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System Management Services (SMS) 1.2 Dynamic Reconfiguration User Guide

Creating System Management Applications on the Sun Fire 15K and Sun Fire 12K Systems

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Contents

Preface

This book describes the dynamic reconfiguration (DR) feature in the system management services (SMS) software. DR enables you to attach system boards to, and detach them from, active Sun Fire 15K and Sun Fire 12K domains while the Solaris™ operating system continues to run.

Before You Read This Book

This book is intended for the Sun Fire 15K/12K platform administrator who has a working knowledge of UNIX® systems, particularly those based on the Solaris operating environment. If you do not have such knowledge, first read the Solaris user and system administrator books in AnswerBook2™ format provided with this system, and consider UNIX system administration training.

How This Book Is Organized

This book contains the following chapters:

Chapter 1 "Introduction to DR in System Management Services"

Chapter 2 "DR Software Components on the SC"

Chapter 3 "SMS DR User Interfaces"

Chapter 4 "SMS DR Procedures"

Using UNIX Commands

This document does not contain complete information on basic UNIX® commands and procedures, such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

■ AnswerBook2™ online documentation for the Solaris™ software environment

■ Other software documentation that you received with your system

Typographic Conventions

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

Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

Application	Title	Part Number
User information	*Sun Fire 15K Dynamic Reconfiguration User Guide*	816-4278
SMS Command reference	*System Management Services (SMS) 1.2 Reference Manual*	816-3268
Administrator Guide	System Management Services (SMS) 1.2 Administrator Guide	816-3267

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Introduction to DR in System Management Services

This chapter contains an introduction to the dynamic reconfiguration (DR) feature in the system management services software on the Sun Fire 15K/12K system controller (SC). For more information about DR on the domain, refer to the *Sun™ Fire 15K Dynamic Reconfiguration User Guide*.

What Is DR?

The dynamic reconfiguration feature on the Sun Fire 15K/12K server enables you to perform hardware configuration changes to a live domain that is running the Solaris operating environment, without causing machine downtime. You can also use DR, in conjunction with hot-swap functionality, physically to remove boards from, or add them to, the server.

You can execute DR operations from the SC by using the system management services commands—`addboard`(1M), `moveboard`(1M), `deleteboard`(1M), and `rcfgadm`(1M).

Note – You can execute DR operations either on the SC, or on the domain, using the `cfgadm`(1M) command. Refer to the *Sun Fire 15K Dynamic Reconfiguration User Guide* for more information about running DR on the domain.

Automatic DR

Automatic DR enables an application to execute DR operations without requiring user interaction. This ability is provided by an enhanced DR framework that includes the reconfiguration coordination manager (RCM) and the system event facility, `sysevent`. The RCM enables application-specific loadable modules to register callbacks. The callbacks perform preparatory tasks before a DR operation; error recovery during a DR operation; or clean-up after a DR operation. The system event framework enables applications to register for system events and receive notifications of those events. The automatic DR framework interfaces with the RCM and with the system event facility to enable applications to automatically give up resources prior to unconfiguring them and to capture new resources as they are configured into the domain.

The automatic DR framework can be used both locally (that is, from the domain by using the `cfgadm`(1M) command) or from the SC. The automatic DR operations that are initiated locally on the domain are referred to as local automatic DR, and the automatic DR operations initiated from the SC are referred to as global automatic DR. The global automatic DR operations include moving system boards from one domain to another, configuring hot-swaped boards into a domain, and removing system boards from a domain.

Enhanced System Availability

The DR feature enables you to hot-swap system boards without bringing the server down. It is used to unconfigure the resources on a faulty system board from a domain so that the system board can be removed from the server. The repaired, or replacement, board can be inserted into the domain while the Solaris operating environment is running. DR then configures the resources on the board into the domain. If you use the DR feature to add or remove a system board or component, DR always leaves the board or component in a known configuration state (see Chapter 1 "SC State Models" for more information about configuration states for system boards and components).

Component Types

You can use DR to add or to remove the following components:

Component	Description
cpu	An individual CPU
memory	All of the memory on the board
pci	Any I/O device, controller, or bus

DR on I/O Boards

You must use caution when you add or remove system boards with I/O devices. Before you can remove a board with I/O devices, all of its devices must be closed and all its file systems must be unmounted.

If you need to remove a board with I/O devices from a domain temporarily and then re-add it before any other boards with I/O devices are added, reconfiguration is not necessary and need not be performed. In this case, device paths to the board devices will remain unchanged. But if you add another board with I/O devices after the first was removed, then re-add the first board, reconfiguration is required because the paths to devices on the first board have changed.

Sun Fire 15K/12K Domains

The Sun Fire 15K/12K server can be divided into dynamic system domains, referred to simply as *domains* in this document. These domains are based on system board slots that are assigned to the domains. Each domain is electrically isolated into hardware partitions, which ensures that any failure in one domain does not affect the other domains in the server.

Sun Fire 15K/12K domain configuration is determined by the domain configuration in the platform configuration database (PCD), which resides on the SC. The PCD controls how the system board slots are logically partitioned into domains. The domain configuration represents the intended domain configuration. Thus, the configuration can include empty slots and populated slots. The physical domain is determined by the logical domain.

> **Note –** You can run DR operations in one of two ways: from the SC by using the system management services commands—addboard(1M), moveboard(1M), deleteboard(1M), and rcfgadm(1M); or directly on the domain, using the cfgadm(1M) command.

The number of slots available to a given domain is controlled by an available component list (ACL) that is maintained on the SC. A slot must be assigned or available to a domain before you can change its state. After a slot has been assigned to a domain, it becomes visible to that domain and unavailable and invisible to any other domain. Conversely, you must disconnect and unassign a slot from its domain before you can assign and connect it to another domain.

The logical domain is the set of slots that belong to the domain. The physical domain is the set of boards that are physically interconnected. A slot can be a member of a logical domain without having to be part of a physical domain. After the domain is booted, the system boards and the empty slots can be assigned to or unassigned from a logical domain; however, they are not allowed to become a part of the physical domain until the operating system requests it. System boards or slots that are not assigned to any domain are available to all domains. These boards can be assigned to a domain by the platform administrator; however, an available component list can be set up on the SC to allow users with appropriate privileges to assign available boards to a domain.

DR Administration Models

The available conponent list controls what administrative tasks can be performed, based on the name and group identification of the user. For instance, the platform administrator can add, delete, or move boards to or from a domain, as well as assign and unassign boards to or from a domain; however, the domain administrator or a domain configurator cannot assign or unassign boards to or from a domain. A brief description of the privileges model for each DR operation is given in Chapter 3 "SMS DR User Interfaces". For a detailed description of the privileges required for each SMS command, refer to the *System Management Services (SMS) 1.2 Administrator Guide*.

SC State Models

On the Sun Fire 15K/12K SC, a board can be in one of four states: unavailable, available, assigned, or active. You can use the showboards(1M) command to view the state (that is, status in the showboards(1M) output) of a specific board. You must have the appropriate privileges for the specified domain.

In the following example of the showboards(1M) command, the output does not include boards that are assigned to other domains.

```
Slot   Pwr   Type of Board   Board Status   Test Status   Domain

SB3    On    CPU             Active         Passed        engB
SB6    -     Empty Slot      Available        -           Isolated
IO8    On    HPCI            Assigned       Unknown       engB
IO9    Off   HPCI            Assigned       Failed        engB
```

You will never see an unavailable board in the output for the domain administrator. Only the platform administrator can see every board in the system.

The following table contains the names and descriptions of the states for boards on the SC. The state of a board on the SC is not the same as the state of a board on the domain. For more information about board states on the domain, refer to the *Sun Fire 15K Dynamic Reconfiguration User Guide*.

Name	Description
unavailable	The board is unavailable to the domain. The board has not been added to the ACL for the specified domain, or the board is currently assigned to another domain. Note that boards that are not in the ACL are invisible to the domain. In the unavailable state, the board is not considered part of the specified domain.
available	The board is available to be added to the domain. The board is in the ACL for the domain. Note that the board can be available to any number of domains. In the available state, the board is not considered to be part of the logical domain.
assigned	The board has been assigned to the domain: it is in the ACL for that domain and is unavailable to any other domain. In the assigned state, the board is considered to be part of the logical domain.
active	The board has been connected. Or, the board has been connected and configured into the Solaris operating environment and is available for use by the operating system. In the active state, the board is considered part of the physical domain.

DR Software Components on the SC

This chapter contains information about the various processes and daemons on the Sun Fire 15K/12K system controller (SC) that work together to accomplish DR operations. The processes and/or daemons that are used depends entirely on the point of execution of the DR operation. For instance, if you execute the DR operation from the SC, the system uses several more processes and/or daemons to accomplish the DR operation than it would if you executed the DR operation from the domain.

For more information about the processes and daemons that reside on the domain, refer to the *Sun Fire 15K Dynamic Reconfiguration User Guide.* In addition, refer to the *System Management Services (SMS) 1.2 Administrator Guide* for more information about the processes and daemons that reside in the SMS software on the SC.

Domain Configuration Agent

The domain configuration agent (DCA) enables applications such as Sun™ Management Center and SMS to initiate DR operations on a Sun Fire 15K/12K domain. The DCA runs on the SC and manages the DR communications between software applications running on the SC and the domain configuration server on the domain. An individual instance of the DCA runs on the SC for each domain on the platform. For more information about the DCA, refer to the *System Management Services (SMS) 1.2 Administrator Guide.*

PCD Daemon

The platform configuration daemon (PCD) manages the configuration of the Sun Fire 15K/12K platforms through a collection of flat files that comprise the PCD database. All changes to the configuration of the platform must go through the PCD. For more information about the PCD, refer to the *System Management Services (SMS) 1.2 Administrator Guide.*

SMS DR User Interfaces

The dynamic reconfiguration (DR) feature supports a single point of control, the Sun Fire 15K/12K system controller (SC), which runs the system management services (SMS) software. However, it also supports administration control from the domain. This chapter describes the DR interfaces on the SC. For information about using cfgadm(1M) to run DR on the domain, refer to the *Sun Fire 15K Dynamic Reconfiguration User Guide*.

SMS DR Commands and Options

This section contains descriptions of the SMS DR commands and related options.

addboard(1M)

The addboard(1M) command attaches a specific board to a specific domain. The following table describes the addboard(1M) command options and operands:

Options and Operands	Specifies
board_id	The board ID of the board to be added. The board ID corresponds to the board location (for example, SB2 is the board in slot 2). Multiple board identifiers are permitted.
-c *function*	The configuration state into which to move the board. You can add a board by steps. For example, you can assign the board, connect it, then configure it.
-d *domain_id* | *domain_tag*	The target domain name
-h	Help, which displays the usage description

Options and Operands	Specifies
-n	*No* to all prompts
-q	Quiet mode, which means messages are not written to standard output
-r *retry_count*	Number of retries that are performed if the attach fails
-t *timeout*	Wait time in seconds before a retry
-y	*Yes* to all prompts

Refer to the addboard(1M) man page for more information.

The following table contains the privileges needed to use the addboard(1M) command. The platform operator, platform service, and superuser groups cannot initiate the addboard(1M) command.

Platform Admin	Domain Admin	Domain Configurator
Can assign boards to a domain by using the -c option with the assign function.	Can connect or configure a board into the domain if the board has been assigned to the domain, or if it appears in the available component list (ACL) for the domain and is not assigned to another domain.	Can connect or configure a board into the domain if the board has been assigned to the domain, or if it appears in the available component list (ACL) for the domain and is not assigned to another domain.

The following example of the addboard(1M) command attaches system board 2 to the domain specified by *domain_id*. Two retries are performed, if necessary, with a wait time of 10 minutes (600 seconds).

```
% addboard -d domain_id -r 2 -t 600 SB2
```

deleteboard(1M)

The deleteboard(1M) command attempts to detach the specified board from the domain in which it currently resides. The following table describes the deleteboard(1M) command options and operands:

Options and Operands	Specifies
board_id	The board ID of the board to be deleted. The board ID corresponds to the board location (for example, SB2 is the system board in slot 2). Multiple board identifiers are permitted.
-c *function*	The configuration state into which to move the board. You can add a board by steps. For example, you can unconfigure the board, disconnect it, then unassign it.
-h	Help, which displays the usage description
-n	*No* to all prompts
-q	Quiet mode, which means messages are not written to standard output.
-r *retry_count*	Number of retries that are performed if the detach fails
-t *timeout*	Wait time in seconds before a retry
-y	*Yes* to all prompts

Refer to the deleteboard(1M) man page for more information.

The following table contains the privileges needed to use the deleteboard(1M) command. The platform operator, platform service, and superuser groups cannot initiate the deleteboard(1M) command.

Platform Admin	Domain Admin	Domain Configurator
Can unassign boards from a domain by using the -c option with the unassign function. This function unconfigures and disconnects the board before it unassigns the board. The board cannot be active in a running domain.	Can disconnect or unconfigure a board from the domain. The board remains assigned to the domain.	Can disconnect or unconfigure a board from the domain. The board remains assigned to the domain.

The following example of the deleteboard(1M) command detaches system board 2 from its current domain. Two retries are performed, if necessary, with a wait time of 15 minutes (900 seconds).

```
% deleteboard -r 2 -t 900 SB2
```

moveboard(1M)

The moveboard(1M) command detaches a board from the domain in which it currently resides and attaches it to the specified domain. The following table describes the moveboard(1M) command options and operands:

Options and Operands	Specifies
board_id	The board ID of the board to be moved. The board ID corresponds to the board location (for example, SB2 is the system board in slot 2). Multiple board identifiers are permitted.
-c *function*	The configuration state into which to move the board. You can move a board by steps. For example, you can assign the board, connect it, then configure it.
-d *domain_id* | *domain_tag*	The target domain name
-h	Help, which displays the usage description
-n	*No* to all prompts
-q	Quiet mode, which means messages are not written to standard output
-r *retry_count*	Number of retries that are performed if the operation fails
-t *timeout*	Wait time in seconds before a retry
-y	*Yes* to all prompts

Refer to the moveboard(1M) man page for more information.

The following table contains the privileges needed to use the moveboard(1M) command. The platform operator, platform service, and superuser groups cannot initiate the moveboard(1M) command.

Platform Admin	Domain Admin	Domain Configurator
Can re-assign boards from one domain to another domain by using the -c option with the assign function. The board cannot be active in the domain from which it is being re-assigned.	Can re-assign a board between domains for which he or she has domain admin privileges. The board must already be assigned to the target domain, or it must be in the ACL for that domain.	Can re-assign a board between domains for which he or she has domain configurator privileges. The board must already be assigned to the target domain, or it must be in the ACL for that domain.

The following example of the moveboard(1M) command moves system board 5 from its current domain to the domain specified by *domain_id.* Two retries are performed, if necessary, with a wait time of 15 minutes (900 seconds).

```
% moveboard -d domain_id -r 2 -t 900 SB5
```

rcfgadm(1M)

The rcfgadm(1M) command provides remote configuration administration operations on dynamically reconfigurable hardware resources. The rcfgadm(1M) command performs configuration administration on attachment points, which are device nodes in the device tree.

The following table describes the rcfgadm(1M) command options and operands.

Options and Operands	Specifies
-a	The -a option lists dynamic attachment points.
-c *function*	The configuration state into which to move the board. You can disconnect, connect, configure, or unconfigure a board.
-d *domain_id* | *domain_tag*	The target domain name
-f	The specified action to be forced to occur
-h *ap_id* | *ap_type*	Help message text to be printed. If *ap_id* or *ap_type* is given, the command displays the hardware specific help for the attachment point.
-l *ap_id* | *ap_type*	State and condition of attachment points to be listed
-n	*No* to all prompts

Options and Operands	Specifies
-o *hardware_options*	Hardware specific options
-r *retry_count*	Number of times to retry the DR operation
-s *listing_options*	Options to list
-T *timeout*	Wait time in seconds before a retry
-t	A test on one or more attachment points
-v	Verbose mode
-x *hardware_function*	Hardware specific functions
-y	*Yes* to all prompts

Refer to the rcfgadm(1M) man page for more information and examples of how to use this command.

The following table contains the privileges needed to use the rcfgadm(1M) command. The platform operator, platform service, and superuser groups cannot initiate the rcfgadm(1M) command.

Platform Admin	Domain Admin	Domain Configurator
Can assign or unassign boards to or from a domain by using the -x option with the assign or unassign function, respectively. To use the unassign function, the board must be assigned and cannot be active in a running domain.	Can disconnect, connect, configure, or unconfigure a board to or from the domain. The board must be assigned to the domain or in the ACL.	Can disconnect, connect, configure, or unconfigure a board to or from the domain. The board must be assigned to the domain or in the ACL.

scdrhelp(1M)

The scdrhelp(1M) shell script starts the Sun Fire 15K/12K dynamic reconfiguration errors help system. The help system uses the JavaHelp™ hsviewer script that launches a graphical user interface (GUI) by using Java™ Swing foundation classes.

All of the user privileges groups can use this command, except for the domain administrator and the domain configurator.

Refer to the scdrhelp(1M) man page for more information about this script.

showboards(1M)

The showboards(1M) command displays the assignment information and status of the system boards in a domain. Although the showboards(1M) command is not DR-specific, it should be used in conjunction with the DR commands. The following table describes the showboards(1M) command options.

Option	Specifies
–d *domain_id* | *domain_tag*	The target domain name
-h	Help, which displays the usage description
-v	Verbose mode. In this mode, showboards(1M) displays all of the components on the board, including the domain configuration units such as CPUs, DPUs, and I/O boards.

All of the user privileges groups can use this command; however, the domain platform administrator and the domain configurator can show boards only in the domains for which they have privileges.

Refer to the showboards(1M) man page for more information and examples of how to use this command.

showdevices(1M)

The showdevices(1M) command displays the configured physical devices on system boards and the resources that are made available by these devices. Although the showdevices(1M) command is not DR-specific, it should be used in conjunction with the DR commands.

The usage information is provided by applications and subsystems that are actively managing system resources. The predicted impact of a system board DR operation can be displayed by performing an offline query of managed resources.

The following table describes the showdevices(1M) command options and operands.

Options and Operands	Specifies
board_id	The board ID of the board to be added. The board ID corresponds to the board location (for example, SB2 is the system board in slot 2). Multiple board identifiers are permitted.
–d *domain_id* | *domain_tag*	The target domain name

Options and Operands	Specifies
-h	Help, which displays the usage description
-p *reports*	Offline query information
-v	All I/O devices

Only the domain platform administrator and the domain configurator can show device information in the domains for which they have privileges.

Refer to the showdevices(1M) man page for more information and examples of how to use this command.

showplatform(1M)

The showplatform(1M) command displays the available component list and the domain state for each domain. Although the showplatform(1M) command is not DR-specific, it should be used in conjunction with the DR commands.

The following table describes the showplatform(1M) command options and operands.

Options and Operands	Specifies
-d *domain_id* | *domain_tag*	The target domain name
-h	Help, which displays the usage description
-p domains | acls	Displays domain state for domains (domains) or ACL for domains (acls)
-v	All available command information

All of the user privileges groups, except for the platform service and superuser groups, can use this command; however, the domain administrator and the domain configurator can show the platform information only in the domains for which they have privileges.

Refer to the showplatform(1M) man page for more information and examples of how to use this command.

Error Message Help System

The SMS software contains an error message help systems that you can use to find a description and recovery for a specific error message.

You can start the DR error message help system with the following command.

```
% /opt/SUNWSMS/jh/scdrhelp &
```

The standard JavaHelp system viewer, hsviewer, is used to display the DR error messages help system. The viewer consists of a toolbar and two panes: the content pane and the navigation pane, as shown in FIGURE 3-1.
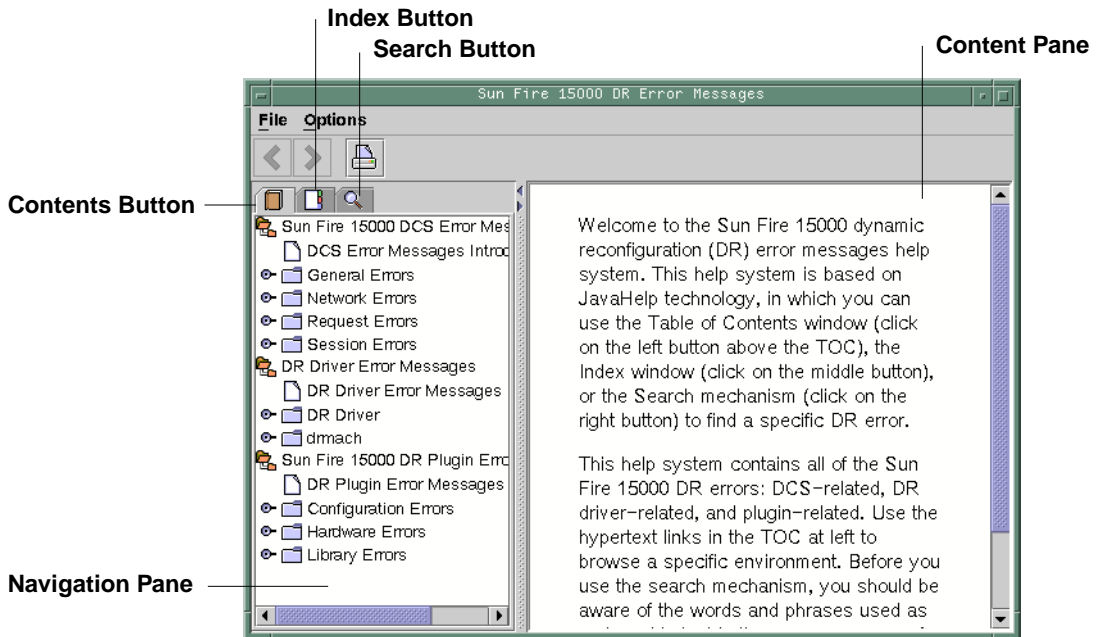

FIGURE 3-1 hsviewer GUI Components

JavaHelp Table of Contents

The DR error messages are separated into logical groups according to the type of errors, as shown in FIGURE 3-1. These groups represent the major topics that appear as the top level headings in the table of contents. Error message numbers and/or abbreviated text appear under their respective group name.

JavaHelp Index

The IDN error messages are indexed so that key topics are represented in the Index display (FIGURE 3-2). Some index topics are embedded when that embedding is deemed appropriate. For these topics, only the embedded topics are links to error messages.
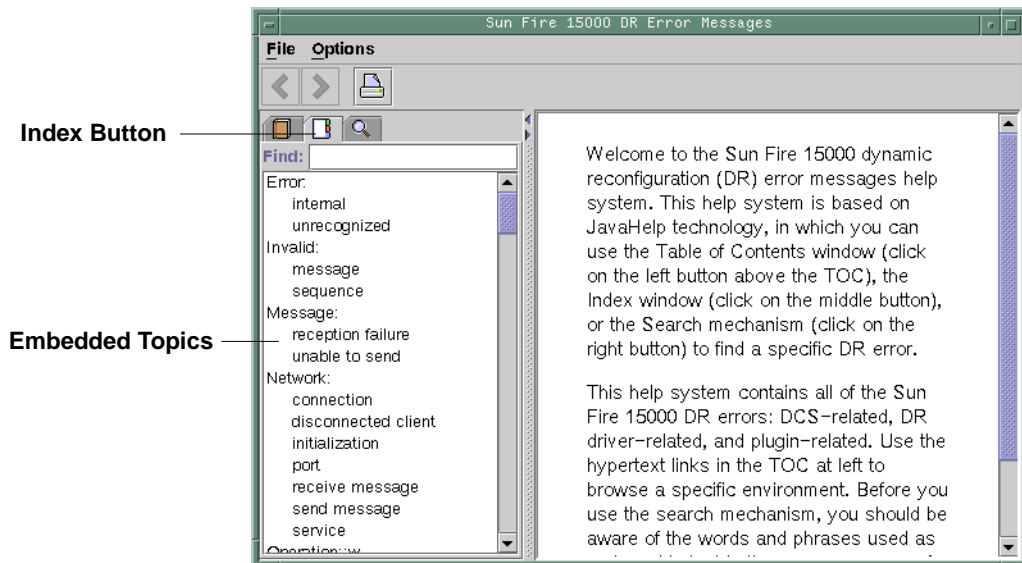

FIGURE 3-2   JavaHelp Index Display

JavaHelp Search

The DR error messages help system provides a full-text search function. The search database is constructed by indexing the error message help files.

Before you search for a specific error message, read the following list of search tips:

- Search on a specific string of text in the error message.
- Avoid using numeric values. They are treated as replaceable text (FIGURE 3-3).
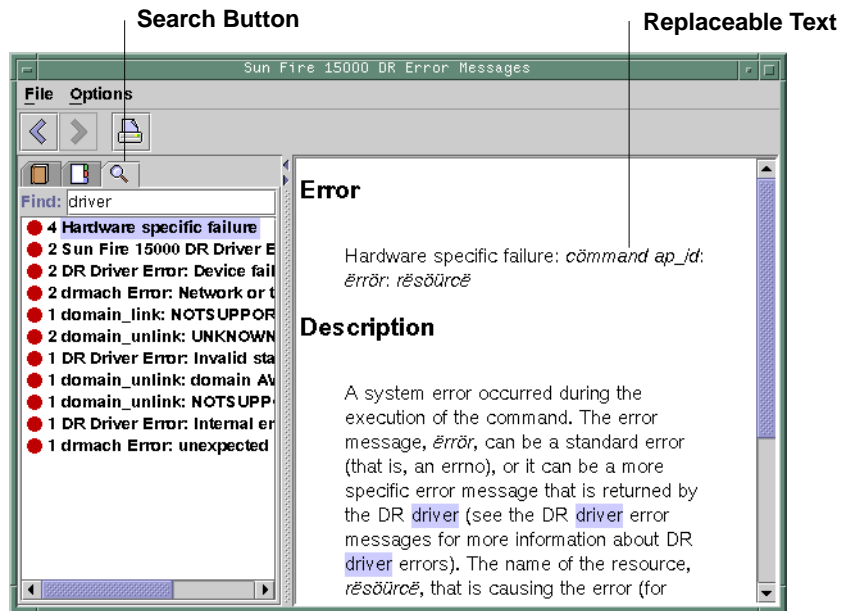

FIGURE 3-3   JavaHelp Search Display

SMS DR Procedures

This chapter contains procedures that describe how to use the DR feature on the Sun Fire 15K/12K system controller (SC), which runs the system management services (SMS) software. The following procedures are included:

- "Showing Platform Information"
- "Showing Board Information"
- "Showing Device Information"
- "Adding Boards"
- "Deleting Boards"
- "Moving Boards"

Showing Platform Information

Before you attempt to add, move, or delete a board to or from a specific domain, use the showboards(1M) command to determine the domain ID, the boards available to the domain, and the status of the domain.

You can use the domain ID in all of the DR commands. You can use the board list to determine the domain to which a specific board is assigned, and you can use the domain status to determine whether or not you can delete or move a board from the domain. For domain administrators and domain configurators, the board must be assigned to the domain, or it must be in the available component list before it can be added to the domain. Use the showplatforms(1M) command to determine whether the component is in the ACL. For platform administrators, the assigned board must not be active in a running domain before it can be deleted from the domain or moved to another domain.

You must have the appropriate privileges for this command. See "showboards" on page 15 and "showplatform" on page 16 for an explanation of which user groups can use this command.

▼ To Show the Platform Information

● **Use the** `showplatform`**(1M) command to obtain the domain information.**

```
% showplatform
```

The `showplatform`(1M) command displays the domain ID, the available component list, and the status of the domain, as in the following example.

```
ACLs for domain domainA:
       slot0: SB0, SB1, SB2, SB3
       slot1: IO0, IO1, IO2, IO3

ACLs for domain domainB:
       slot0: None
       slot1: None


Domain          Solaris Nodename        Domain Status

domainA         sms3-b0                 Powered Off
domainB         sms3-b1                 Running Solaris
```

Showing Board Information

Before you attempt to delete or move a system board, you must query the board to determine the state of the board and to which domain the board is assigned.

Note – The output of the `showboards`(1M) command depends on the privileges of the user. For instance, the platform administrator can obtain information about all of the boards in the server. The domain administrator and domain configurator, however, can obtain the information about only those boards that are assigned and available to the domain(s) to which they have access.

After you have determined the domain ID that contains the board that you want to delete or move, or after you have determined that a particular board has already been assigned to a specific domain, use the showboards(1M) command to determine the state of the board. The board may be in a state that makes it impossible for you to delete or move it.

▼ To Show Board Information

● **Use the** `showboards` **(1M) command to display the board information for the domain.**

```
% showboards -d A
```

The above command displays the device information for domain A. The following example contains the information that would be displayed.

```
Slot    Pwr      Type of Board      Board Status    Test Status    Domain

SB0     On       CPU Board          Active          Passed         A
SB1     –        Empty Slot         Assigned          –            A
```

You can use the `showboards` (1M) command to display all of the assigned system boards, all of the available system boards, and/or all of the CPU, memory, and I/O boards in the domain. Refer to the `showboards` (1M) man page for more information on how to obtain board information.

Showing Device Information

Before you attempt to perform any DR operation, use the `showdevices` (1M) command to display the device information, especially when you are removing devices.

▼ To Show Device Information

- **Use the** `showdevices`**(1M) command to display the device information for the domain.**

```
% showdevices -v -d A
```

The above command displays the device information for all of the devices in the domain. Refer to the `showdevices`(1M) man page to learn how to display device-specific information. The above command produces the following output for CPUs in domain A (the following is only an example).

```
CPU
----
domain    board    id    state      speed     ecache     usage
A         SB1      40    online     400       4
A         SB1      41    online     400       4
A         SB1      42    online     400       4
A         SB1      43    online     400       4
A         SB2      55    online     400       4
A         SB2      56    online     400       4
A         SB2      57    online     400       4
A         SB2      58    online     400       4
```

The following output represents an example of the memory output for the `showdevices`(1M) command above.

```
Memory
drain in progress:
-----------------
              board    perm    base      domain   target deleted remaining
domain  board mem MB   mem MB  addr      mem MB   board  MB      MB
A       SB1   2048     933     0x600000 4096      C2     250     1500
A       SB2   2048     0       0x200000 4096
```

The following output represents an example of the I/O devices output for the
showdevices(1M) command above.

```
IO Devices
----------
domain   board   device   resource             usage
A        IO1     sd0
A        IO1     sd1
A        IO1     sd2
A        IO1     sd3      /dev/dsk/c0t3d0s0    mounted filesystem "/"
A        IO1     sd3      /dev/dsk/c0t3d0s1    dump device (swap)
A        IO1     sd3      /dev/dsk/c0t3d0s1    swap area
A        IO1     sd3      /dev/dsk/c0t3d0s3    mounted filesystem "/var"
A        IO1     sd3      /var/run             mounted filesystem "/var/run"
A        IO1     sd4
A        IO1     sd5
```

Refer to the showdevices(1M) man page for a complete list of the options and
arguments for this command.

Adding Boards

Adding a board to a domain moves the board through several state changes. If it is
not already assigned, it is first assigned to the domain. Then, it is connected to the
domain and configured into the Solaris operating environment. After it is connected,
it is considered to be part of the physical domain and available to be used by the
operating system.

You must have the appropriate privileges to add a board to a domain. See
"addboard" on page 9 for a description of the privileges needed to use this
command.

▼ To Add a Board to a Domain

● **Use the** addboard**(1M) command to add the board to the domain.**

The following example of the addboard(1M) command adds system board 2 to the domain specified by *domain_id*. Two retries are performed, if necessary, with a wait time of 10 minutes.

```
% addboard -d domain_id -r 2 -t 600 SB2
```

Deleting Boards

Deleting a board from a domain removes the board from the domain that it is currently assigned to and possibly active in. The board must be in the assigned or active state.

Always check the usage of the components on a board before you delete it from a domain. If the board hosts permanent memory, the memory is moved to another board within the same domain before the board is deleted from the domain. Likewise, if any busy devices are present, you must wait or ensure that the device is no longer being used by the system before you attempt to remove the board.

Caution – You must power off the board before you physically remove it from the server. The deleteboard(1M) command does not power off the board.

A domain administrator can unconfigure and disconnect a board, but cannot delete a board from the a domain unless the board is in the available component list. See "deleteboard" on page 11 for more information about privileges for this command.

▼ To Delete a Board From a Domain

● **Use the** deleteboard**(1M) command to delete the board from the domain.**

The following example of the deleteboard(1M) command deletes system board 2 from its current domain. Two retries are performed, if necessary, with a wait time of 15 minutes (900 seconds).

```
% deleteboard -r 2 -t 900 SB2
```

Moving Boards

Moving a board from one domain to another domain unassigns the board from the first domain and assigns, connects, and configures the board into the target domain.

You should always check the usage of the memory and devices on a board before you move it out of a domain. If the board hosts permanent memory, the memory must be moved to another board within the same domain before the board can be moved to another domain. Likewise, if any busy devices are present, you must wait or ensure that the device is no longer being used by the system before you attempt to move the board.

▼ To Move a Board

- **Use the** `moveboard`**(1M) command to move the board from one domain to another domain.**

  The following example of the `moveboard`(1M) command moves system board 2 from its current domain to the domain specified by *domain_id*. Two retries are performed, if necessary, with a wait time of 15 minutes (900 seconds).

  ```
  % moveboard -d domain_id -r 2 -t 900 SB2
  ```

Replacing System Boards

This section describes how to physically replace a board in a domain by using the commands described in this chapter.

▼ To Physically Replace a System Board

In the following steps, system board 2 is removed from its current domain and replaced by system board 3.

1. **Delete the board from the domain.**

   ```
   % deleteboard -r 2 -t 900 SB2
   ```

2. Power off the board.

```
% poweroff SB2
```

3. Power on the board.

```
% poweron SB3
```

4. Add the board to the domain.

```
% addboard -d domain_id -r 2 -t 900 SB3
```

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