the operations), and `-p reset_power-cycle_delay` (the time in deciseconds to be waited between the reset and power cycle portions of the recovery operation before a failed reset is declared and the power cycle portion of the operation starts; default is 0 deciseconds).

▼ To Manually Recover a Board

1. Log in to the distributed management card.
2. Perform manual recovery operations on a board with the `recoveryoperset` command:

```
hostname cli> pmsd recoveryoperset -s slot_num|all -o pc|rst|rstpc|pd|rb
```

where `slot_num` can be a slot number from 3 to 20, and `all` specifies all slots containing node boards. For example, to instruct PMS to reboot slot 5 after a fault, enter the following:

```
hostname cli> pmsd recoveryoperset -s 5 -o rb
```

▼ To Automatically Recover a Board

1. Log in to the distributed management card.
2. Perform automatic recovery operations on a board with the `recoveryoperset` command:

```
hostname cli> pmsd recoveryautooperset -s slot_num|all -o
pc|rst|rstpc|pd|rb|rbpc|none|trg [-d startup_delay][-f on|off][-r retries][-n
inter_op_delay][-p reset_power-cycle_delay]
```

where `slot_num` can be a slot number from 3 to 20, and `all` specifies all slots containing node boards. For example, to instruct PMS to automatically reboot slot 5 after a fault, with the default delays, retries, and failure power state, enter the following:

```
hostname cli> pmsd recoveryautooperset -s 5 -o rb
```

Printing PMS Automatic Recovery Information

The `pmsd recoveryautoinfoshow -s slot_num|all` command can be used to print information showing the configuration information affected by the `recoveryautooperset` command.

Monitoring and Controlling a Node Board's Resources From the Distributed Management Card

PMS can perform operations on a board's hardware, the operating system, and applications. You can specify that PMS performs operations on one of these, rather than all.

Hardware Operations

The `pmsd hwoperset -s slot_num|all` command performs operations on the hardware. The operations can only be performed in maintenance or none mode unless the optional `-f` parameter is used. You specify the operation to be performed on the specified slot by using the option `-o` with the parameters: `powerdown` (set the hardware to the power-off state), `powerup` (set the hardware to the power-on state),

reset (reset the hardware), `mon_enable` (enable health monitoring of the hardware), or `mon_disable` (disable health monitoring of the hardware). The optional `-f` parameter can be used to perform the operation even if applications are in the active state, and the slot is in operational mode.

The `pmsd hwinfoshow -s slot_num |all` command can be used to print PMS system information on the hardware state, monitoring status, and alarm status (whether an alarm was generated).

The `pmsd hwhistoryshow -s slot_num |all` command can be used to print a short log (one-line descriptions) of messages pertaining to changes in the hardware's operation. The log is printed to the ChorusOS terminal performing the operation.

Operating System Operations

The `pmsd osoperset -s slot_num |all` command performs operations on the operating system. The operations can only be performed in maintenance or none mode unless the optional `-f` parameter is used. You specify the operation to be performed on the specified slot by using the option `-o` with the parameters: `reboot` (reboot the operating system), `mon_enable` (enable health monitoring of the operating system), or `mon_disable` (disable health monitoring of the operating system). The optional `-f` parameter can be used to perform the operation even if applications are in the active state, and the slot is in operational mode.

The `pmsd osinfoshow -s slot_num |all` command can be used to print PMS system information on the operating system state, monitoring status, and alarm status (whether an alarm was generated).

The `pmsd oshistoryshow -s slot_num |all` command can be used to print a short log (one-line descriptions) of messages pertaining to changes in the operating system's operation. The log is printed to the ChorusOS terminal performing the operation.

Application Operations

The `pmsd appoperset -s slot_num |all` command performs operations on the applications. The operations can only be performed in the none mode. You specify the operation to be performed on the specified slot by using the option `-o` with the parameters: `force_offline` (force the applications to an offline state), `vote_active` (move the group of applications to the active state only if all of the applications agree to be moved), or `force_active` (force the applications to the active state).

The `pmsd appinfoshow -s slot_num |all` command can be used to print PMS system information on the applications' state and alarm status (whether an alarm was generated).

The `pmsd apphistoryshow -s slot_num|all` command can be used to print a short log (one-line descriptions) of messages pertaining to changes in the applications' operation. The log is printed to the ChorusOS terminal performing the operation.

Printing Other PMS Information

The `pmsd version` command prints the current version of `pmsd`.

The `pmsd usage` command prints a synopsis of the `pmsd` commands.

Monitoring Your System

This section describes various ways to monitor your system.

Command-line Interface Information

The distributed management card CLI provides many commands to display system status. Refer to the distributed management card CLI commands in the section, "Using the Distributed Management Card Command-Line Interface" on page 37, in particular the `show` commands, to view system status.

The MOH Application

The MOH collects information about individual field replaceable units (FRUs) in your system and monitors their operational status. MOH can also monitor certain daemons; for example, if you installed the Netra High Availability Suite, MOH monitors daemons through that application.

Starting and Stopping MOH

If you installed the Solaris patches for MOH in a directory other than the default directory, specify that path instead. You must start the MOH application as root.

```
# cd /opt/SUNWnetract/mgmt3.0/bin
# ./ctmgx start [option]
```

Refer to TABLE 2-4 for the options available with `ctmgx start`.

```
# cd /opt/SUNWnetract/mgmt3.0/bin
# ./ctmgx stop
```

Once MOH is running, it interfaces with your SNMP or RMI application to discover network elements, monitor the system, and provide status messages. Refer to the *Netra CT Server Software Developer's Guide* for information on writing applications to interface with the MOH application.

Additional Troubleshooting Information

In the event of an active distributed management card fault, hot swap is not supported.

For additional troubleshooting information, refer to the *Netra CT Server Service Manual*.

Error Messages from the PMS Application

This appendix contains information on PMS error messages.

Overview

PMS is a high-level application. Thus, faults in various places in the software and hardware underlying this application can result in PMS error messages. For example, a fault could occur on the midplane or on a disk. This situation may make it difficult to isolate where a specific fault is occurring. A solution to many PMS error messages is to reset the distributed management card.

PMS error messages are printed to the console you are using to execute the `pmsd` CLI command; they are not saved to a log on either the distributed management card or on a node board.

Messages

```
Board RG0 resource state must be OFFLINE to perform operation on this slot
```

Cause: Resource Group 0 (RG0), or the group of applications on a node board that PMS manages, must be offline before you can run certain commands from the distributed management card.

Action: Change the RG0 state from active to offline. For example, use the command `pmsd appoperset -o force_offline`.

DM board or switch board slot not managed by PMS Daemon

Cause: Many `pmsd` CLI commands can generate this message.

Action: PMS does not manage the distributed management card or the switching fabric boards.

Slot not configured to be managed by PMS Daemon

Cause: Many `pmsd` CLI commands can generate this message.

Action: Use the `pmsd slotaddressset` command to set the IP address for the slot.

Unable to communicate with CPU board PMS Daemon

Cause: Several `pmsd` CLI commands can generate this message.

Action: (1) Check network connectivity. (2) Check to see if the `ping` command works between the distributed management card and the node board. (3) Check the status of the node board with the `pmsd slotrndadderssshow` command, and modify if appropriate, with the `pmsd slotrndadderssssadd` command.

Unable to communicate with DM board PMS Daemon

Cause: Many `pmsd` CLI commands can generate this message. The distributed management card CPU may be temporarily overloaded.

Action: (1) Retry the command after waiting 15 seconds or more. (2) Reset the distributed management card.

Unable to connect to CPU board PMS Daemon

Cause: Several `pmsd` CLI commands can generate this message.

Action: (1) Check network connectivity. (2) Check to see if the `ping` command works between the distributed management card and the node board. (3) Check the status of the node board with the `pmsd slotrndadderssshow` command, and modify if appropriate, with the `pmsd slotrndadderssssadd` command.

Unable to connect to DM board COSL

Cause: Many `pmsd` CLI commands can generate this message. The message usually results from PMS being unable to monitor or control the hardware; PMS cannot get the information it needs from the lower-level common operating system library (COSL) hardware interface.

Action: Reset the distributed management card.

Unable to connect to DM board PMS Daemon

Cause: Many `pmsd` CLI commands can generate this message. The distributed management card CPU may be temporarily overloaded.

Action: (1) Retry the command after waiting 15 seconds or more. (2) Reset the distributed management card.

Unable to disconnect from DM board COSL

Cause: Many `pmsd` CLI commands can generate this message. The message usually results from PMS being unable to monitor or control the hardware; PMS cannot get the information it needs from the lower-level common operating system library (COSL) hardware interface.

Action: Reset the distributed management card.

Unable to fetch valid data from DM board COSL

Cause: Many `pmsd` CLI commands can generate this message. The message usually results from PMS being unable to monitor or control the hardware; PMS cannot get the information it needs from the lower-level common operating system library (COSL) hardware interface.

Action: Reset the distributed management card.

Unable to get valid data for this slot

Cause: Many `pmsd` CLI commands can generate this message. The most probable cause is that PMS is having trouble communicating with the hardware or the node boards.

Action: (1) Check network connectivity. (2) Reset the distributed management card. (3) Reboot the node boards.

Unable to perform operation on empty slot/entry

Cause: Many `pmsd` CLI commands can generate this message.

Action: If you want to use PMS to control the slot, put a board in the slot.

Unable to perform operation on this slot

Cause: Many `pmsd` CLI commands can generate this message. For example, if you used the `pmsd hardware -o reset` command on a slot that was empty or not powered on, this message would display.

Action: Compare the command issued and the state of the slot.

Unable to perform operation on this slot/entry

Cause: Several `pmsd` CLI commands can generate this message.

Action: (1) Make sure the remote distributed management card and the remote node board are operational. (2) Check network connectivity. (3) Check the status of the node board with the `pmsd slotrndaddersssshow` command, and modify if appropriate, with the `pmsd slotrndadderssssadd` command.

Unable to start CPU board PMS Daemon

Cause: The PMS daemon can't be started on a node board.

Action: (1) Check to see if a PMS daemon is already running on the node board; if there is, stop the daemon and try restarting it. (2) Reboot the node board and try restarting the daemon.

Unable to start DM board PMS Daemon

Cause: May occur after the CLI `pmsd start` command is used. The PMS daemon can't be started on the distributed management card.

Action: (1) Check to see if a PMS daemon is already running; if there is, stop the daemon and try restarting it. (2) Reset the distributed management card.

Unable to stop CPU board PMS Daemon

Cause: The PMS daemon can't be stopped on the node board.

Action: (1) Check to see if a PMS daemon is already running; if there is, stop the daemon with the command `kill process number`. (2) Reboot the node board.

Unable to stop DM board PMS Daemon

Cause: May occur after the CLI `pmsd stop` command is used. The PMS daemon can't be stopped on the distributed management card.

Action: (1) Check to see if a PMS daemon is already running; if there is, stop the daemon with the Chorus command `akill process number`. (2) Reset the distributed management card.

Unable to write default data to DM board COSL

Cause: Many `pmsd` CLI commands can generate this message. The message usually results from PMS being unable to monitor or control the hardware; PMS cannot get the information it needs from the lower-level common operating system library (COSL) hardware interface.

Action: Reset the distributed management card.

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