

7750 SR OS Basic System Configuration Guide

Software Version: 7750 SR OS 8.0

February 2010

Document Part Number: 93-0070-07-01

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Preface

About This Guide

This guide describes system concepts and provides configuration explanations and examples to configure 7750 SR-Series boot option file (BOF), file system and system management functions.

This document is organized into functional chapters and provides concepts and descriptions of the implementation flow, as well as Command Line Interface (CLI) syntax and command usage.

Audience

This manual is intended for network administrators who are responsible for configuring the 7750 SR-Series routers. It is assumed that the network administrators have an understanding of networking principles and configurations. Protocols, standards, and processes described in this manual include the following:

- CLI concepts
- File system concepts
- Boot option, configuration, image loading, and initialization procedures
- Basic system management functions such as the system name, router location and coordinates, and CLLI code, time zones, Network Time Protocol (NTP), Simple Network Time Protocol (SNTP), and synchronization properties

List of Technical Publications

The 7750 SR documentation set is composed of the following books:

• 7750 SR OS Basic System Configuration Guide

This guide describes basic system configurations and operations.

• 7750 SR OS System Management Guide

This guide describes system security and access configurations as well as event logging and accounting logs.

• 7750 SR OS Interface Configuration Guide

This guide describes card, Media Dependent Adapter (MDA), and port provisioning.

• 7750 SR OS Router Configuration Guide

This guide describes logical IP routing interfaces and associated attributes such as an IP address, port, link aggregation group (LAG) as well as IP and MAC-based filtering, VRRP, and Cflowd.

• 7750 SR OS Routing Protocols Guide

This guide provides an overview of routing concepts and provides configuration examples for RIP, OSPF, IS-IS, Multicast, BGP, and route policies.

7750 SR OS MPLS Guide

This guide describes how to configure Multiprotocol Label Switching (MPLS) and Label Distribution Protocol (LDP).

7750 SR OS Services Guide

This guide describes how to configure service parameters such as service distribution points (SDPs), customer information, and user services.

• 7750 SR OS OAM and Diagnostic Guide

This guide describes how to configure features such as service mirroring and Operations, Administration and Management (OAM) tools.

• 7750 SR OS Triple Play Guide

This guide describes Triple Play services and support provided by the 7750 SRand presents examples to configure and implement various protocols and services.

7750 SR Quality of Service Guide

This guide describes how to configure Quality of Service (QoS) policy management.

OS Multi-Service ISA Guide

This guide describes services provided by integrated service adapters such as Application Assurance, IPSec, ad insertion (ADI) and Network Address Translation (NAT).

Technical Support

If you purchased a service agreement for your 7750 SR router and related products from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller for assistance. If you purchased an Alcatel-Lucent service agreement, contact your welcome center:

Web: http://www1.alcatel-lucent.com/comps/pages/carrier_support.jhtml

Getting Started

In This Chapter

This chapter provides process flow information to configure basic router and system parameters, perform operational functions with directory and file management, and boot option tasks.

Alcatel-Lucent 7750 SR-Series System Configuration Process

Table 1 lists the tasks necessary to configure boot option files (BOF) and system and file management functions. Each chapter in this book is presented in an overall logical configuration flow. Each section describes a software area and provides CLI syntax and command usage to configure parameters for a functional area. After the hardware installation has been properly completed, proceed with the 7750 SR-Series router configuration tasks in the following order:

Table 1: Configuration Process

Area	Task	Chapter
CLI Usage	The CLI structure	CLI Usage on page 17
	Basic CLI commands	Basic CLI Commands on page 23
	Configure environment commands	CLI Environment Commands on page 26
	Configure monitor commands	CLI Monitor Commands on page 27
Operational functions	Directory and file management	File System Management on page 131
Boot options	Configure boot option files (BOF)	Boot Options on page 157

Table 1: Configuration Process

Area	Task	Chapter (Continued)
System configuration	Configure system functions, including host name, address, domain name, and time parameters.	System Management on page 203
Reference	List of IEEE, IETF, and other proprietary entities.	Standards and Protocol Support on page 477

CLI Usage

In This Chapter

This chapter provides information about using the command-line interface (CLI).

Topics in this chapter include:

- CLI Structure on page 18
- Navigating in the CLI on page 21
- Basic CLI Commands on page 23
- CLI Environment Commands on page 26
- CLI Monitor Commands on page 27
- Getting Help in the CLI on page 28
- The CLI Command Prompt on page 30
- Displaying Configuration Contexts on page 31
- EXEC Files on page 32
- Entering CLI Commands on page 33
- VI Editor on page 38

CLI Structure

Alcatel-Lucent's SR-Series Operating System (OS) CLI is a command-driven interface accessible through the console, Telnet and secure shell (SSH). The CLI can be used for configuration and management of 7750 SR-Series routers.

The 7750 SR OS CLI command tree is a hierarchical inverted tree. At the highest level is the ROOT level. Below this level are other tree levels with the major command groups; for example, **configuration** commands and **show** commands are levels below ROOT.

The CLI is organized so related commands with the same scope are at the same level or in the same context. Sublevels or subcontexts have related commands with a more refined scope.

Figure 1 and Figure 2 display the major contexts for router configuration.

ADMIN —————				application-a
				debug-save disconnect display-conf radius-disc reboot
BOF ————————————————————————————————————			address autonegotiate console-speed dnm-domain duplex li-local-save li-separate	redundancy save set-time
ENVIRONMENT —	alias create more reduced-prompt saved-ind-promp terminal time-display time-stamp	criowd cron eth-cfm filter ipsec lag li log mirror port qos redundancy router saa service subscriber-mgmt system test-oam vrrp vsm	persist primary-config primary-dns primary-image save secondary-conf secondary-image speed static-route tertiary-config tertiary-dns tertiary-image wait	
FILE				attrib cd
MONITOR —			ccag cpm-filter filter lag management-acc	copy delete dir format md move rd
HELP		help help edit help globals	port qos router service	repair scp shutdown type version

Figure 1: Root Commands

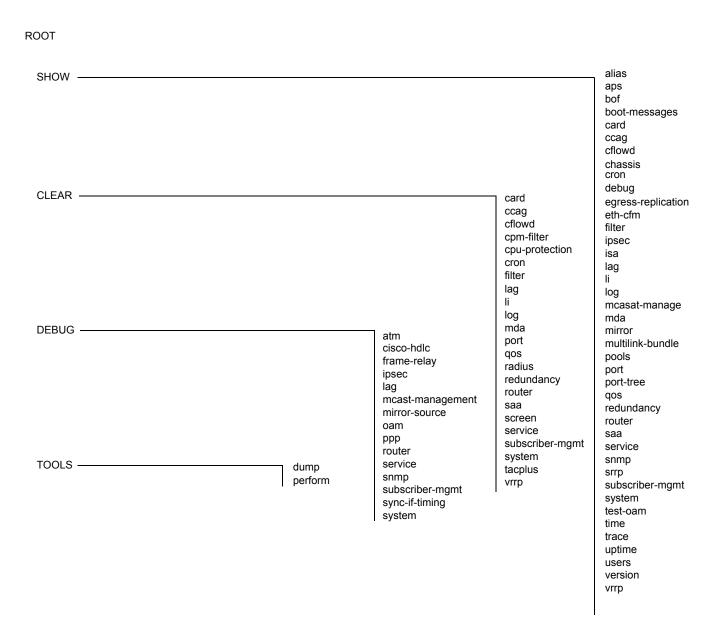


Figure 2: Operational Root Commands

Navigating in the CLI

The following sections describe additional navigational and syntax information.

- CLI Contexts on page 21
- Basic CLI Commands on page 23
- CLI Environment Commands on page 26
- CLI Monitor Commands on page 27
- Entering Numerical Ranges on page 46

CLI Contexts

Use the CLI to access, configure, and manage Alcatel-Lucent's SR-Series routers. CLI commands are entered at the command line prompt. Access to specific CLI commands is controlled by the permissions set by your system administrator. Entering a CLI command makes navigation possible from one command context (or level) to another.

When you initially enter a CLI session, you are in the ROOT context. Navigate to another level by entering the name of successively lower contexts. For example, enter either the **configure** or **show** commands at the ROOT context to navigate to the **config** or **show** context, respectively. For example, at the command prompt, enter **config**. The active context displays in the command prompt.

```
A:ALA-12# config
A:ALA-12>config#
```

In a given CLI context, you can enter commands at that context level by simply entering the text. It is also possible to include a command in a lower context as long as the command is formatted in the proper command and parameter syntax.

The following example shows two methods to navigate to a service SDP ingress level:

Method 1:

```
A:ALA-12# configure service epipe 6 spoke-sdp 2:6 ingress *A:ALA-12>config>service>epipe>spoke-sdp>ingress#
```

Method 2:

```
A:ALA-12>config# service
A:ALA-12>config>service# epipe 6
*A:ALA-12>config>service>epipe# spoke-sdp 2:6
*A:ALA-12>config>service>epipe>spoke-sdp# ingress
*A:ALA-12>config>service>epipe>spoke-sdp>ingress#
```

The CLI returns an error message when the syntax is incorrect.

*A:ALA-12>config# rooter Error: Bad command.

Basic CLI Commands

The console control commands are the commands that are used for navigating within the CLI and displaying information about the console session. Most of these commands are implemented as global commands. They can be entered at any level in the CLI hierarchy with the exception of the password command which must be entered at the ROOT level. The console control commands are listed in Table 2.

Table 2: Console Control Commands

Command	Description	Page
<ctrl-c></ctrl-c>	Aborts the pending command.	
<ctrl-z></ctrl-z>	Terminates the pending command line and returns to the ROOT context.	
back	Navigates the user to the parent context.	58
clear	Clears statistics for a specified entity or clears and resets the entity.	58
echo	Echos the text that is typed in. Primary use is to display messages to the screen within an exec file.	59
exec	Executes the contents of a text file as if they were CLI commands entered at the console.	59
exit	Returns the user to the previous higher context.	59
exit all	Returns the user to the ROOT context.	61
help ?	Displays help in the CLI.	61
history	Displays a list of the most recently entered commands.	62
info	Displays the running configuration for a configuration context.	63
logout	Terminates the CLI session.	65
oam	Provides OAM test suite options. See the OAM section of the 7750 SR OS OAM and Diagnostic Guide.	
password	Changes the user CLI login password. The password can only be changed at the ROOT level.	67
ping	Verifies the reachability of a remote host.	68
pwc	Displays the present or previous working context of the CLI session.	70

Table 2: Console Control Commands (Continued)

Command	Description	Page
sleep	Causes the console session to pause operation (sleep) for one second or for the specified number of seconds. Primary use is to introduce a pause within the execution of an exec file.	70
ssh	Opens a secure shell connection to a host.	71
telnet	Telnet to a host.	71
traceroute	Determines the route to a destination address.	72
tree	Displays a list of all commands at the current level and all sublevels.	73
write	Sends a console message to a specific user or to all users with active console sessions.	73

The list of all system global commands is displayed by entering help globals in the CLI. For example:

```
*A:ALA-12>config>service# help globals
back - Go back a level in the command tree
echo - Echo the text that is typed in
enable-admin - Enable the user to become a system administrator
exec - Execute a file - use -echo to show the commands and
prompts on the screen
exit - Exit to intermediate mode - use option all to exit to
root prompt
help - Display help
history - Show command history
info - Display configuration for the present node
logout - Log off this system
mrinfo - Request multicast router information
mstat - Trace multicast path from a source to a receiver and
display multicast packet rate and loss information
mtrace - Trace multicast path from a source to a receiver
oam + OAM Test Suite
ping - Verify the reachability of a remote host
pwc - Show the present working context
sleep - Sleep for specified number of seconds
ssh - SSH to a host
telnet - Telnet to a host
traceroute - Determine the route to a destination address
tree - Display command tree structure from the context of
execution
write - Write text to another user

*A:ALA-12>config>service#
```

Table 3 lists describes command syntax symbols.

Table 3: Command Syntax Symbols

Symbol	Description
I	A vertical line indicates that one of the parameters within the brackets or braces is required. tcp-ack {true false}
[]	Brackets indicate optional parameters. redirects [number seconds]
< >	Angle brackets indicate that you must enter text based on the parameter inside the brackets. interface <interface-name></interface-name>
{ }	Braces indicate that one of the parameters must be selected. default-action {drop forward}
[{ }]	Braces within square brackets indicates that you must choose one of the optional parameters. • sdp sdp-id [{gre mpls}]
Bold	Commands in bold indicate commands and keywords.
Italic	Commands in italics indicate command options.

CLI Environment Commands

The CLI **environment** commands are found in the root>environment context of the CLI tree and controls session preferences for a single CLI session. The CLI environment commands are listed in Table 4.

Table 4: CLI Environment Commands

Command	Description	Page
alias	Enables the substitution of a command line by an alias.	74
create	Enables or disables the use of a create parameter check.	74
more	Configures whether CLI output should be displayed one screen at a time awaiting user input to continue.	74
reduced-prompt	Configures the maximum number of higher-level CLI context nodes to display by name in the CLI prompt for the current CLI session.	75
saved-ind- prompt	Saves the indicator in the prompt.	75
terminal	Configures the terminal screen length for the current CLI session.	76
time-display	Specifies whether time should be displayed in local time or UTC.	76

CLI Monitor Commands

Monitor commands display specified statistical information related to the monitor subject (such as filter, port, QoS, router, service, and VRRP) at a configurable interval until a count is reached. The CLI monitor commands are found in the root>monitor context of the CLI tree.

The **monitor** command output displays a snapshot of the current statistics. The output display refreshes with subsequent statistical information at each configured interval and is displayed as a delta to the previous display.

The <Ctrl-c> keystroke interrupts a monitoring process. Monitor command configurations cannot be saved. You must enter the command for each monitoring session. Note that if the maximum limits are configured, you can monitor the statistical information for a maximum of 60 * 999 sec ~ 1000 minutes.

The CLI monitor command contexts are listed in Table 4.

Table 5: CLI Monitor Command Contexts

Command	Description	Page
ccag	Enables CCAG port monitoring for traffic statistics.	77
cpm-filter	Monitor command output for CPM filters.	77
filter	Enables IP and MAC filter monitoring at a configurable interval until that count is reached.	78
lag	Enables Link Aggregation Group (LAG) monitoring to display statistics for individual port members and the LAG.	83
management- access-filter	Enables management access filter monitoring.	85
port	Enables port traffic monitoring. The specified port(s) statistical information displays at the configured interval until the configured count is reached.	86
qos	Enables scheduler statistics monitoring per customer multi- service-site or on a per SAP basis.	90
router	Enables virtual router instance monitoring at a configurable interval until that count is reached.	94
service	Monitors commands for a particular service.	120

Getting Help in the CLI

The **help** system commands and the ? key display different types of help in the CLI. Table 6 lists the different help commands.

Table 6: Online Help Commands

Command	Description	
help ?	List all commands in the current context.	
string?	List all commands available in the current context that start with <i>string</i> .	
command ?	Displays the command's syntax and associated keywords.	
command keyword ?	List the associated arguments for keyword in command.	
string <tab> string<space></space></tab>	Complete a partial command name (auto-completion) or list available commands that match <i>string</i> .	

The **tree** and **tree detail** system commands are help commands useful when searching for a command in a lower-level context.

The following example displays a partial list of the **tree** and **tree detail** command output entered at the **config** level.

*A:ALA-12>config# tree	*A:ALA-12>config# tree detail	
configure	configure	
+card	+card <slot-number></slot-number>	
+card-type	no card <slot-number>]</slot-number>	
+mcm	+card-type <card-type></card-type>	
+mcm-type	no card-type	
+shutdown	+mda <mda-slot></mda-slot>	
+mda	no mda <mda-slot></mda-slot>	
+access	+access	
	resv-cbs <percent-or-sum></percent-or-sum>	
	slope-policy <name></name>	
+mda-type		
+network		
+egress		
	resv-cbs <percent-or-sum></percent-or-sum>	
+slope-policy		
	+mda-type <mda-type></mda-type>	
	no mda-type	
	+network	
+slope-policy	+egress	
+queue-policy		
+shutdown		
+shutdown		
+cflowd	resv-cbs <percent-or-sum></percent-or-sum>	
+active-timeout		
+cache-size		
+collector		
+aggregation		
+as-matrix		
+destination-prefix		
+protocol-port	resv-cbs <percent-or-sum></percent-or-sum>	
+source-destination-prefix	1 1 1 1 1 · 110 Stope-policy	
+source-prefix	•••	
+autonomous-system-type		
+description		
+shutdown		
+cron		
+action		
+expire-time		
+lifetime		
+max-completed		
+results		
+script		
+shutdown		
+schedule		
+scriedule +day-of-month		
+description +hour		
+interval		
•		
+minute		

The CLI Command Prompt

By default, the CLI command prompt indicates the device being accessed and the current CLI context. For example, the prompt: **A:ALA-1>config>router>if#** indicates the active context, the user is on the device with hostname ALA-1 in the **configure>router>interface** context. In the prompt, the separator used between contexts is the ">" symbol.

At the end of the prompt, there is either a pound sign ("#") or a dollar sign ("\$"). A "#" at the end of the prompt indicates the context is an existing context. A "\$" at the end of the prompt indicates the context has been newly created. New contexts are newly created for logical entities when the user first navigates into the context.

Since there can be a large number of sublevels in the CLI, the **environment** command **reduced-prompt** *no of nodes in prompt* allows the user to control the number of levels displayed in the prompt.

All special characters (#, \$, etc.) must be enclosed within double quotes, otherwise it is seen as a comment character and all characters on the command line following the # are ignored. For example:

*A:ALA-1>config>router# interface "primary#1"

When changes are made to the configuration file a "*" appears in the prompt string (*A:ALA-1) indicating that the changes have not been saved. When an admin save command is executed the "*" disappears. This behavior is controlled in the **saved-ind-prompt** command in the **environment** context.

Displaying Configuration Contexts

The info and info detail commands display configuration for the current level. The info command displays non-default configurations. The info detail command displays the entire configuration for the current level, including defaults. The following example shows the output that displays using the info command and the output that displays using the info detail command.

```
*A:ALA-1>config>router# interface system
*A:ALA-1>config>router>if# info
         address 10.10.0.1/32
*A:ALA-1>config>router>if#
*A:ALA-1>config>router>if# info detail
______
          address 10.10.10.103/32 broadcast host-ones
          no description
          no arp-timeout
          no allow-directed-broadcasts
          tos-marking-state trusted
          no local-proxy-arp
          no proxy-arp
             mask-reply
             redirects 100 10
             unreachables 100 10
             ttl-expired 100 10
          exit
          no mac
          no ntp-broadcast
          no cflowd
          no shutdown
*A:ALA-1>config>router>if#
```

EXEC Files

The exec command allows you to execute a text file of CLI commands as if it were typed at a console device.

The exec command and the associated exec files can be used to conveniently execute a number of commands that are always executed together in the same order. For example, an exec command can be used by a user to define a set of commonly used standard command aliases.

The echo command can be used within an exec command file to display messages on screen while the file executes.

Entering CLI Commands

Command Completion

The CLI supports both command abbreviation and command completion. If the keystrokes entered are enough to match a valid command, the CLI displays the remainder of the command syntax when the <Tab> key or space bar is pressed. When typing a command, the <Tab> key or space bar invokes auto-completion. If the keystrokes entered are definite, auto-completion will complete the command. If the letters are not sufficient to identify a specific command, pressing the <Tab> key or space bar will display commands matching the letters entered. System commands are available in all CLI context levels.

Unordered Parameters

In a given context, the CLI accepts command parameters in any order as long as the command is formatted in the proper command keyword and parameter syntax. Command completion will still work as long as enough recognizable characters of the command are entered.

The following output shows different **static-route** command syntax and an example of the command usage.

Editing Keystrokes

When entering a command, special keystrokes allow for editing of the command. Table 7 lists the command editing keystrokes.

Table 7: Command Editing Keystrokes

Editing Action	Keystrokes
Delete current character	<ctrl-d></ctrl-d>
Delete text up to cursor	<ctrl-u></ctrl-u>
Delete text after cursor	<ctrl-k></ctrl-k>
Move to beginning of line	<ctrl-a></ctrl-a>
Move to end of line	<ctrl-e></ctrl-e>
Get prior command from history	<ctrl-p></ctrl-p>
Get next command from history	<ctrl-n></ctrl-n>
Move cursor left	<ctrl-b></ctrl-b>
Move cursor right	<ctrl-f></ctrl-f>
Move back one word	<esc></esc>
Move forward one word	<esc><f></f></esc>
Convert rest of word to uppercase	<esc><c></c></esc>
Convert rest of word to lowercase	<esc><1></esc>
Delete remainder of word	<esc><d></d></esc>
Delete word up to cursor	<ctrl-w></ctrl-w>
Transpose current and previous character	<ctrl-t></ctrl-t>
Enter command and return to root prompt	<ctrl-z></ctrl-z>
Refresh input line	<ctrl-l></ctrl-l>

Absolute Paths

CLI commands can be executed in any context by specifying the full path from the CLI root. To execute an out-of-context command enter a forward slash "/" or backward slash "\" at the beginning of the command line. The forward slash "/" or backward slash "\" cannot be used with the **environment alias** command. The commands are interpreted as absolute path. Spaces between the slash and the first command will return an error. Commands that are already global (such as ping, telnet, exit, back, etc.) cannot be executed with a forward slash "/" or backward slash "\" at the beginning of the command line.

```
*A:ALA-12# configure router

*A:ALA-12>config>router# interface system address 1.2.3.4

*A:ALA-12>config>router# /admin save

*A:ALA-12>config>router# \clear router interface

*A:ALA-12>config>router#
```

The command may or may not change the current context depending on whether or not it is a leaf command. This is the same behavior the CLI performs when CLI commands are entered individually, for example:

```
*A:ALA-12# admin
*A:ALA-12>admin# save
Or
*A:ALA-12# admin save
*A:ALA-12#
```

Note that an absolute path command behaves the same as manually entering a series of command line instructions and parameters.

For example, beginning in an IES context service ID 4 (IES 4),

```
CLI Syntax: config>service>ies> /clear card 1
```

behaves the same as the following series of commands.

```
Example: config>service>ies>exit all
clear card 1
configure service ies 4 (returns you to your starting point)
config>service>ies
```

If the command takes you to a different context, the following occurs:

CLI Syntax: config>service>ies>/configure service ies 5 create

becomes

Example: config>service>ies>exit all

configure service vpls 5 create

config>service>vpls>

History

The CLI maintains a history of the most recently entered commands. The history command displays the most recently entered CLI commands.

```
*A:ALA-1# history
  1 environment terminal length 48
  2 environment no create
  3 show version
  4 configure port 1/1/1
  5 info
  6 \configure router isis
  7 \port 1/1/1
  8 con port 1/1/1
  9 \con port 1/1/1
  10 \configure router bgp
  11 info
 12 \configure system login-control
 13 info
 14 history
 15 show version
 16 history
*A:ALA-1# !3
*A:ALA-1# show version
TiMOS-B-0.0.12010 both/i386 ALCATEL SR 7750 Copyright (c) 2000-2008 Alcatel-Luce
All rights reserved. All use subject to applicable license agreements.
Built on Mon Oct 6 19:42:02 PDT 2008 by builder in /rel0.0/I2010/panos/main
A:ALA-48#
```

VI Editor

Note that "vi" sual editor (vi) is a file editor that can edit any ASCII file. This includes configuration, exec files, BOF and any other ASCII file on the system.

VT100 terminal mode is supported. However, if a different terminal mode is configured there will no noticeable negative effect.

When a configuration file is changed, a validation check is executed to see if the user is allowed to view or perform configuration changes. When a user is modifying the configuration file using the vi editor these checks do not occur. Because of this, the vi editor is only available to a user with administrator privileges. Should others require access to the vi editor, their profile must be modified allow the access. Access permission for the file directory where the file resides must be performed before a user can opens, read, or write a file processing command. If a user does not have permission to access the directory then the operation must be denied.

When opening a file, a resource check verifies that sufficient resources are available to process that file. If there are not enough resources, then the operation is denied and the operator is informed of that event.

Multiple sessions are allowed and are limited only by the memory resources available on the node.

Summary of vi Commands

The vi editor operates in two modes:

- Command mode This mode causes actions to be taken on the file.
 In the this mode, each character entered is a command that does something to the text file being edited; a character typed in the command mode may even cause the vi editor to enter the insert mode.
- Insert mode Entered text is inserted into the file.
 In the insert mode, every character typed is added to the text in the file. Hitting the Esc (Escape) key turns off the insert mode.

Using the vi Commands

Use the following commands to start and end vi edit sessions, move around in a file, enter new text, modify, move, and delete old text, as well as read from and write to files other files. Although there are numerous vi commands, only a few are usually sufficient to vi users. The following tables list vi commands.

- Cutting and Pasting/Deleting Text in vi on page 39
- Inserting New Text on page 40
- Moving the Cursor Within the File on page 40
- Moving the Cursor Around the Screen on page 42
- Replacing Text on page 42
- Searching for Text or Characters on page 43
- Manipulating Character/Line Formatting on page 44
- Saving and Quitting on page 44
- Miscellaneous on page 44

Table 8: Cutting and Pasting/Deleting Text in vi

vi Command	Description
"	Specify a buffer to be used any of the commands using buffers. Follow the "character with a letter or a number, which corresponds to a buffer.
d	Deletes text. "dd" deletes the current line. A count deletes that many lines. Whatever is deleted is placed into the buffer specified with the "command. If no buffer is specified, then the general buffer is used.
D	Delete to the end of the line from the current cursor position.
p	Paste the specified buffer after the current cursor position or line. If no buffer is specified (with the " command.) then 'p' uses the general buffer.
P	Paste the specified buffer before the current cursor position or line. If no buffer is specified (with the " command.) then ${\tt P}$ uses the general buffer.
x	Delete character under the cursor. A count tells how many characters to delete. The characters will be deleted after the cursor.
X	Delete the character before the cursor.

Table 8: Cutting and Pasting/Deleting Text in vi (Continued)

vi Command	Description
у	Yank text, putting the result into a buffer. yy yanks the current line. Entering a number yanks that many lines. The buffer can be specified with the "command. If no buffer is specified, then the general buffer is used.
Y	Yank the current line into the specified buffer. If no buffer is specified, then the general buffer is used.

Table 9: Inserting New Text

vi Command	Description
A	Append at the end of the current line.
I	Insert from the beginning of a line.
O	Enter insert mode in a new line above the current cursor position.
a	Enter insert mode, the characters typed in will be inserted after the current cursor position. A count inserts all the text that was inserted that many times.
i	Enter insert mode, the characters typed in will be inserted before the current cursor position. A count inserts all the text that was inserted that many times.
0	Enter insert mode in a new line below the current cursor position.

Table 10: Moving the Cursor Within the File

vi Command	Description
^B	Scroll backwards one page. A count scrolls that many pages.
^D	Scroll forwards half a window. A count scrolls that many lines.
^F	Scroll forwards one page. A count scrolls that many pages.
^H	Move the cursor one space to the left. A count moves that many spaces.
^J	Move the cursor down one line in the same column. A count moves that many lines down.
^M	Move to the first character on the next line.
^N	Move the cursor down one line in the same column. A count moves that many lines down.

Table 10: Moving the Cursor Within the File

vi Command	Description
^ P	Move the cursor up one line in the same column. A count moves that many lines up.
^U	Scroll backwards half a window. A count scrolls that many lines.
\$	Move the cursor to the end of the current line. A count moves to the end of the following lines.
%	Move the cursor to the matching parenthesis or brace.
^	Move the cursor to the first non-whitespace character.
(Move the cursor to the beginning of a sentence.
)	Move the cursor to the beginning of the next sentence.
{	Move the cursor to the preceding paragraph.
}	Move the cursor to the next paragraph.
	Move the cursor to the column specified by the count.
+	Move the cursor to the first non-whitespace character in the next line.
-	Move the cursor to the first non-whitespace character in the previous line.
_	Move the cursor to the first non-whitespace character in the current line.
0	Move the cursor to the first column of the current line.
В	Move the cursor back one word, skipping over punctuation.
E	Move forward to the end of a word, skipping over punctuation.
G	Go to the line number specified as the count. If no count is given, then go to the end of the file.
Н	Move the cursor to the first non-whitespace character on the top of the screen.
L	Move the cursor to the first non-whitespace character on the bottom of the screen.
M	Move the cursor to the first non-whitespace character on the middle of the screen.
W	Move forward to the beginning of a word, skipping over punctuation.
b	Move the cursor back one word. If the cursor is in the middle of a word, move the cursor to the first character of that word.

Table 10: Moving the Cursor Within the File

vi Command	Description
e	Move the cursor forward one word. If the cursor is in the middle of a word, move the cursor to the last character of that word.
h	Move the cursor to the left one character position.
j	Move the cursor down one line.
k	Move the cursor up one line.
1	Move the cursor to the right one character position.
W	Move the cursor forward one word. If the cursor is in the middle of a word, move the cursor to the first character of the next word.

Table 11: Moving the Cursor Around the Screen

vi Command	Description
^E	Scroll forwards one line. A count scrolls that many lines.
^Y	Scroll backwards one line. A count scrolls that many lines.
z	Redraw the screen with the following options. z <return> puts the current line on the top of the screen; z. puts the current line on the center of the screen; and z- puts the current line on the bottom of the screen. If you specify a count before the z command, it changes the current line to the line specified. For example, 16z. puts line 16 on the center of the screen.</return>

Table 12: Replacing Text

vi Command	Description
С	Change to the end of the line from the current cursor position.
R	Replace characters on the screen with a set of characters entered, ending with the Escape key.
S	Change an entire line.
c	Change until . cc changes the current line. A count changes that many lines.
r	Replace one character under the cursor. Specify a count to replace a number of characters.

Table 12: Replacing Text

vi Comman	d Description (Continued)
S	Substitute one character under the cursor, and go into insert mode. Specify a count to substitute a number of characters. A dollar sign (\$) will be put at the last character to be substituted.

Table 13: Searching for Text or Characters

vi Command	Description
,	Repeat the last f, F, t or T command in the reverse direction.
/	Search the file downwards for the string specified after the /.
;	Repeat the last f, F, t or T command.
?	Search the file upwards for the string specified after the ?.
F	Search the current line backwards for the character specified after the 'F' command. If found, move the cursor to the position.
N	Repeat the last search given by / or ?, except in the reverse direction.
T	Search the current line backwards for the character specified after the T command, and move to the column after the if it's found.
f	Search the current line for the character specified after the f command. If found, move the cursor to the position.
n	Repeat last search given by / or ?.
t	Search the current line for the character specified after the t command, and move to the column before the character if it's found.

Table 14: Manipulating Character/Line Formatting

vi Command	Description
~	Switch the case of the character under the cursor.
<	Shift the lines up to where to the left by one shiftwidth. << shifts the current line to the left, and can be specified with a count.
>	Shift the lines up to where to the right by one shiftwidth. >> shifts the current line to the right, and can be specified with a count.
J	Join the current line with the next one. A count joins that many lines.

Table 15: Saving and Quitting

vi Command	Description
ZZ	Exit the editor, saving if any changes were made.

Table 16: Miscellaneous

vi Command	Description	
^G	Show the current filename and the status.	
^L	Clear and redraw the screen.	
^R	Redraw the screen removing false lines.	
^[Escape key. Cancels partially formed command.	
^^	Go back to the last file edited.	
!	Execute a shell. Not supported	
&	Repeat the previous :s command.	
	Repeat the last command that modified the file.	
:	Begin typing an EX editor command. The command is executed once the user types return.	
@	Type the command stored in the specified buffer.	
U	Restore the current line to the previous state before the cursor entered the line.	
m	Mark the current position with the character specified after the 'm' command.	
u	Undo the last change to the file. Typing 'u' again will re-do the change.	

EX Commands

The vi editor is built upon another editor, called EX. The EX editor only edits by line. From the vi editor you use the : command to start entering an EX command. This list given here is not complete, but the commands given are the more commonly used. If more than one line is to be modified by certain commands (such as :s and :w) the range must be specified before the command. For example, to substitute lines 3 through 15, the command is :3,15s/from/this/g.

Table 17: EX commands

vi Command	Description
:ab string strings	Abbreviation. If a word is typed in vi corresponding to string1, the editor automatically inserts the corresponding words. For example, the abbreviation :ab usa United States of America would insert the words, United States of America whenever the word usa is typed in.
:map keys new_seq	Mapping. This lets you map a key or a sequence of keys to another key or a sequence of keys.
:q	Quit vi. If there have been changes made, the editor will issue a warning message.
:q!	Quit vi without saving changes.
:s/pattern/ to_pattern/ options	Substitute. This substitutes the specified pattern with the string in the to_pattern. Without options, it only substitutes the first occurence of the pattern. If a 'g' is specified, then all occurences are substituted. For example, the command :1,\$s/Alcatel/Alcatel-Lucent/g substitutes all occurences of Alcatel to Alcatel-Lucent.
:set [all]	Sets some customizing options to vi and EX. The :set all command gives all the possible options.
:una string	Removes the abbreviation previously defined by :ab.
:unm keys	Removes the remove mapping defined by :map.
:vi filename	Starts editing a new file. If changes have not been saved, the editor will give you a warning.
:w	Write out the current file.
:w filename	Write the buffer to the filename specified.
:w >> filename	Append the contents of the buffer to the filename.
:wq	Write the buffer and quit.

Entering Numerical Ranges

The 7750 SR OS CLI allows the use of a single numerical range as an argument in the command line. A range in a CLI command is limited to positive integers and is denoted with two numbers enclosed in square brackets with two periods ("..") between the numbers:

[x..y]

where x and y are positive integers and y-x is less than 1000.

For example, it is possible to shut down ports 1 through 10 in Slot 1 on MDA 1. A port is denoted with "*slot/mda/port*", where *slot* is the slot number, *mda* is the MDA number and *port* is the port number. To shut down ports 1 through 10 on Slot 1 and MDA 1, the command is entered as follows:

configure port 1/1/[1..10] shutdown

<Ctrl-C> can be used to abort the execution of a range command.

Specifying a range in the CLI does have limitations. These limitations are summarized in Table 18.

Table 18: CLI Range Use Limitations

Limitation	Description
Only a single range can be specified.	It is not possible to shut down ports 1 through 10 on MDA 1 and MDA 2, as the command would look like configure port 1/[12]/[110] and requires two ranges in the command, [12] for the MDA and [110] for the port number.
Ranges within quotation marks are interpreted literally.	In the CLI, enclosing a string in quotation marks ("string") causes the string to be treated literally and as a single parameter. For example, several commands in the CLI allow the configuration of a descriptive string. If the string is more than one word and includes spaces, it must be enclosed in quotation marks. A range that is enclosed in quotes is also treated literally. For example, configure router interface "A[110]" no shutdown creates a single router interface with the name "A[110]". However, a command such as: configure router interface A[110] no shutdown creates 10 interfaces with names A1, A2 A10.

Table 18: CLI Range Use Limitations (Continued)

Limitation	Description
The range cannot cause a change in contexts.	Commands should be formed in such a way that there is no context change upon command completion. For example, configure port 1/1/[110] will attempt to change ten different contexts. When a range is specified in the CLI, the commands are executed in a loop. On the first loop execution, the command changes contexts, but the new context is no longer valid for the second iteration of the range loop. A "Bad Command" error is reported and the command aborts.
Command completion may cease to work when entering a range.	After entering a range in a CLI command, command and key completion, which normally occurs by pressing the <tab> or spacebar, may cease to work. If the command line entered is correct and unambiguous, the command works properly; otherwise, an error is returned.</tab>

Pipe/Match

The 7750 SR OS supports the pipe feature to search one or more files for a given character string or pattern.

Note: When using the pipe/match command the variables and attributes must be spelled correctly. The attributes following the command and must come before the expression/pattern. The following displays examples of the pipe/match command to complete different tasks:

• Task: Capture all the lines that include "echo" and redirect the output to a file on the compact flash:

```
admin display-config | match "echo" > cf3:\echo_list.txt
```

• Task: Display all the lines that do not include "echo":

```
admin display-config | match invert-match "echo"
```

• Task: Display the first match of "vpls" in the configuration file:

```
admin display-config | match max-count 1 "vpls"
```

Command syntax:

```
match [ignore-case] [invert-match] [post-lines num-lines] [max-count
num-matches] [expression] pattern
```

where:

ignore-case keyword invert-match keyword

num-lines 1 - 2147483647num-matches 1 - 2147483647

expression keyword

pattern string or regular expression

For example:

state: up"

```
A:Dut-C# show log log-id 98 | match ignore-case "sdp bind"

"Status of SDP Bind 101:1002 in service 1001 (customer 1) changed to admin=up oper=up flags="

"Processing of a SDP state change event is finished and the status of all affected SDP Bindings on SDP 101 has been updated."

A:Dut-C# show log log-id 98 | match max-count 1 "service 1001"

"Status of service 1001 (customer 1) changed to administrative state: up, operational
```

Table 19 describes regular expression symbols and interpretation (similar to what is used for route policy regexp matching). Table 20 describes special characters.

Table 19: Regular Expression Symbols

String	Description
•	Matches any single character.
[]	Matches a single character that is contained within the brackets. [abc] matches "a", "b", or "c". [a-z] matches any lowercase letter. [A-Z] matches any uppercase letter. [0-9] matches any number.
[^]	Matches a single character that is not contained within the brackets. [^abc] matches any character other than "a", "b", or "c". [^a-z] matches any single character that is not a lowercase letter.
^	Matches the start of the line (or any line, when applied in multiline mode)
\$	Matches the end of the line (or any line, when applied in multiline mode)
()	Define a "marked subexpression". Every matched instance will be available to the next command as a variable.
*	A single character expression followed by "*" matches zero or more copies of the expression.
$\{m,n\}$	Matches least m and at most n repetitions of the term
{ m }	Matches exactly m repetitions of the term
{m,}	Matches m or more repetitions of the term
?	The preceding item is optional and matched at most once.
+	The preceding item is matched one or more times.
-	Used between start and end of a range.

Table 19: Regular Expression Symbols (Continued)

String Description

An escape character to indicate that the following character is a match criteria and not a grouping delimiter.

> Redirect output

Table 20: Special Characters

Options	Similar to	Description
[:upper:]	[A-Z]	uppercase letters
[:lower:]	[a-z]	Names Min
[:alpha:]	[A-Za-z]	upper- and lowercase letters
\w	[A-Za-z_]	word characters
[:alnum:]	[A-Za-z0-9]	digits, upper- and lowercase letters
[:digit:]	[0-9]	digits
\d	[0-9]	digits
[:xdigit:]	[0-9A-Fa-f]	hexadecimal digits
[:punct:]	[.,!?:]	punctuation
[:blank:]	[\t]	space and TAB
[:space:]	$[\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	blank characters
\s	$[\t \n\r\f\v]$	blank characters

Redirection

The 7750 SR OS supports redirection (">") which allows the operator to store the output of a CLI command as a local or remote file. Redirection of output can be used to automatically store results of commands in files (both local and remote).

```
'ping <customer_ip> > cf3:/ping/result.txt'
'ping <customer_ip> > ftp://ron@ftp.alcatel.com/ping/result.txt'
```

In some cases only part of the output might be applicable. The pipe/match and redirection commands can be combined:

```
ping 10.0.0.1 | match expression "time.\d+" > cf3:/ping/time.txt
```

This records only the RTT portion (including the word "time").

Basic Command Reference

Command Hierarchies

- Basic CLI Commands
- Environment Commands
- Monitor Commands

Basic CLI Commands

— back — clear — echo [text-to-echo] [extra-text-to-echo] [more-text] — enable-admin — exec [-echo] [-syntax] filename — exit [all] — help — history - info [detail] — logout — **mrinfo** [ip-address | dns-name] [**router** router-instance] — mstat source [ip-address | dns-name] [group grp-ip-address] [destination dst-ip-address] [hop hop] [router router-instance] [wait-time wait-time] — mtrace source [ip-address | dns-name] [group grp-ip-address] [destination dst-ip-address] [hop *hop*] [router router-instance] [wait-time wait-time] — password — ping {ip-address | dns-name} [rapid | detail] [ttl time-to-live] [tos type-of-service] [size bytes] [pattern pattern] [source ip-address] [interval seconds] [{next-hop ip-address}] | {interface interface out] — pwc [previous] — sleep [seconds] — ssh [ip-addr | dns-name | username@ip-addr] [-l username] [-v SSH-version] [router router-instance **service-name** *service-name*] — **telnet** [ip-address| dns-name] [port] [**router** router-instance] — traceroute {ip-address | dns-name}[ttl value] [wait milliseconds] [no-dns] [source ip-address] [tos *type-of-service*] - tree [detail] — write {user | broadcast} message-string

Monitor Commands

```
monitor
         ccag ccag-id [path {a | b}] [type {sap-sap | sap-net | net-sap}] [interval seconds] [repeat repeat]
         [absolute | rate]

    cpm-filter

               — ip entry entry-id [interval seconds] [repeat repeat] [absolute | rate]
     — filter
                — ip ip-filter-id entry entry-id [interval seconds] [repeat repeat] [absolute | rate]
               — ipv6 ipv6-filter-id entry entry-id [interval seconds] [repeat repeat] [absolute | rate]
               — mac mac-filter-id entry entry-id [interval seconds] [repeat repeat] [absolute | rate]
     — lag lag-id [lag-id...(up to 5 max)] [interval seconds] [repeat repeat] [absolute | rate]
     — port port-id [port-id...(up to 5 max)] [interval seconds] [repeat repeat] [absolute | rate]
     — port atm [interval seconds] [repeat repeat] [absolute|rate]
     - qos

    arbiter-stats

                         — sap sap-id [arbiter name | root] [ingress | egress] [interval seconds] [repeat
                             repeat [absolute | rate]
                         — subscriber sub-ident-string [arbiter name | root] [ingress | egress] [interval sec-
                             onds] [repeat repeat] [absolute | rate]

    scheduler-stats

                         — customer customer-id site customer-site-name [scheduler scheduler-name]
                             [ingress | egress] [interval seconds] [repeat repeat] [absolute | rate]
                         — sap sap-id [scheduler scheduler-name] [ingress | egress] [interval seconds]
                             [repeat repeat] [absolute | rate]
                         — subscriber sub-ident-string [scheduler scheduler-name] [ingress | egress] [inter-
                             val seconds [repeat repeat] [absolute | rate]
     — router [router-instance]
               — bgp
                         — neighbor ip-address [ip-address...(up to 5 max)] [interval seconds] [repeat
                             repeat] [absolute | rate]
               — isis
                          — statistics [interval seconds] [repeat repeat] [absolute | rate]
               — ldp
                         — session ldp-id [ldp-id...(up to 5 max)] [interval seconds] [repeat repeat] [absolute
                             | rate]
                          statistics [interval seconds] [repeat repeat] [absolute | rate]
               — mpls
                         — interface interface [interface...(up to 5 max)] [interval seconds] [repeat repeat]
                             [absolute | rate]
                         — lsp-egress-statistics lsp-name [interval seconds] [repeat repeat] [absolute]
                         — lsp-ingress-statistics ip-address lsp lsp-name [interval seconds] [repeat repeat]
                             [absolute | rate]
               — ospf [ospf-instance]
               — ospf3
                         — interface interface [interface...(up to 5 max)][interval seconds] [repeat repeat]
                             [absolute | rate]
                         — neighbor ip-address [ip-address...(up to 5 max)] [interval seconds] [repeat
                             repeat] [absolute | rate]
                         — virtual-link nbr-rtr-id area area-id [interval seconds] [repeat repeat] [absolute
                         — virtual-neighbor nbr-rtr-id area area-id [interval seconds] [repeat repeat]
                             [absolute | rate]
               — ospf3
```

```
— neighbor [router-id] [interface-name] [interval seconds] [repeat repeat] [abso-
                      lute | rate]
         — pim
                   — group grp-ip-address [source ip-address] [interval seconds] [repeat repeat]
                      [absolute | rate]
                   — neighbor neighbor [neighbor...(up to 5 max)] [interval seconds] [repeat repeat]
                      [absolute | rate]
                   — interface interface [interface...(up to 5 max)][interval seconds] [repeat repeat]
                      [absolute | rate]
         — vrrp
                   — instance interface interface-name vr-id virtual-router-id [interval seconds]
                      [repeat repeat] [absolute | rate]
- service
         — id service-id
                   — sap sap-id [interval seconds] [repeat repeat] [absolute | rate]
                   — sdp sdp-id [far-end] ip-address [interval seconds] [repeat repeat] [absolute |
         — subscriber sub-ident-string sap sap-id sla-profile sla-profile-name [base | ingress-queue-
             id ingress-queue-id | egress-queue-id | [interval seconds] [repeat repeat]
             [absolute | rate]
```

Environment Commands

Basic CLI Commands

Global Commands

enable-admin

Syntax enable-admin

Context <global>

Description

NOTE: See the description for the **admin-password** command. If the **admin-password** is configured in the **config>system>security>password** context, then any user can enter a special administrative mode by entering the **enable-admin** command.

enable-admin is in the default profile. By default, all users are given access to this command.

Once the **enable-admin** command is entered, the user is prompted for a password. If the password matches, the user is given unrestricted access to all the commands.

The minimum length of the password is determined by the **minimum-length** command. The complexity requirements for the password is determined by the **complexity** command.

The following displays a password configuration example:

```
A:ALA-1>config>system>security# info

...

password
aging 365
minimum-length 8
attempts 5 time 5 lockout 20
admin-password "rUYUz9XMo6I" hash
exit
...

A:ALA-1>config>system>security#
```

There are two ways to verify that a user is in the enable-admin mode:

- show users Administrator can know which users are in this mode.
- Enter the enable-admin command again at the root prompt and an error message will be returned.

A:ALA-1# show users

User Type From Login time Idle time

admin Console -- 10AUG2006 13:55:24 0d 19:42:22
admin Telnet 10.20.30.93 09AUG2004 08:35:23 0d 00:00:00 A

Number of users : 2
'A' indicates user is in admin mode

A:ALA-1#

A:ALA-1#

A:ALA-1# enable-admin

MINOR: CLI Already in admin mode.

A:ALA-1#

back

Syntax back

Context <GLOBAL>

Description This command moves the context back one level of the command hierarchy. For example, if the cur-

rent level is the config router ospfcontext, the back command moves the cursor to the config router

context level.

clear

Syntax clear

Context <GLOBAL>

Description This command clears statistics for a specified entity or clears and resets the entity.

Parameters card — Reinitializes a I/O module in the specified slot.

cflowd — Clears cflowd.

cpm-filter — Clears IP filter entry IDs.

cron — Clears CRON history.

filter — Clears IP, MAC, and log filter counters.

lag — Clears LAG-related entities.

log — Closes and reinitializes the log specified by log-id.

mda — Reinitializes the specified MDA in a particular slot.

port — Clears port statistics.

qos — Clears QoS statistics.

radius — Clears the RADIUS server state.

router — Clears router commands affecting the router instance in which they are entered.

Values arp, authentication, bgp, bfd, dhcp, dhcp6, forwarding-table, icmp-redirect-

route,icmp6, igmp, interface, isis, ldp, mpls, neighbor, ospf, ospf3, pim, rip, router-

advertisement, rsvp

saa — Clears the SAA test results.

screen — Clears the console or telnet screen.

service — Clears service ID and statistical entities.

subscriber-mgmt — Clears subscriber management data.

system — Clears (re-enables) a previously failed reference.

tacplus — Clears the TACACS+ server state.

trace — Clears the trace log.

vrrp — Clears and resets the VRRP interface and statistical entities.

echo

Syntax echo [text-to-echo] [extra-text-to-echo] [more-text]

Context <GLOBAL>

Description This command echoes arguments on the command line. The primary use of this command is to allow

messages to be displayed to the screen in files executed with the exec command.

Parameters *text-to-echo* — Specifies a text string to be echoed up to 256 characters.

extra-text-to-echo — Specifies more text to be echoed up to 256 characters.

more-text — Specifies more text to be echoed up to 256 characters.

exec

Syntax exec [-echo] [-syntax] {filename | <<[eof_string]}

Context <GLOBAL>

Description This command executes the contents of a text file as if they were CLI commands entered at the con-

sole.

Exec commands do not have **no** versions.

Parameters -echo — Echo the contents of the exec file to the session screen as it executes.

Default Echo disabled.

-syntax — Perform a syntax check of the file without executing the commands. Syntax checking will be able to find invalid commands and keywords, but it will not be able to validate erroneous usersupplied parameters.

Default Execute file commands.

filename — The text file with CLI commands to execute.

Stdin can be used as the source of commands for the exec command. When stdin is used as the exec command input, the command list is terminated with <Ctrl-C>, "EOF<Return>" or "eof string<Return>".

If an error occurs entering an exec file sourced from stdin, all commands after the command returning the error will be silently ignored. The exec command will indicate the command error line number when the stdin input is terminated with an end-of-file input.

eof_string — The ASCII printable string used to indicate the end of the exec file when stdin is used as the exec file source. <Ctrl-C> and "EOF" can always be used to terminate an exec file sourced from stdin.

Default <Ctrl-C>, EOF

Related Commands

boot-bad-exec command on page 321 — Use this command to configure a URL for a CLI script to exec following a failed configuration boot.

boot-good-exec command on page 321 — Use this command to configure a URL for a CLI script to exec following a successful configuration boot.

exit

Syntax exit [all]

Context <GLOBAL>

Description

This command returns to the context from which the current level was entered. For example, if you navigated to the current level on a context by context basis, then the **exit** command only moves the cursor back one level.

```
A:ALA-1# configure
A:ALA-1>config# router
A:ALA-1>config>router# ospf
A:ALA-1>config>router>ospf# exit
A:ALA-1>config>router# exit
A:ALA-1>config# exit
```

If you navigated to the current level by entering a command string, then the **exit** command returns the cursor to the context in which the command was initially entered.

```
A:ALA-1# configure router ospf
A:ALA-1>config>router>ospf# exit
A:ALA-1#

The exit all command moves the cursor all the way back to the root level.

A:ALA-1# configure
A:ALA-1>config# router
A:ALA-1>config>router# ospf
A:ALA-1>config>router# ospf
A:ALA-1>config>router>ospf# exit all
A:ALA-1#
```

Parameters all — Exits back to the root CLI context.

help

Syntax help

help edit help global

help special-characters

<GLOBAL>

Description

This command provides a brief description of the help system. The following information displays:

Help may be requested at any point by hitting a question mark '?'.

In case of an executable node, the syntax for that node will be displayed with an explanation of all parameters.

In case of sub-commands, a brief description is provided.

Global Commands:

Help on global commands can be observed by issuing "help globals" at any time. Editing Commands:

Help on editing commands can be observed by issuing "help edit" at any time.

Parameters

help — Displays a brief description of the help system.

help edit — Displays help on editing.

Available editing keystrokes:

Delete current characterCtrl-d
Delete text up to cursorCtrl-u
Delete text after cursorCtrl-k
Move to beginning of lineCtrl-a
Move to end of lineCtrl-e
Get prior command from historyCtrl-p
Get next command from historyCtrl-n
Move cursor leftCtrl-b
Move cursor rightCtrl-f
Move back one wordEsc-b
Move forward one wordEsc-f
Convert rest of word to uppercaseEsc-c
Convert rest of word to lowercaseEsc-l
Delete remainder of wordEsc-d
Delete word up to cursorCtrl-w
Transpose current and previous characterCtrl-t
Enter command and return to root promptCtrl-z
Refresh input lineCtrl-l

help global — Displays help on global commands.

Available global commands:

```
back
               - Go back a level in the command tree
echo
               - Echo the text that is typed in
               - Execute a file - use -echo to show the commands and
exec
                prompts on the screen
exit
               - Exit to intermediate mode - use option all to exit to
                root prompt
help
               - Display help
help
history
               - Show command history
               - Display configuration for the present node
info
```

```
logout - Log off this system
oam + OAM Test Suite
ping - Verify the reachability of a remote host
pwc - Show the present working context
sleep - Sleep for specified number of seconds
ssh - SSH to a host
telnet - Telnet to a host
traceroute - Determine the route to a destination address
tree - Display command tree structure from the context of
execution
write - Write text to another user
```

help special-characters — Displays help on special characters.

Use the following CLI commands to display more information about commands and command syntax:

? — Lists all commands in the current context.

string? — Lists all commands available in the current context that start with the string.

command? — Display command's syntax and associated keywords.

string<Tab> or **string<Space>** — Complete a partial command name (auto-completion) or list available commands that match the string.

history

Syntax history

Context <GLOBAL>

Description

This command lists the last 30 commands entered in this session.

Re-execute a command in the history with the !n command, where n is the line number associated with the command in the history output.

For example:

```
A:ALA-1# history
  68 info
  69 exit
  70 info
  71 filter
  72 exit all
  73 configure
  74 router
  75 info
  76 interface "test"
  77 exit
  78 reduced-prompt
  79 info
  80 interface "test"
  81 icmp unreachables exit all
  82 exit all
  83 reduced-prompt
  84 configure router
  85 interface
  86 info
  87 interface "test"
```

```
88 info
89 reduced-prompt
90 exit all
91 configure
92 card 1
93 card-type
94 exit
95 router
96 exit
97 history
A:ALA-1# !91
A:ALA-1# configure
A:ALA-1>config#
```

info

Syntax info [detail]

Context <GLOBAL>

Description

This command displays the running configuration for the configuration context.

The output of this command is similar to the output of a **show config** command. This command, however, lists the configuration of the context where it is entered and all branches below that context level.

By default, the command only enters the configuration parameters that vary from the default values. The **detail** keyword causes all configuration parameters to be displayed.

For example,

```
A:ALA-48>config>router>mpls# info
          admin-group "green" 15
           admin-group "red" 25
           admin-group "yellow" 20
           interface "system"
           exit
           interface "to-104"
               admin-group "green"
               admin-group "red"
               admin-group "yellow"
               label-map 35
                  swap 36 nexthop 10.10.10.91
                   no shutdown
               exit
           exit
           path "secondary-path"
               hop 1 10.10.0.111 strict
               hop 2 10.10.0.222 strict
               hop 3 10.10.0.123 strict
               no shutdown
           exit
           path "to-NYC"
               hop 1 10.10.10.104 strict
               hop 2 10.10.0.210 strict
               no shutdown
           exit
           path "to-104"
```

```
no shutdown
           exit
           lsp "to-104"
               to 10.10.10.104
               from 10.10.10.103
               rsvp-resv-style ff
               cspf
_____
A:ALA-48>config>router>mpls#
A:ALA-48>config>router>mpls# info detail
          frr-object
           no resignal-timer
           admin-group "green" 15
           admin-group "red" 25
           admin-group "yellow" 20
           interface "system"
              no admin-group
              no shutdown
           exit
           interface "to-104"
               admin-group "green"
               admin-group "red"
               admin-group "yellow"
               label-map 35
                  swap 36 nexthop 10.10.10.91
                  no shutdown
               exit.
               no shutdown
           path "secondary-path"
               hop 1 10.10.0.111 strict
               hop 2 10.10.0.222 strict
               hop 3 10.10.0.123 strict
               no shutdown
           exit
           path "to-NYC"
               hop 1 10.10.10.104 strict
               hop 2 10.10.0.210 strict
               no shutdown
           exit
           path "to-104"
              no shutdown
           lsp "to-104"
               to 10.10.10.104
               from 10.10.10.103
               rsvp-resv-style ff
               adaptive
               cspf
               include "red"
               exclude "green"
               adspec
               fast-reroute one-to-one
                  no bandwidth
                  no hop-limit
                  node-protect
               exit
               hop-limit 10
               retry-limit 0
```

```
retry-timer 30
               secondary "secondary-path"
                   no standby
                   no hop-limit
                   adaptive
                   no include
                   no exclude
                   record
                   record-label
                   bandwidth 50000
                   no shutdown
               primary "to-NYC"
                   hop-limit 50
                   adaptive
                   no include
                   no exclude
                   record
                   record-label
                   no bandwidth
                   no shutdown
                exit
               no shutdown
           exit
A:ALA-48>config>router>mpls#
```

Parameters

detail — Displays all configuration parameters including parameters at their default values.

logout

Syntax logout

Context <GLOBAL>

Description This command logs out of the router session.

> When the logout command is issued from the console, the login prompt is displayed, and any log IDs directed to the console are discarded. When the console session resumes (regardless of the user), the log output to the console resumes.

When a Telnet session is terminated from a **logout** command, all log IDs directed to the session are removed. When a user logs back in, the log IDs must be re-created.

mrinfo

Syntax mrinfo [ip-address | dns-name] [router router-instance]

<GLOBAL> Context

Description This command is used to print relevant multicast information from the target multicast router. Infor-

mation displayed includes adjacency information, protocol, metrics, thresholds, and flags from the

target multicast route

Parameters *ip-address* — Specify the ip-address of the multicast capable target router.

dns-name — Specify the DNS name (if DNS name resolution is configured).

Values 63 characters maximum

router *router-instance* — Specify the router name or service ID.

Values *router-name*: Base, management

service-id: 1 — 2147483647

Default Base

mstat

Syntax mstat source [ip-address | dns-name] [group grp-ip-address] [destination dst-ip-address]

[hop hop] [router router-instance] [wait-time wait-time]

Context <GLOBAL>

Description This command traces a multicast path from a source to a receiver and displays multicast packet rate

and loss information.

Parameters source *ip-address* — Specify the IP address of the multicast-capable source.

ip-address — Specify the ip-address of the multicast capable target router.

dns-name — Specify the DNS name (if DNS name resolution is configured).

Values 63 characters maximum

group group-ip-address — Specify the multicast address of the group to be displayed.

destination *dst-ip-address* — Specify the unicast destination address.

hop count — Specify the maximum number of hops that will be traced from the receiver back

toward the source.

Values 1 — 255

Default 32 hops (infinity for the DVMRP routing protocol).

router *router-instance* — Specify the router name or service ID.

Values *router-name*: Base, management

service-id: 1 — 2147483647

Default Base

wait-time wait-time — Specify the number of seconds to wait for the response.

Values 1 — 60

mtrace

Syntax mtrace source [ip-address | dns-name] [group grp-ip-address] [destination dst-ip-

address] [hop hop] [router router-instance] [wait-time wait-time]

Context <GLOBAL>

Description This command traces a multicast path from a source to a receiver.

Parameters *ip-address* — Specify the ip-address of the multicast capable target router.

dns-name — Specify the DNS name (if DNS name resolution is configured).

Values 63 characters maximum

group *group-ip-address* — Specify the multicast address or DNS name of the group that resolves to the multicast group address that will be used. If the group is not specified, address 224.2.0.1 (the MBone audio) will be used. This will suffice if packet loss statistics for a particular multicast group are not needed.

destination *dst-p-address* — Specify either the IP address or the DNS name of the unicast destination. If this parameter is omitted the IP address of the system where the command is entered will be used. The receiver parameter can also be used to specify a local interface address as the destination address for sending the trace query. The response will also be returned to the address specified as the receiver.

hop — Specify the maximum number of hops that will be traced from the receiver back toward the source.

Values 1 — 255

Default 32 hops (infinity for the DVMRP routing protocol).

router-instance — Specify the router name or service ID.

Values router-name: Base, management

service-id: 1 — 2147483647

Default Base

wait-time wait-time — Specify the number of seconds to wait for the response.

Values 1 — 60

password

Syntax password

Context <ROOT>

Description This command changes a user CLI login password.

When a user logs in after the administrator forces a **new-password-at-login**, or the password has expired (**aging**), then this command is automatically invoked.

When invoked, the user is prompted to enter the old password, the new password, and then the new password again to verify the correct input.

If a user fails to create a new password after the administrator forces a **new-password-at-login** or after the password has expired, the user is not allowed access to the CLI.

ping

Syntax ping {ip-address | ipv6-address | dns-name} [rapid | detail] [ttl time-to-live] [tos type-of-

service] [size bytes] [pattern pattern] [source ip-address] [interval seconds] [{next-hop ip-address} | {interface interface-name} | bypass-routing] [count requests] [do-not-fragment] [router [router-instance] [timeout timeout]

Context <GLOBAL>

Description This command is the TCP/IP utility to verify IP reachability.

Parameters *ip-address* | *dns-name* — The remote host to ping. The IP address or the DNS name (if DNS name resolution is configured) can be specified.

ipv6-address — The IPv6 IP address.

```
Values x:x:x:x:x:x:x: (eight 16-bit pieces) x:x:x:x:x:x:d.d.d.d x: 0 — FFFF H d: 0 — 255 D
```

rapid | detail — The rapid parameter specifies to send ping requests rapidly. The results are reported in a single message, not in individual messages for each ping request. By default, five ping requests are sent before the results are reported. To change the number of requests, include the count option.

The detail parameter includes in the output the interface on which the ping reply was received.

Example output:

```
A:ALA-1# ping 192.168.xx.xx4 detail
PING 192.168.xx.xx4: 56 data bytes
64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=0 ttl=64 time=0.000 ms.
64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=1 ttl=64 time=0.000 ms.
64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=2 ttl=64 time=0.000 ms.
64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=3 ttl=64 time=0.000 ms.
64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=4 ttl=64 time=0.000 ms.
64 bytes from 192.168.xx.xx4 via fei0: icmp_seq=4 ttl=64 time=0.000 ms.
65 packets transmitted, 5 packets received, 0.00% packet loss round-trip min/avg/max/stddev = 0.000/0.000/0.000/0.000 ms

A:ALA-1#
```

ttl *time-to-live* — The IP Time To Live (TTL) value to include in the ping request, expressed as a decimal integer.

```
Values 0 - 128
```

tos *type-of-service* — The type-of-service (TOS) bits in the IP header of the ping packets, expressed as a decimal integer.

```
Values 0 — 255
```

size bytes — The size in bytes of the ping request packets.

Default 56 bytes (actually 64 bytes because 8 bytes of ICMP header data are added to the

packet)

Values 0 - 65507

pattern pattern — A 16-bit pattern string to include in the ping packet, expressed as a decimal integer.

Values 0 - 65535

source *ip-address* — The source IP address to use in the ping requests in dotted decimal notation.

Default The IP address of the egress IP interface.

Values 0.0.0.0 - 255.255.255.255

interval seconds — The interval in seconds between consecutive ping requests, expressed as a decimal integer.

Default

Values 1 - 10000

next-hop *ip-address* — This option disregards the routing table and will send this packet to the specified next hop address. This address must be on an adjacent router that is attached to a subnet that is common between this and the next-hop router.

Default Per the routing table.

Values A valid IP next hop IP address.

interface *interface-name* — Specify the interface name.

bypass-routing — Send the ping request to a host on a directly attached network bypassing the routing table. The host must be on a directly attached network or an error is returned.

count requests — The number of ping requests to send to the remote host, expressed as a decimal integer.

Default 5

Values 1 - 10000

do-not-fragment — Specifies that the request frame should not be fragmented. This option is particularly useful in combination with the size parameter for maximum MTU determination.

router *router-instance* — Specify the router name or service ID.

Default Base

Values router-name: Base, management

> 1 - 2147483647service-id:

timeout — Specify the timeout in seconds.

Default

1 - 10Values

pwc

Syntax pwc [previous]

Context <GLOBAL>

Description

This command displays the present or previous working context of the CLI session. The **pwc** command provides a user who is in the process of dynamically configuring a chassis a way to display the current or previous working context of the CLI session. The **pwc** command displays a list of the CLI nodes that hierarchically define the current context of the CLI instance of the user. For example,

A:ALA-1>config>router>bgp>group#

For example,

When the **previous** keyword is specified, the previous context displays. This is the context entered by the CLI parser upon execution of the **exit** command. The current context of the CLI is not affected by the **pwc** command.

For example,

Parameters

previous — Specifies to display the previous present working context.

sleep

Syntax sleep [seconds]

Context <GLOBAL>

Description This command causes the console session to pause operation (sleep) for 1 second (default) or for the

specified number of seconds.

Parameters seconds — The number of seconds for the console session to sleep, expressed as a decimal integer.

Default 1

Values 1 — 100

ssh

Syntax ssh [ip-addr | dns-name | username@ip-addr] [-I username] [-v SSH-version] [router router-

instance | service-name service-name

Context <GLOBAL>

Description This command initiates a client SSH session with the remote host and is independent from the admin-

istrative or operational state of the SSH server. However, to be the target of an SSH session, the SSH

server must be operational.

Quitting SSH while in the process of authentication is accomplished by either executing a ctrl-c or

"~." (tilde and dot) assuming the "~" is the default escape character for SSH session.

Parameters ip-address | host-name — The remote host to which to open an SSH session. The IP address or the

DNS name (providing DNS name resolution is configured) can be specified.

-l user — The user name to use when opening the SSH session.

router *router-instance* — Specify the router name or service ID.

Values router-name: Base, management

service-id: 1 — 2147483647

Default Base

telnet

Syntax telnet [ip-address | dns-name] [port] [**router** router-instance]

Context <GLOBAL>

Description This command opens a Telnet session to a remote host. Telnet servers in 7750 SR networks limit a

Telnet clients to three retries to login. The Telnet server disconnects the Telnet client session after

three retries. The number of retry attempts for a Telnet client session is not user-configurable.

Parameters ip-address — The IP address or the DNS name (providing DNS name resolution is configured) can

be specified.

Values ipv4-address a.b.c.d

ipv6-address x:x:x:x:x:x:x:x[-interface]

x:x:x:x:x:x:d.d.d.d[-interface]

x: [0 — FFFF]H

d: [0 — 255]Dipv6-address

dns-name — Specify the DNS name (if DNS name resolution is configured).

Values 128 characters maximum

port — The TCP port number to use to Telnet to the remote host, expressed as a decimal integer.

Default 23

Values 1 — 65535

router *router-instance* — Specify the router name or service ID.

Values router-name: Base, management

service-id: 1 — 2147483647

Default Base

traceroute

Syntax traceroute {ip-address | dns-name} [ttl ttl] [wait milliseconds] [no-dns] [source ip-address]

[tos type-of-service] [router router-instance]

Context <GLOBAL>

Description

The TCP/IP traceroute utility determines the route to a destination address. Note that aborting a traceroute with the <Ctrl-C> command could require issuing a second <Ctrl-C> command before the prompt is returned.

```
A:ALA-1# traceroute 192.168.xx.xx4 traceroute to 192.168.xx.xx4, 30 hops max, 40 byte packets 1 192.168.xx.xx4 0.000 ms 0.000 ms 0.000 ms A:AI,A-1#
```

Parameters

ip-address | *dns-name* — The remote address to traceroute. The IP address or the DNS name (if DNS name resolution is configured) can be specified.

Values ipv4-address a.b.c.d

ipv6-address x:x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x: [0 — FFFF]H

d: [0 — 255]Dipv6-address

dns-name 128 characters maximum

ttl *ttl* — The maximum Time-To-Live (TTL) value to include in the traceroute request, expressed as a decimal integer.

Values 1 — 255

wait *milliseconds* — The time in milliseconds to wait for a response to a probe, expressed as a decimal integer.

Default 5000

Values 1 — 60000

no-dns — When the **no-dns** keyword is specified, a DNS lookup for the specified host name will not be performed.

Default DNS lookups are performed

source *ip-address* — The source IP address to use as the source of the probe packets in dotted decimal notation. If the IP address is not one of the device's interfaces, an error is returned.

tos *type-of-service* — The type-of-service (TOS) bits in the IP header of the probe packets, expressed as a decimal integer.

Values 0 — 255

router router-instance — Specifies the router name or service ID.

Values router-name: Base, management

service-id: 1 — 2147483647

Default Base

tree

Syntax tree [detail]

Context <GLOBAL>

Description This command displays the command hierarchy structure from the present working context.

Parameters detail — Includes parameter information for each command displayed in the tree output.

write

Syntax write {user | broadcast} message-string

Context <GLOBAL>

Description This command sends a console message to a specific user or to all users with active console sessions.

Parameters user — The name of a user with an active console session to which to send a console message.

Values Any valid CLI username

broadcast — Specifies that the *message-string* is to be sent to all users logged into the router.

message-string — The message string to send. Allowed values are any string up to 250 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

CLI Environment Commands

alias

Syntax alias alias-name alias-command-line

no alias alias-name

Context environment

Description This command enables the substitution of a command line by an alias. Use the **alias** command to cre-

ate alternative or easier to remember/understand names for an entity or command string. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes. Only a single command can be present in the command string. The **alias** command can be

entered in any context but must be created in the **root>environment** context. For example, to create an alias named **soi** to display OSPF interfaces, enter:

alias soi "show router ospf interface"

Parameters alias-name — The alias name. Do not use a valid command string for the alias. If the alias specified is

an actual command, this causes the command to be replaced by the alias.

alias-command-line — The command line to be associated.

create

Syntax [no] create

Context environment

Description By default, the **create** command is required to create a new OS entity.

The **no** form of the command disables requiring the **create** keyword.

Default create — The create keyword is required.

more

Syntax [no] more

Context environment

Description This command enables per-screen CLI output, meaning that the output is displayed on a screen-by-

screen basis. The terminal screen length can be modified with the **terminal** command.

The following prompt appears at the end of each screen of paginated output:

Press any key to continue (Q to quit)

The **no** form of the command displays the output all at once. If the output length is longer than one

screen, the entire output will be displayed, which may scroll the screen.

Default more — CLI output pauses at the end of each screen waiting for the user input to continue.

reduced-prompt

Syntax reduced-prompt [number of nodes in prompt]

no reduced-prompt

Context environment

Description This command configures the maximum number of higher CLI context levels to display in the CLI

prompt for the current CLI session. This command is useful when configuring features that are several node levels deep, causing the CLI prompt to become too long.

By default, the CLI prompt displays the system name and the complete context in the CLI.

The number of *nodes* specified indicates the number of higher-level contexts that can be displayed in the prompt. For example, if reduced prompt is set to 2, the two highest contexts from the present working context are displayed by name with the hidden (reduced) contexts compressed into a ellipsis ("...").

A:ALA-1>environment# reduced-prompt 2 A:ALA-1>vonfig>router# interface to-103 A:ALA-1>...router>if#

Note that the setting is not saved in the configuration. It must be reset for each CLI session or stored in an **exec** script file.

The **no** form of the command reverts to the default.

Default no reduced-prompt — Displays all context nodes in the CLI prompt.

Parameters *number of nodes in prompt* — The maximum number of higher-level nodes displayed by name in the

prompt, expressed as a decimal integer.

Default 2

Values 0 — 15

saved-ind-prompt

Syntax [no] saved-ind-prompt

Context environment

Description This command enables saved indicator in the prompt. When changes are made to the configuration

file a "*" appears in the prompt string indicating that the changes have not been saved. When an

admin save command is executed the "*" disappears.

*A:ALA-48# admin save

Writing file to ftp://128.251.10.43/./sim48/sim48-config.cfg

Saving configuration Completed.

A:ALA-48#

terminal

Syntax terminal

no terminal

Context environment

Description This command enables the context to configure the terminal screen length for the current CLI session.

length

Syntax length lines

Context environment>terminal

Default 24 — Terminal dimensions are set to 24 lines long by 80 characters wide.

Parameters lines — The number of lines for the terminal screen length, expressed as a decimal integer.

Values 1 — 512

time-display

Syntax time-display {local | utc}

Context environment

Description This command displays time stamps in the CLI session based on local time or Coordinated Universal

Time (UTC).

The system keeps time internally in UTC and is capable of displaying the time in either UTC or local

time based on the time zone configured.

This configuration command is only valid for times displayed in the current CLI session. This includes displays of event logs, traps and all other places where a time stamp is displayed.

includes displays of event logs, traps and an other places where a time stamp is displayed.

In general all time stamps are shown in the time selected. This includes log entries destined for console/session, memory, or SNMP logs. Log files on compact flash are maintained and displayed in

UTC format.

Default time-display local — Displays time stamps based on the local time.

Monitor CLI Commands

ccag

Syntax ccag ccag-id [path {a | b}] [type {sap-sap | sap-net | net-sap}] [interval seconds] [repeat

repeat] [absolute | rate]

Context monitor

Description Displays monitor command output of traffic statistics for Cross Connect Aggregation Groups

(CCAGs) ports.

Parameters *ccag-id* — Specifies the CCAG instance to monitor.

path — Specifies the CCA path nodal context where the CCA path bandwidth, buffer and accounting parameters are maintained. The path context must be specified with either the **a** or **b** keyword

specifying the CCA path context to be entered.

type — Specify cross connect type.

Values sap-sap, sap-net, net-sap

interval — Configures the interval for each display in seconds.

Default 5 seconds
Values 3 — 60

repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without

processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

cpm-filter

Syntax cpm-filter

Context monitor

Description Displays monitor command output for CPM filters.

ip

Syntax ip entry entry-id [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>cpm-filter

Description Displays monitor command statistics for IP filter entries.

Parameters entry entry-id — Displays information on the specified filter entry ID for the specified filter ID only.

> 1 - 65535Values

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds Values 3 - 60

repeat repeat — Configures how many times the command is repeated.

Default 10 **Values** 1 - 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

filter

filter **Syntax**

Context monitor

Description This command enables the context to configure criteria to monitor IP and MAC filter statistics.

ip

Syntax ip ip-filter-id entry entry-id [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>filter

Description This command enables IP filter monitoring. The statistical information for the specified IP filter entry

displays at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified IP filter. The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword rate is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

ip-filter-id — Displays detailed information for the specified filter ID and its filter entries.

Values 1 — 65535

entry entry-id — Displays information on the specified filter entry ID for the specified filter ID only.

Values 1 — 65535

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds

Values 3 — 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

```
A:ALA-1>monitor# filter ip 10 entry 1 interval 3 repeat 3 absolute
______
Monitor statistics for IP filter 10 entry 1
At time t = 0 sec (Base Statistics)
 ._____
Ing. Matches: 0
                           Egr. Matches : 0
At time t = 3 sec (Mode: Absolute)
Ing. Matches: 0
                           Egr. Matches : 0
______
At time t = 6 sec (Mode: Absolute)
Ing. Matches: 0
                            Egr. Matches : 0
At time t = 9 sec (Mode: Absolute)
Ing. Matches: 0
                           Egr. Matches : 0
______
A:ALA-1>monitor#
A:ALA-1>monitor# filter ip 10 entry 1 interval 3 repeat 3 rate
Monitor statistics for IP filter 10 entry 1
At time t = 0 sec (Base Statistics)
______
Ing. Matches: 0
                           Egr. Matches : 0
______
At time t = 3 \text{ sec (Mode: Rate)}
```

ipv6

Syntax ipv6 ipv6-filter-id entry entry-id [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>filter

Description

This command enables IPv6 filter monitoring. The statistical information for the specified IPv6 filter entry displays at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified IPv6 filter. The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

iv6p-filter-id — Displays detailed information for the specified IPv6 filter ID and its filter entries.

Values 1 — 65535

entry *entry-id* — Displays information on the specified IPv6 filter entry ID for the specified filter ID only.

Values 1 — 65535

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds **Values** 3 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

A:ALA-48# monitor filter ipv6 100 entry 10 i	
Monitor statistics for IPv6 filter 100 entry	7 10
At time t = 0 sec (Base Statistics)	
Ing. Matches : 0	Egr. Matches : 1
At time t = 3 sec (Mode: Absolute)	
Ing. Matches : 0	Egr. Matches : 1
At time t = 6 sec (Mode: Absolute)	
Ing. Matches : 0	Egr. Matches : 1
At time t = 9 sec (Mode: Absolute)	
Ing. Matches : 0	Egr. Matches : 01
A:ALA-48#	
A:ALA-48# monitor filter ipv6 100 entry 10 i	nterval 3 repeat 3 rate
	7 10
Monitor statistics for IPv6 filter 100 entry	7 10
Monitor statistics for IPv6 filter 100 entry	7 10
Monitor statistics for IPv6 filter 100 entry At time t = 0 sec (Base Statistics) Ing. Matches: 0 At time t = 3 sec (Mode: Rate)	7 10
Monitor statistics for IPv6 filter 100 entry At time t = 0 sec (Base Statistics) Ing. Matches: 0 At time t = 3 sec (Mode: Rate) Ing. Matches: 0	Egr. Matches : 1
Monitor statistics for IPv6 filter 100 entry At time t = 0 sec (Base Statistics) Ing. Matches: 0 At time t = 3 sec (Mode: Rate) Ing. Matches: 0 At time t = 6 sec (Mode: Rate)	Egr. Matches : 1 Egr. Matches : 1
Monitor statistics for IPv6 filter 100 entry At time t = 0 sec (Base Statistics) Ing. Matches: 0 At time t = 3 sec (Mode: Rate) Ing. Matches: 0	Egr. Matches : 1 Egr. Matches : 1
Monitor statistics for IPv6 filter 100 entry At time t = 0 sec (Base Statistics) Ing. Matches: 0 At time t = 3 sec (Mode: Rate) Ing. Matches: 0 At time t = 6 sec (Mode: Rate) At time t = 9 sec (Mode: Rate)	Egr. Matches : 1 Egr. Matches : 1
Monitor statistics for IPv6 filter 100 entry At time t = 0 sec (Base Statistics) Ing. Matches: 0 At time t = 3 sec (Mode: Rate) Ing. Matches: 0 At time t = 6 sec (Mode: Rate) Ing. Matches: 0	Egr. Matches : 1 Egr. Matches : 1

mac

Syntax mac mac-filter-id entry entry-id [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>filter

Description This command enables MAC filter monitoring. The statistical information for the specified MAC filter entry displays at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified MAC filter. The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

mac-filter-id — The MAC filter policy ID.

Values 1 — 65535

entry entry-id — Displays information on the specified filter entry ID for the specified filter ID only.

Values 1 — 65535

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds **Values** 3 - 60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

```
At time t = 9 sec (Mode: Absolute)
Ing. Matches: 0
                    Egr. Matches : 0
______
A:ALA-1>monitor>filter# mac 50 entry 10 interval 3 repeat 3 rate
______
Monitor statistics for Mac filter 50 entry 10
______
At time t = 0 sec (Base Statistics)
______
                    Egr. Matches : 0
Ing. Matches: 0
______
At time t = 3 sec (Mode: Rate)
______
                    Egr. Matches : 0
______
At time t = 6 sec (Mode: Rate)
Ing. Matches: 0
                    Egr. Matches : 0
______
At time t = 9 sec (Mode: Rate)
Ing. Matches: 0
                   Egr. Matches : 0
______
A:ALA-1>monitor>filter#
```

lag

Syntax

lag lag-id [lag-id...(up to 5 max)] [interval seconds] [repeat repeat] [absolute | rate]

Context

monitor

Description

This command monitors traffic statistics for Link Aggregation Group (LAG) ports. Statistical information for the specified LAG ID(s) displays at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified LAG ID. The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

lag-id — The number of the LAG.

Default none — The LAG ID value must be specified.

Values 1 — 200

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds **Values** 3 — 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

Sample Output

A:ALA-12# monitor lag 12 ______ Monitor statistics for LAG ID 12 ______ Input Input Output Output Input Output Bytes Packets Bytes Packets Errors Errors At time t = 0 sec (Base Statistics) ______
 1/1/1
 2168900
 26450
 64
 1
 0
 0

 1/1/2
 10677318
 125610
 2273750
 26439
 0
 0

 1/1/3
 2168490
 26445
 0
 0
 0
 0
 ______ 15014708 178505 2273814 26440 0 Totals 0 ______ At time t = 5 sec (Mode: Delta)
 1/1/1
 0
 0
 0
 0
 0

 1/1/2
 258
 3
 86
 1
 0
 0

 1/1/3
 82
 1
 0
 0
 0
 0
 Totals 340 4 86 1 0 0 ______

A:ALA-12#

Isp-egress-stats

Syntax Isp-egress-stats

Isp-egress-stats Isp-name

Context show>router>mpls

Description This command displays MPLS LSP egress statistics information.

Isp-ingress-stats

Syntax Isp-ingress-stats

Isp-ingress-stats ip-address Isp Isp-name

Context show>router>mpls

Description This command displays MPLS LSP ingress statistics information.

management-access-filter

Syntax management-access-filter

Context monitor

Description This command enables the context to monitor management-access filters. These filters are configured

in the config>system>security>mgmt-access-filter context.

ip

Syntax ip entry entry-id [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>management-access-filter

Description This command nonitors statistics for the MAF IP filter entry.

Parameters entry entry-id — Specifies an existing IP MAF entry ID.

Values 1 — 9999

interval seconds — Configures the interval for each display in seconds.

Default 10 **Values** 3 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

ipv6

Syntax ipv6 entry-id [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>management-access-filter

Description This command nonitors statistics for the MAF IPv6 filter entry.

Parameters entry entry-id — Specifies an existing IP MAF entry ID.

Values 1 — 9999

interval seconds — Configures the interval for each display in seconds.

Default 10 **Values** 3-60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

mac

Syntax mac entry-id [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>management-access-filter

Description This command nonitors statistics for the MAF MAC filter entry.

Parameters entry entry-id — Specifies an existing IP MAF entry ID.

Values 1 — 9999

interval seconds — Configures the interval for each display in seconds.

Default 10

Values 3 — 60

repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

port

Syntax port port-id [port-id...(up to 5 max)] [interval seconds] [repeat repeat] [absolute | rate]

Context monitor

Description This command enables port traffic monitoring. The specified port(s) statistical information displays at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified port(s). The subsequent

statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

port port-id — Specify up to 5 port IDs.

Syntax: port-id slot/mda/port[.channel]

aps-id aps-group-id[.channel]

aps keyword

group-id 1 — 64

bundle ID bundle-type-slot/mda.bundle-num

bundle keyword type ima, ppp bundle-num 1 — 128

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds

Values 3 — 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

A:ALA-12>monitor#	port	2/1/4	interval 3	repeat 3	3 absolute

Monitor statistics for Port 2/1/4		
	Input	Output
At time t = 0 sec (Base Statistics)		
Octets Packets Errors	0 39 0	0 175 0
At time t = 3 sec (Mode: Absolute)		
Octets Packets Errors	0 39 0	0 175 0
At time t = 6 sec (Mode: Absolute)		
Octets Packets Errors	0 39 0	0 175 0

At time t = 9 sec (Mode: Absolute)		
Octets Packets Errors	0 39 0	0 175 0
A:ALA-12>monitor#		
A:ALA-12>monitor# port 2/1/4 interv	ral 3 repeat 3 rate	
Monitor statistics for Port 2/1/4		
	Input	Output
At time t = 0 sec (Base Statistics)		
Octets Packets Errors	0 39 0	0 175 0
At time t = 3 sec (Mode: Rate)		
Octets Packets Errors	0 0 0	0 0 0
At time t = 6 sec (Mode: Rate)		
Octets Packets Errors	0 0 0	0 0 0
At time t = 9 sec (Mode: Rate)		
Octets Packets Errors	0 0 0	0 0 0
40: "		

atm

Syntax atm [interval seconds] [repeat repeat] [absolute|rate]

Context monitor>port

Description This command enables ATM port traffic monitoring.

A:ALA-12>monitor#

Parameters interval seconds — Configures the interval for each display in seconds.

Default 5 seconds **Values** 3 - 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

port

Syntax port port-id atm [interval seconds] [repeat repeat] [absolute | rate]

port port-id atm aal-5 [interval seconds] [repeat repeat] [absolute | rate] port port-id atm ilmi [interval seconds] [repeat repeat] [absolute | rate]

port port-id atm interface-connection [interval seconds] [repeat repeat] [absolute | rate]

port port-id atm pvc [interval seconds] [repeat repeat] [absolute | rate] port port-id atm pvp [interval seconds] [repeat repeat] [absolute | rate] port port-id atm pvt [interval seconds] [repeat repeat] [absolute | rate]

Context monitor

Description This command monitors ATM port traffic statistics.

Parameters *port-id* — Specify up to 5 port IDs.

Syntax: *port-id* slot/mda/port[.channel]

aps-id aps-group-id[.channel]

aps keyword group-id 1 — 64

bundle ID bundle-type-slot/mda.bundle-num

bundle keyword type ima, ppp bundle-num 1 — 128

atm — keyword specifying ATM information.

interface-connection — Monitors ATM interface statistics.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds

Values 3 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

Default Default mode delta

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

Default Default mode delta

aal-5 — Displays ATM Adaptation Layer 5 (AAL5) information.

ilmi — Monitors ATM ILMI statistics.

pvc — Identifies the port by the PVC identifier (vpi/vci).

pvp — Identifies the port by the permanent virtual path.

pvt — Identifies the port by the permanent virtual tunnel.

oam — Identifies the port by the OAM test suite ID.

qos

Syntax qos

Context monitor

Description This command enables the context to configure criteria to monitor QoS scheduler statistics for spe-

cific customers and SAPs.

arbiter-stats

Syntax arbiter-stats

Context monitor>qos

Description This command enables the context to configure monitor commands for arbiter statistics.

sap

Syntax sap sap-id [arbiter name | root] [ingress | egress] [interval seconds] [repeat repeat]

[absolute | rate]

Context monitor>qos>arbiter-stats

Description This command monitors arbiter statistics for a SAP.

Parameters sap-id — Specify the physical port identifier portion of the SAP definition.

arbiter *name* — Specify the name of the policer control policy arbiter.

Values An existing *scheduler-name* in the form of a string up to 32 characters long com-

posed of printable, 7-bit ASCII characters. If the string contains special characters

(#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

root — Specify the scheduler to which this queue would be feeding.

ingress — Displays *scheduler-name* statistics applied on the ingress SAP.

egress — Displays scheduler-name statistics applied on the egress SAP.

interval seconds — Configures the interval for each display in seconds.

Default 11 seconds

Values 11 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

subscriber

Syntax subscriber sub-ident-string [arbiter name | root] [ingress | egress] [interval seconds]

[repeat repeat] [absolute | rate]

Context monitor>qos>arbiter-stats

Description This command monitors arbiter statistics for a subscriber.

Parameters sub-ident-string — Specifies an existing subscriber a identification policy name.

arbiter name — Specify the name of the policer control policy arbiter.

Values An existing *scheduler-name* in the form of a string up to 32 characters long com-

posed of printable, 7-bit ASCII characters. If the string contains special characters

(#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

root — Specify the scheduler to which this queue would be feeding.

ingress — Displays *scheduler-name* statistics applied on the ingress SAP.

egress — Displays scheduler-name statistics applied on the egress SAP.

interval seconds — Configures the interval for each display in seconds.

Default 11 seconds

Values 11 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

customer

Syntax customer customer-id site customer-site-name [scheduler scheduler-name] [ingress |

egress] [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>qos>scheduler-stats

Description Use this command to monitor scheduler statistics per customer multi-service-site. The first screen

displays the current statistics related to the specified customer ID and customer site name. The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed

instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. These commands display selected statistics per the configured number of times at the interval specified.

Parameters *customer-id* — Specifies the ID number to be associated with the customer, expressed as an integer.

Values 1 — 2147483647

site *customer-site-name* — Specify the customer site which is an anchor point for ingress and egress virtual scheduler hierarchy.

scheduler *scheduler-name* — Specify an existing *scheduler-name*. Scheduler names are configured in the **config>qos>scheduler-policy>tier** *level* context.

Values An existing *scheduler-name* is in the form of a string up to 32 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters

(#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

ingress — Displays the customer's multi-service-site ingress scheduler policy.

egress — Displays the customer's multi-service-site egress scheduler policy.

interval seconds — Configures the interval for each display in seconds.

Default 11 seconds **Values** 11 − 60

repeat repeat — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

sap

Syntax sap sap-id [scheduler scheduler-name] [ingress | egress] [interval seconds] [repeat

repeat] [absolute | rate]

Context monitor>qos>scheduler-stats

Description Use this command to monitor scheduler statistics for a SAP at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified SAP. The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

sap-id — Specifies the physical port identifier portion of the SAP definition.

scheduler *scheduler-name* — Specify an existing *scheduler-name*. Scheduler names are configured in the config>qos>scheduler-policy>tier *level* context.

Values

An existing *scheduler-name* in the form of a string up to 32 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

ingress — Displays scheduler-name statistics applied on the ingress SAP.

egress — Displays *scheduler-name* statistics applied on the egress SAP.

interval seconds — Configures the interval for each display in seconds.

 Default
 11 seconds

 Values
 11 — 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

subscriber

Syntax subscriber sub-ident-string [scheduler scheduler-name] [ingress | egress] [interval

seconds] [repeat repeat] [absolute | rate]

Context monitor>qos>scheduler-stats

Description This command monitors cheduler statistics for a subscriber.

Parameters *sub-ident-string* — Specifies an existing subscriber a identification policy name.

scheduler *scheduler-name* — Specify an existing QoS scheduler policy name. Scheduler names are configured in the config>qos>scheduler-policy>tier *level* context.

Values An existing *scheduler-name* in the form of a string up to 32 characters long com-

posed of printable, 7-bit ASCII characters. If the string contains special characters

(#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

ingress — Displays scheduler-name statistics applied on the ingress SAP.

egress — Displays scheduler-name statistics applied on the egress SAP.

interval seconds — Configures the interval for each display in seconds.

Default 11 seconds **Values** 11 − 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

router

Syntax router router-instance

Context monitor

Description This command enables the context to configure criteria to monitor statistical information for BGP,

LDP, MPLS, OSPF, OSPF3, PIM, RIP, and RSVP protocols.

Parameters router-instance — Specify the router name or service ID.

Values router-name: Base, management

service-id: 1 — 2147483647

Default Base

neighbor

Syntax neighbor ip-address [ip-address...(up to 5 max)] [interval seconds] [repeat repeat]

[absolute | rate]

Context monitor>router>bgp

Description This command displays statistical BGP neighbor information at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified neighbor(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

neighbor *ip-address* — Displays damping information for entries received from the BGP neighbor. Up to 5 IP addresses can be specified.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds
Values 3 — 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

```
Recd. Paths : 0
Num of Flaps : 0
                                Suppressed Paths: 0
i/p Messages : 0
i/p Octets : 0
i/p Updates : 0
                                o/p Messages : 0
                                o/p Octets : 0
o/p Updates : 0
At time t = 6 \text{ sec}
______
Recd. Prefixes : 0
                               Sent Prefixes : 0
Recd. Paths : 0
                               Suppressed Paths : 0
Num of Flaps : 0
i/p Messages : 0
i/p Octets : 0
i/p Updates : 0
                         o/p Messages : 0
o/p Octets : 0
o/p Updates : 0
At time t = 9 sec
______
Recd. Prefixes : 0
                                Sent Prefixes : 0
                                Suppressed Paths: 0
Recd. Paths : 0
Num of Flaps : 0
i/p Messages : 0
i/p Octets : 6
i/p Updates : 0
                               o/p Messages : 0
o/p Octets : 0
o/p Updates : 0
______
```

A:ALA-12>monitor>router>bgp#

statistics

Syntax statistics [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>router>isis

Description

This command displays statistical IS-IS traffic information at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified router statistics. The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds **Values** 3 — 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

SIS Stati					
		 (Base Statis			=======================================
SIS Insta Purge Init		: 1		SPF Run LSP Reg	s : 2 ens. : 11
CSPF Stati	istics				
Requests Paths Four		: 0		=	Drops : 0 ot Found: 0
	Received		d Dropped	Sent	Retransmitted
SP IH SNP SNP nknown	0 0 0 0	0 0 0 0	0 0 0 0	0 74 0 0	0 0 0 0
t time t	= 3 sec	(Mode: Absol	ute) 		
SIS Insta Purge Init	ance :	: 1 : 0		SPF Run LSP Reg	s : 2 ens. : 11
SPF Stati	istics				
Requests Paths Four		: 0			Drops : 0 ot Found: 0
DU Type		d Processe	d Dropped	Sent	Retransmitted
SP IH CSNP PSNP Jnknown	0 0 0 0	0 0 0 0	0 0 0 0	0 74 0 0	0 0 0 0
At time t	= 6 sec	(Mode: Absol	ute)		
SIS Insta Purge Init		: 1		SPF Run LSP Reg	
SPF Stati	istics				
	: nd :				Drops : 0 ot Found: 0
PDU Type	Received	d Processe	d Dropped	Sent	Retransmitted
SP IH	0	0	0	0 74	0
ΤΠ	U	U	U	/ 4	U

CSNP PSNP	0		0	0	0	0	
Unknown	0		0	0	0	0	
A: AT.A-12>r	monitor>	rout	er>isis# st	atistics i	nterval 3	repeat 2	rate
ISIS Stat:		====	=======				
At time t	= 0 sec 	(Ba:	se Statisti 	cs)			
ISIS Insta		: 1			SPF Run	s :	2
Purge Init	tiated	: 0			LSP Reg	ens. :	11
CSPF Stat:	istics						
Requests		: 0			Request	Drops :	0
Paths Four	nd 	: 0			Paths No	ot Found:	0
PDU Type	Receiv	ed	Processed	Dropped	Sent	Retra	nsmitted
LSP	0		0	0	0	0	
	0		0	0	76	0	
CSNP	0		0	0	0	0	
PSNP	0		0	0	0	0	
Unknown	0 		0 	0	0	0	
At time t	= 3 sec	(Mo	de: Rate)				
ISIS Insta		: 1			SPF Run	s :	0
Purge Init	tiated	: 0			LSP Reg	ens. :	0
CSPF Stat:	istics						
Requests		: 0			Request	Drops :	0
Paths Four		: 0				ot Found:	
PDU Type	Receiv	ed	Processed	Dropped	Sent	Retra	nsmitted
LSP	0		0	0	0	0	
IIH	0		0	0	0	0	
CSNP	0		0	0	0	0	
PSNP	0		0	0	0	0	
Unknown	0 		0 	0	0	0	
At time t	= 6 sec						
ISIS Insta					SPF Run:	s :	0
Purge Init	tiated	: 0			LSP Reg	ens. :	0
CSPF Stat:	istics						
Requests		: 0			Request	Drops :	0
Paths Four	nd	: 0			Paths No	ot Found:	
PDU Type	Receiv	ed	Processed	Dropped	Sent	Retra	nsmitted
	0		 0	0	0	0	
IIH			0	0	1	0	
CSNP	0		0	0	0	0	

PSNP	0	0	0	0	0	
Unknown	0	0	0	0	0	
======						

A:ALA-12>monitor>router>isis#

session

Syntax session | dp-id [|dp-id...(up to 5 max)] [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>router>ldp

Description This command displays statistical information for LDP sessions at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified LDP session(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

ldp-id — Specify the IP address of the LDP session to display.

Values ip-address[:label-space] ip-address — a.b.c.d label-space — [0..65535]

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds **Values** 3 - 60

repeat repeat — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta

Sample Output

FECs	1	2
Hello	5288	5289
Keepalive	8225	8225
Init	1	1
Label Mapping		4
Label Request	0	0
Label Release	0	0
Label Withdraw	0	0
Label Abort Notification	0	0
	1	
Address		1
Address Withdraw	0	0
At time t = 3 sec (Mode: Abso	lute) 	
FECs	1	2
Hello	5288	5289
Keepalive	8226	8226
Init	1	1
Label Mapping	1	4
Label Request	0	0
Label Release	0	0
Label Withdraw	0	0
Label Abort	0	0
Notification	0	0
Address	1	1
Address Withdraw	0	0
At time t = 6 sec (Mode: Abso	lute)	
FECs	1	2
Hello	5288	5290
Keepalive	8226	8226
Init	1	1
Label Mapping	1	4
Label Request	0	0
Label Release	0	0
Label Withdraw	0	0
Label Abort	0	0
Notification	0	0
Address	1	1
Address Withdraw	0	0
At time t = 9 sec (Mode: Abso	lute)	
FECs	1	2
Hello	5288	5290
Keepalive	8226	8226
Init	1	1
		4
		7
Label Mapping	1	Λ
Label Request	0	0
Label Request Label Release	0	0
Label Request Label Release Label Withdraw	0 0 0	0
Label Request Label Release Label Withdraw Label Abort	0 0 0 0	0 0 0
Label Request Label Release Label Withdraw Label Abort Notification	0 0 0 0 0	0 0 0 0
Label Request Label Release Label Withdraw Label Abort Notification Address	0 0 0 0 0 0	0 0 0 0 0
Label Request Label Release Label Withdraw Label Abort Notification	0 0 0 0 0	0 0 0 0

A:ALA-12>monitor>router>ldp#

	Monitor statistics for LDP Session 10.10.10.104				
	Sent	Received			
	(Base Statistics)				
 FECs	1	2			
Hello	5289	5290			
Keepalive	8227	8227			
Init	1	1			
Label Mapping	1	4			
Label Request	0	0			
Label Release	0	0			
Label Withdraw	0	0			
Label Abort	0	0			
Notification	0	0			
Address	1	1			
Address Withdraw	0	0			
At time t = 3 sec					
FECs	0	0			
Hello	0	0			
Keepalive	0	0			
Init	0	0			
Label Mapping	0	0			
Label Request	0	0			
Label Release	0	0			
Label Withdraw	0	0			
Label Abort	0	0			
Notification	0	0			
Address	0	0			
Address Withdraw	0	0			
At time $t = 6 \text{ sec}$					
At time t = 6 sec FECs		0			
		0 0			
FECs	0				
FECs Hello	0 0	0			
 FECs Hello Keepalive	0 0 0	0			
FECs Hello Keepalive Init	0 0 0 0	0 0 0			
FECs Hello Keepalive Init Label Mapping	0 0 0 0 0	0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request	0 0 0 0 0	0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release	0 0 0 0 0 0 0	0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw	0 0 0 0 0 0 0	0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort Notification Address Address Withdraw	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort Notification Address Address Withdraw At time t = 9 sec	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort Notification Address Address Withdraw	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort Notification Address Address Withdraw At time t = 9 sec	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort Notification Address Address Withdraw At time t = 9 sec FECs Hello	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort Notification Address Address Withdraw At time t = 9 sec FECs Hello Keepalive	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort Notification Address Address Withdraw At time t = 9 sec FECs Hello Keepalive Init	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort Notification Address Address Withdraw At time t = 9 sec FECs Hello Keepalive Init Label Mapping	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0			
FECs Hello Keepalive Init Label Mapping Label Request Label Release Label Withdraw Label Abort Notification Address Address Withdraw At time t = 9 sec FECs Hello Keepalive Init	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0			

Label Abort	0	0
Notification	0	0
Address	0	0
Address Withdraw	0	0
=======================================		

A:ALA-12>monitor>router>ldp#

statistics

Syntax statistics [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>router>ldp

Description Monitor statistics for LDP instance at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the LDP statistics. The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds
Values 3 — 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

A:ALA-12>monitor>	router>ldp# statistics	interval 3	repeat 3	absolute
Monitor statistics	s for LDP instance			
At time t = 0 sec	(Base Statistics)			
Addr FECs Sent Serv FECs Sent		Addr FECs Serv FECs		
At time t = 3 sec	(Mode: Absolute)			
Addr FECs Sent Serv FECs Sent		Addr FECs Serv FECs		
At time $t = 6 \text{ sec}$	(Mode: Absolute)			

```
Addr FECs Recv : 0
Serv FECs Recv : 2
Addr FECs Sent : 0
Serv FECs Sent : 1
At time t = 9 sec (Mode: Absolute)
______
Addr FECs Sent : 0
                      Addr FECs Recv : 0
Serv FECs Sent : 1
                       Serv FECs Recv
______
A:ALA-12>monitor>router>ldp#
A:ALA-12>monitor>router>ldp# statistics interval 3 repeat 3 rate
______
Monitor statistics for LDP instance
At time t = 0 sec (Base Statistics)
______
Addr FECs Sent : 0
                      Addr FECs Recv : 0
Serv FECs Sent : 1
                      Serv FECs Recv
At time t = 3 \text{ sec (Mode: Rate)}
______
                      Addr FECs Recv : 0
Serv FECs Recv : 0
Addr FECs Sent : 0
Serv FECs Sent : 0
At time t = 6 sec (Mode: Rate)
______
                     Addr FECs Recv
Addr FECs Sent : 0
                                 : 0
                      Serv FECs Recv
Serv FECs Sent : 0
At time t = 9 sec (Mode: Rate)
______
Addr FECs Sent : 0 Addr FECs Recv : 0 Serv FECs Sent : 0 Serv FECs Recv : 0
______
A:ALA-12>monitor>router>ldp#
```

interface

Syntax interface interface [interface...(up to 5 max)] [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>router>mpls

Description This command displays statistics for MPLS interfaces at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the MPLS interface(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

interface — Specify the interface's IP address (*ip-address*) or interface name (*ip-int-name*). Up to 5 interfaces can be specified. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

interval seconds — Configures the interval for each display in seconds.

 Default
 11 seconds

 Values
 11 − 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

```
A:ALA-12>monitor>router>mpls# interface system interval 3 repeat 3 absolute
Monitor statistics for MPLS Interface "system"
At time t = 0 sec (Base Statistics)
______
 Transmitted : Pkts - 0
                         Octets - 0
Received : Pkts - 0
                         Octets - 0
  ______
At time t = 3 sec (Mode: Absolute)
______
Transmitted : Pkts - 0
                         Octets - 0
Received : Pkts - 0
                         Octets - 0
At time t = 6 sec (Mode: Absolute)
 Transmitted : Pkts - 0
                         Octets - 0
Received : Pkts - 0
                         Octets - 0
At time t = 9 sec (Mode: Absolute)
______
Transmitted: Pkts - 0 Octets - 0
Received : Pkts - 0
                         Octets - 0
______
A:ALA-12>monitor>router>mpls#
A:ALA-12>monitor>router>mpls# interface system interval 3 repeat 3 rate
______
Monitor statistics for MPLS Interface "system"
______
______
Transmitted : Pkts - 0
                         Octets - 0
Received : Pkts - 0
                         Octets - 0
At time t = 3 \text{ sec (Mode: Rate)}
```

```
Transmitted : Pkts - 0
                      Octets - 0
Received : Pkts - 0
                     Octets - 0
______
At time t = 6 \text{ sec (Mode: Rate)}
______
Transmitted : Pkts - 0
                     Octets - 0
Received : Pkts - 0
                     Octets - 0
______
At time t = 9 sec (Mode: Rate)
Transmitted : Pkts - 0
                      Octets - 0
Received : Pkts - 0
                      Octets - 0
______
```

A:ALA-12>monitor>router>mpls#

Isp-egress-statistics

Syntax | Isp-egress-stats | Isp-name [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>router>mpls

Description This command displays egress statistics for LSP interfaces at the configured interval until the config-

ured count is reached.

Default no lsp-egress-statistics

Parameters repeat repeat — Specifies how many times the command is repeated.

Values 10

Values 1 — 999

interval seconds — Specifies the interval for each display, in seconds.

Values 10

Values 3 — 60

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

Sample

Monitor CLI Commands

```
FC BE
InProf Pkts : 0
                                 OutProf Pkts : 551
InProf Octets : 0
                                 OutProf Octets: 560918
FC L2
InProf Pkts : 0
                                 OutProf Pkts : 551
                                 OutProf Octets: 560918
InProf Octets : 0
FC AF
InProf Pkts : 551
                                 OutProf Pkts : 0
InProf Octets : 560918
                                 OutProf Octets: 0
FC L1
InProf Pkts : 551
                                 OutProf Pkts : 0
InProf Octets: 560918
                                 OutProf Octets: 0
FC H2
InProf Pkts : 0
                                 OutProf Pkts : 551
InProf Octets : 0
                                 OutProf Octets: 560918
FC EF
InProf Pkts : 0
                                 OutProf Pkts : 551
InProf Octets: 0
                                 OutProf Octets: 560918
FC H1
InProf Pkts : 0
                                 OutProf Pkts : 551
InProf Octets : 0
                                 OutProf Octets: 560918
FC NC
InProf Pkts : 551
                                OutProf Pkts : 0
InProf Octets : 560918
                                OutProf Octets: 0
At time t = 10 sec (Mode: Absolute)
LSP Name : sample
______
Collect Stats : Enabled
                                Accting Plcy. : 5
Adm State : Up
                                 PSB Match : True
FC BE
InProf Pkts : 0
                                OutProf Pkts : 580
                                OutProf Octets: 590440
InProf Octets : 0
FC L2
InProf Pkts : 0
                                 OutProf Pkts : 580
InProf Octets : 0
                                 OutProf Octets: 590440
FC AF
InProf Pkts : 580
                                 OutProf Pkts : 0
InProf Octets : 590440
                                 OutProf Octets: 0
FC L1
InProf Pkts : 580
                                 OutProf Pkts : 0
InProf Octets : 590440
                                 OutProf Octets: 0
FC H2
InProf Pkts : 0
                                 OutProf Pkts : 580
InProf Octets : 0
                                 OutProf Octets: 590440
FC EF
InProf Pkts : 0
                                 OutProf Pkts : 580
InProf Octets : 0
                                 OutProf Octets: 590440
InProf Pkts : 0
                                 OutProf Pkts : 580
                                 OutProf Octets: 590440
InProf Octets: 0
FC NC
InProf Pkts : 580
                                OutProf Pkts : 0
InProf Octets : 590440
                                OutProf Octets: 0
______
At time t = 20 sec (Mode: Absolute)
LSP Name : sample
______
Collect Stats : Enabled
                                Accting Plcy. : 5
```

```
Adm State : Up
                                 PSB Match
                                           : True
FC BE
InProf Pkts : 0
                                 OutProf Pkts : 609
InProf Octets : 0
                                 OutProf Octets: 619962
FC L2
InProf Pkts : 0
                                OutProf Pkts : 609
InProf Octets : 0
                                OutProf Octets: 619962
InProf Pkts : 609
                                 OutProf Pkts : 0
InProf Octets: 619962
                                OutProf Octets: 0
FC L1
InProf Pkts : 609
                                OutProf Pkts : 0
InProf Octets: 619962
                                 OutProf Octets: 0
FC H2
InProf Pkts : 0
                                OutProf Pkts : 609
InProf Octets: 0
                                OutProf Octets: 619962
InProf Pkts : 0
                                OutProf Pkts : 609
                                OutProf Octets: 619962
InProf Octets: 0
FC H1
InProf Pkts : 0
                                OutProf Pkts : 609
InProf Octets : 0
                                OutProf Octets: 619962
FC NC
InProf Pkts : 609
                                OutProf Pkts : 0
InProf Octets : 619962
                                OutProf Octets: 0
At time t = 30 sec (Mode: Absolute)
______
LSP Name : sample
______
Collect Stats : Enabled
                                Accting Plcy. : 5
Adm State : Up
                                 PSB Match : True
FC BE
InProf Pkts : 0
                                OutProf Pkts : 638
InProf Octets: 0
                                OutProf Octets: 649484
FC L2
InProf Pkts : 0
                                OutProf Pkts : 638
InProf Octets : 0
                                OutProf Octets: 649484
FC AF
InProf Pkts : 638
                                OutProf Pkts : 0
InProf Octets: 649484
                                 OutProf Octets: 0
FC L1
InProf Pkts : 638
                                OutProf Pkts : 0
InProf Octets : 649484
                                OutProf Octets: 0
FC H2
InProf Pkts : 0
                                OutProf Pkts : 638
InProf Octets: 0
                                OutProf Octets: 649484
FC EF
InProf Pkts : 0
                                 OutProf Pkts : 638
InProf Octets : 0
                                 OutProf Octets: 649484
FC H1
InProf Pkts : 0
                                OutProf Pkts : 638
InProf Octets : 0
                                 OutProf Octets: 649484
InProf Pkts : 638
                                OutProf Pkts : 0
InProf Octets : 649484
                               OutProf Octets: 0
______
B:Dut-C-cpm2#
```

D. Duc C CPINZ

Isp-ingress-statistics

Syntax | Isp-ingress-stats | Isp-name sender sender-address [interval seconds] [repeat repeat]

[absolute | rate]

Context monitor>router>mpls

Description This command displays ingress statistics for LSP interfaces at the configured interval until the config-

ured count is reached.

Parameters repeat repeat — Specifies how many times the command is repeated.

Values 10

Values 1 — 999

interval seconds — Specifies the interval for each display, in seconds.

Values 10

Values 3 — 60

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

```
B:Dut-C-cpm2# monitor router mpls lsp-ingress-stats lsp sample 1.1.1.1 repeat 3
interval 10 absolute
______
Monitor ingress statistics for MPLS LSP "sample" \,
______
At time t = 0 sec (Base Statistics)
______
LSP Name : sample
Sender
         : 1.1.1.1
Collect Stats : Enabled
                             Accting Plcy. : None
Adm State : Up
                             PSB Match : True
FC BE
InProf Pkts : 539
                            OutProf Pkts : 0
InProf Octets : 548702
                            OutProf Octets: 0
InProf Pkts : 0
                             OutProf Pkts : 539
                             OutProf Octets: 548702
InProf Octets : 0
FC AF
InProf Pkts : 0
                             OutProf Pkts : 0
InProf Octets : 0
                             OutProf Octets: 0
FC L1
InProf Pkts : 1078
                            OutProf Pkts : 0
InProf Octets : 1097404
                             OutProf Octets: 0
InProf Pkts : 0
                             OutProf Pkts : 539
InProf Octets: 0
                             OutProf Octets: 548702
FC EF
InProf Pkts : 539
                             OutProf Pkts : 0
```

```
InProf Octets : 548702
                                OutProf Octets: 0
InProf Pkts : 539
                                OutProf Pkts : 0
InProf Octets : 548702
                                OutProf Octets: 0
InProf Pkts : 0
                               OutProf Pkts : 539
InProf Octets : 0
                               OutProf Octets: 548702
At time t = 10 sec (Mode: Absolute)
______
LSP Name
          : sample
           : 1.1.1.1
Collect Stats : Enabled
                                Accting Plcy. : None
Adm State : Up
                                PSB Match : True
FC BE
InProf Pkts : 568
                                OutProf Pkts : 0
InProf Octets : 578224
                                OutProf Octets: 0
FC L2
InProf Pkts : 0
                                OutProf Pkts : 568
InProf Octets : 0
                                OutProf Octets: 578224
FC AF
InProf Pkts : 0
                                OutProf Pkts : 0
InProf Octets : 0
                                OutProf Octets: 0
FC L1
InProf Pkts : 1136
                                OutProf Pkts : 0
InProf Octets : 1156448
                                OutProf Octets: 0
FC H2
InProf Pkts : 0
                                OutProf Pkts : 568
                                OutProf Octets: 578224
InProf Octets: 0
InProf Pkts : 568
                                OutProf Pkts : 0
InProf Octets : 578224
                                OutProf Octets: 0
FC H1
InProf Pkts : 568
                                OutProf Pkts : 0
InProf Octets : 578224
                                OutProf Octets: 0
FC NC
InProf Pkts : 0
                                OutProf Pkts : 568
InProf Octets: 0
                                OutProf Octets: 578224
At time t = 20 sec (Mode: Absolute)
______
LSP Name
          : sample
          : 1.1.1.1
______
Collect Stats : Enabled
                               Accting Plcy. : None
Adm State : Up
                               PSB Match : True
FC BE
InProf Pkts : 597
                                OutProf Pkts : 0
InProf Octets : 607746
                                OutProf Octets: 0
FC L2
InProf Pkts : 0
                                OutProf Pkts : 597
InProf Octets : 0
                                OutProf Octets: 607746
InProf Pkts : 0
                                OutProf Pkts : 0
InProf Octets : 0
                                OutProf Octets: 0
FC L1
InProf Pkts : 1194
                                OutProf Pkts : 0
InProf Octets : 1215492
                                OutProf Octets: 0
FC H2
InProf Pkts : 0
                                OutProf Pkts : 597
```

Monitor CLI Commands

```
InProf Octets : 0
                                   OutProf Octets: 607746
FC EF
InProf Pkts : 597
                                   OutProf Pkts : 0
InProf Octets : 607746
                                   OutProf Octets: 0
FC H1
InProf Pkts : 597
                                  OutProf Pkts : 0
                                  OutProf Octets: 0
InProf Octets: 607746
FC NC
InProf Pkts : 0
                                  OutProf Pkts : 597
InProf Octets : 0
                                  OutProf Octets: 607746
At time t = 30 sec (Mode: Absolute)
LSP Name
        : sample
           : 1.1.1.1
Collect Stats : Enabled
                                 Accting Plcy. : None
Adm State : Up
                                  PSB Match : True
FC BE
InProf Pkts : 627
                                  OutProf Pkts : 0
InProf Octets : 638286
                                  OutProf Octets: 0
InProf Pkts : 0
                                  OutProf Pkts : 627
InProf Octets : 0
                                  OutProf Octets: 638286
FC AF
InProf Pkts : 0
                                   OutProf Pkts : 0
InProf Octets : 0
                                   OutProf Octets: 0
FC L1
                                  OutProf Pkts : 0
InProf Pkts : 1254
InProf Octets: 1276572
                                  OutProf Octets: 0
InProf Pkts : 0
                                   OutProf Pkts : 627
InProf Octets : 0
                                   OutProf Octets: 638286
FC EF
InProf Pkts : 627
                                  OutProf Pkts : 0
InProf Octets: 638286
                                  OutProf Octets: 0
FC H1
InProf Pkts : 627
                                  OutProf Pkts : 0
InProf Octets: 638286
                                  OutProf Octets: 0
FC NC
InProf Pkts : 0
                                   OutProf Pkts : 627
InProf Octets : 0
                                  OutProf Octets: 638286
______
B:Dut-C-cpm2#
```

ospf

```
Syntax ospf [ospf-instance]

Context monitor>router>ospf

Description This command enables the context to configure monitor commands for the OSPF instance.

Parameters ospf-instance — Specifies the OSPF instance.

Values 1—31
```

ospf3

Syntax ospf3

Context monitor>router

Description This command enables the context to configure monitor commands for the OSPF3 instance.

interface

Syntax interface interface [interface...(up to 5 max)] [interval seconds] [repeat repeat] [absolute |

rate]

Context monitor>router>ospf

monitor>router>ospf3

Description This command displays statistics for OSPF interfaces at the configured interval until the configured

count is reached.

The first screen displays the current statistics related to the OSPF interface(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword rate is specified, the "rate per second" for each statistic is displayed instead of the

delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval

specified.

Parameters

interface — Specify the interface's IP address (*ip-address*) or interface name (*ip-int-name*). Up to 5 interfaces can be specified. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds **Values** 3 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

Sample Output

A:ALA-12>monitor>router>ospf# interface to-104 interval 3 repeat 3 absolute

-----Monitor statistics for OSPF Interface "to-104"

```
At time t = 0 sec (Base Statistics)
Tot Rx Packets: 8379
                                   Tot Tx Packets: 8528
                                  Tx Hellos : 8368
Tx DBDs : 12
Rx Hellos : 8225
            : 6
Rx DBDs
                                  TX LSUS
           : 2
Rx LSRs
Rx LSUs
           : 55
Rx LS Acks : 91
                                  Tx LS Acks : 52
Discards : 0
Retransmits : 2
                                  Bad Virt Links : 0
Bad Networks : 0
Bad Areas : 0
                                   Bad Dest Addrs : 0
Bad Auth Types: 0
                                   Auth Failures : 0
Bad Neighbors : 0
                                   Bad Pkt Types : 0
Bad Lengths : 0
                                   Bad Hello Int. : 0
Bad Dead Int. : 0
                                   Bad Options : 0
Bad Versions : 0
______
At time t = 3 sec (Mode: Absolute)
Tot Rx Packets: 8379
                                   Tot Tx Packets: 8528
Rx Hellos : 8225
                                   Tx Hellos : 8368
Rx DBDs
                                  Tx DBDs : 12
Tx LSRs : 1
Tx LSUs : 95
Rx DBDs : 6
Rx LSRs : 2
Rx LSUs : 55
                                  Tx LS Acks : 52
Discards : 0
Rx LS Acks : 91
Retransmits : 2
Bad Networks : 0
                                  Bad Virt Links : 0
Bad Areas : 0
                                  Bad Dest Addrs : 0
                                   Auth Failures : 0
Bad Auth Types: 0
Bad Neighbors : 0
                                   Bad Pkt Types : 0
Bad Lengths : 0
Bad Dead Int. : 0
                                   Bad Hello Int. : 0
                                   Bad Options : 0
Bad Versions : 0
At time t = 6 sec (Mode: Absolute)
______
Tot Rx Packets: 8380
                                   Tot Tx Packets: 8529
Rx Hellos : 8226
                                   Tx Hellos : 8369
           : 6
                                   Tx DBDs
Rx DBDs
.... докs : 2
Rx LSUs · Г
                                   Tx LSRs
                                  та LSUs
             : 55
Rx LS Acks
                                  Tx LS Acks : 52
Discards : 0
             : 91
Retransmits : 2
Bad Networks : 0
                                  Bad Virt Links : 0
Bad Areas : 0
                                  Bad Dest Addrs : 0
Bad Auth Types: 0
                                  Auth Failures : 0
                                   Bad Pkt Types : 0
Bad Neighbors : 0
Bad Lengths : 0
                                   Bad Hello Int. : 0
Bad Dead Int. : 0
                                   Bad Options : 0
Bad Versions : 0
______
At time t = 9 sec (Mode: Absolute)
Tot Rx Packets: 8380
                                  Tot Tx Packets: 8529
Rx Hellos : 8226
                                   Tx Hellos : 8369
Rx DBDs
                                   Tx DBDs
            : 6

      Rx LSRs
      : 2

      Rx LSUs
      : 55

      Rx LS Acks
      : 91

                                   Tx LSRs
Tx LSUs
                                   Tx LSUs
Tx LS Acks : 52
Rx LS Acks : 91
Retransmits : 2
```

```
Bad Networks : 0
                             Bad Virt Links : 0
Bad Areas : 0
                             Bad Dest Addrs : 0
                             Auth Failures
Bad Auth Types: 0
Bad Neighbors : 0
                             Bad Pkt Types
Bad Lengths
           : 0
                             Bad Hello Int. : 0
                             Bad Options
Bad Dead Int. : 0
Bad Versions : 0
______
A:ALA-12>monitor>router>ospf#
A:ALA-12>monitor>router>ospf# interface to-104 interval 3 repeat 3 rate
______
Monitor statistics for OSPF Interface "to-104"
______
At time t = 0 sec (Base Statistics)
______
Tot Rx Packets: 8381
                             Tot Tx Packets: 8530
Rx Hellos : 8227
                             Tx Hellos : 8370
Rx DBDs
         : 6
                             Tx DBDs
         : 2
Rx LSRs
                             Tx LSRs
Rx LSUs
           : 55
                             Tx LSUs
                            Tx LS Acks : 52
Rx LS Acks
           : 91
Retransmits
                            Discards
           : 2
Bad Networks : 0
                            Bad Virt Links : 0
Bad Areas : 0
                            Bad Dest Addrs : 0
Bad Auth Types : 0
                            Auth Failures : 0
Bad Neighbors : 0
                            Bad Pkt Types : 0
Bad Lengths : 0
                            Bad Hello Int. : 0
                             Bad Options : 0
Bad Dead Int. : 0
Bad Versions : 0
At time t = 3 \text{ sec (Mode: Rate)}
Tot Rx Packets: 0
                             Tot Tx Packets: 0
Rx Hellos : 0
                             Tx Hellos : 0
Rx DBDs
                             Tx DBDs
         : 0
Rx LSRs
         : 0
                             Tx LSRs
Rx LS Acks · ^
                            Tx LSUs
                            Tx LS Acks : 0
         : 0
Retransmits
                             Discards
Bad Networks : 0
                            Bad Virt Links : 0
                            Bad Dest Addrs : 0
Bad Areas
           : 0
Bad Auth Types : 0
                            Auth Failures : 0
                            Bad Pkt Types : 0
Bad Neighbors : 0
Bad Lengths : 0
                            Bad Hello Int. : 0
Bad Dead Int. : 0
                            Bad Options : 0
Bad Versions : 0
At time t = 6 \text{ sec (Mode: Rate)}
______
Tot Rx Packets: 0
                             Tot Tx Packets: 0
                             Tx Hellos : 0
Rx Hellos : 0
Rx DBDs
         : 0
                             Tx DBDs
Rx LSRs
         : 0
                             Tx LSRs
Rx LSUs : 0
Rx LS Acks : 0
                            Tx LSUs
         : 0
: 0
                             Tx LS Acks : 0
                             Discards
Retransmits
Bad Networks
                             Bad Virt Links : 0
Bad Areas
           : 0
                             Bad Dest Addrs : 0
Bad Auth Types: 0
                             Auth Failures : 0
```

```
Bad Neighbors : 0
                             Bad Pkt Types : 0
Bad Lengths : 0
                           Bad Hello Int. : 0
Bad Dead Int.
                              Bad Options
Bad Versions : 0
At time t = 9 sec (Mode: Rate)
Tot Tx Packets: 0
Tot Rx Packets: 0
Rx Hellos : 0
                             Tx Hellos : 0
Rx DBDs
          : 0
                              Tx DBDs
                             Tx LSRs : 0
Tx LSUs : 0
Tx LS Acks : 0
Discards : 0
Rx LSRs : 0
Rx LSUs : 0
Rx LSUs : 0
Rx LS Acks : 0
Retransmits : 0
Bad Networks : 0
                             Bad Virt Links : 0
Bad Areas : 0
                             Bad Dest Addrs : 0
Bad Auth Types: 0
                              Auth Failures : 0
Bad Neighbors : 0
                              Bad Pkt Types : 0
Bad Lengths : 0
                              Bad Hello Int. : 0
Bad Dead Int. : 0
                              Bad Options : 0
Bad Versions : 0
______
```

A:ALA-12>monitor>router>ospf#

neighbor

Syntax neighbor ip-address [ip-address...(up to 5 max)] [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>router>ospf

Description

This command displays statistical OSPF or OSPF3 neighbor information at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified OSPF neighbor(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

neighbor *ip-address* — The IP address to display information for entries received from the specified OPSF neighbor. Up to 5 IP addresses can be specified.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds
Values 3 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

Sample Output

```
A:ALA-12>monitor>router# ospf neighbor 10.0.0.104 interval 3 repeat 3 absolute
______
Monitor statistics for OSPF Neighbor 10.0.0.104
______
At time t = 0 sec (Base Statistics)
Bad Nbr States : 0
                         LSA Inst fails : 0
Bad Seq Nums : 0
                         Bad MTUs : 0
Bad Packets : 0
                         LSA not in LSDB : 0
Option Mismatches: 0
                         Nbr Duplicates : 0
At time t = 3 sec (Mode: Absolute)
______
                         LSA Inst fails : 0
Bad Nbr States : 0
Bad Seq Nums : 0
Bad Packets : 0
                        Bad MTUs
                         LSA not in LSDB : 0
Option Mismatches: 0
                         Nbr Duplicates : 0
______
At time t = 6 sec (Mode: Absolute)
Bad Nbr States : 0
                         LSA Inst fails : 0
Bad Seq Nums : 0
Bad Packets : 0
                         Bad MTUs
                         LSA not in LSDB : 0
                         Nbr Duplicates : 0
Option Mismatches: 0
At time t = 9 sec (Mode: Absolute)
Bad Nbr States : 0
                         LSA Inst fails : 0
Bad Seq Nums : 0
                         Bad MTUs : 0
                         LSA not in LSDB : 0
Bad Packets
          : 0
Option Mismatches: 0
                         Nbr Duplicates : 0
______
A:ALA-12>monitor>router#
A:ALA-12>monitor>router# ospf neighbor 10.0.0.104 interval 3 repeat 3 absolute
______
Monitor statistics for OSPF Neighbor 10.0.0.104
______
At time t = 0 sec (Base Statistics)
Bad Nbr States : 0
                        LSA Inst fails : 0
Bad Seq Nums : 0
Bad Packets : 0
                         Bad MTUs : 0
                         LSA not in LSDB : 0
Option Mismatches: 0
                         Nbr Duplicates : 0
______
At time t = 3 \text{ sec (Mode: Rate)}
```

```
LSA Inst fails : 0
Bad MTUs : 0
LSA not in LSDB : 0
Bad Nbr States : 0
Bad Seq Nums : 0
Bad Packets : 0
                          Nbr Duplicates : 0
Option Mismatches: 0
______
At time t = 6 sec (Mode: Rate)
______
Bad Nbr States : 0 LSA Inst fails : 0
Bad Seq Nums : 0 Bad MTUs : 0
Bad Packets : 0 LSA not in LSDB : 0
Option Mismatches: 0 Nbr Duplicates · ^
______
At time t = 9 sec (Mode: Rate)
______
Bad Nbr States : 0
                           LSA Inst fails : 0
Bad Seq Nums : 0 Bad MTUs : 0 Bad Packets : 0 LSA not in LSDB : 0 Option Mismatches: 0 Nbr Duplicates : 0
______
```

A:ALA-12>monitor>router#

neighbor

Syntax neighbor [router-id] [interface-name] [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>router>ospf3

Description

This command displays statistical OSPF or OSPF3 neighbor information at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified OSPF neighbor(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

neighbor *ip-address* — The IP address to display information for entries received from the specified OSPF neighbor. Up to 5 IP addresses can be specified.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds **Values** 3 - 60

repeat repeat — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

router-id — The router ID for an existing IP interface.

virtual-link

Syntax virtual-link nbr-rtr-id area area-id [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>router>ospf monitor>router>ospf3

Description This command displays statistical OSPF virtual link information at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified neighbor(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display.

When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

nbr-rtr-id — The IP address to uniquely identify a neighboring router in the autonomous system.

area *area-id* — The OSPF area ID, expressed in dotted decimal notation or as a 32-bit decimal integer.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds
Values 3 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

virtual-neighbor

virtual-neighbor nbr-rtr-id area area-id [interval seconds] [repeat repeat] [absolute | rate] **Syntax**

Context monitor>router>ospf monitor>router>ospf3

Description This command displays statistical OSPF virtual neighbor information at the configured interval until the configured count is reached.

> The first screen displays the current statistics related to the specified OSPF virtual neighbor router. The subsequent statistical information listed for each interval is displayed as a delta to the previous

When the keyword rate is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters *nbr-rtr-id* — The IP address to uniquely identify a neighboring router in the autonomous system.

> area area-id — The OSPF area ID, expressed in dotted decimal notation or as a 32-bit decimal integer.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds Values 3 - 60

repeat repeat — Configures how many times the command is repeated.

Default 10 **Values** 1 - 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

group

group grp-ip-address [source ip-address] [interval interval] [repeat repeat] [absolute | Syntax

rate]

Context monitor>router>pim

Description This command monitors statistics for a PIM source group.

Parameters grp-ip-address — The IP address of an multicast group that identifies a set of recipients that are

interested in a particular data stream.

source *ip-address* — The source IP address to use in the ping requests in dotted decimal notation.

Default The IP address of the egress IP interface.

Values 0.0.0.0 — 255.255.255.255

interval *interval* — Configures the interval for each display in seconds.

Default 10 seconds

Values 10|20|30|40|50|60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

neighbor

Syntax neighbor neighbor...(up to 5 max)] [interval seconds] [repeat repeat] [absolute |

rate]

Context monitor>router>rip

Description This command displays statistical RIP neighbor information at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the specified RIP neighbor(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

neighbor *ip-address* — The IP address to display information for entries received from the specified RIP neighbor. Up to 5 IP addresses can be displayed.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds

Values 3 — 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

interface

Syntax interface interface [interface...(up to 5 max)][interval seconds] [repeat repeat] [absolute |

rate]

Context monitor>router>rsvp

Description This command displays statistics for RSVP interfaces at the configured interval until the configured

count is reached.

The first screen displays the current statistics related to the RSVP interface(s). The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

interface — Specify the interface's IP address (*ip-address*) or interface name (*ip-int-name*). Up to 5 interfaces can be specified. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds

Values 3 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

service

Syntax service

Context monitor

Description This command enables the context to configure criteria to monitor specific service SAP criteria.

Syntax id service-id

Context monitor>service

Description This command displays statistics for a specific service, specified by the *service-id*, at the configured

interval until the configured count is reached.

The first screen displays the current statistics related to the *service-id*. The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

specific

Parameters service-id — The unique service identification number which identifies the service in the service

domain.

sap

Syntax sap sap-id [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>service>id service-id

Description This command monitors statistics for a SAP associated with this service.

This command displays statistics for a specific SAP, identified by the *port-id* and encapsulation value, at the configured interval until the configured count is reached.

The first screen displays the current statistics related to the SAP. The subsequent statistical information listed for each interval is displayed as a delta to the previous display. When the keyword **rate** is specified, the "rate per second" for each statistic is displayed instead of the delta.

Monitor commands are similar to **show** commands but only statistical information displays. Monitor commands display the selected statistics according to the configured number of times at the interval specified.

Parameters

sap-id — Specifies the physical port identifier portion of the SAP definition.

Values sap-id:	null dot1q qinq atm frame cisco-hdle	[port-id bundle-id bpgrp-id lag-id aps-id] [port-id bundle-id bpgrp-id lag-id aps-id]:qtag1 [port-id bundle-id bpgrp-id lag-id]:qtag1.qtag2 [port-id aps-id bundle-id bpgrp-id][:vpi/vci vpi vpi port-id bundle-id]:dlci slot/mda/port.channel	[1.vpi2]
	port-id aps-id	slot/mda/port[.channel] aps-group-id[.channel] aps keyword group-id 1 — 64	
	bundle- <i>type</i>	slot/mda.bundle-num bundle keyword	

```
ima, fr, ppp
            type
            bundle-num 1 — 128
bpgrp-id:
            bpgrp-type-bpgrp-num
            bpgrp
                       keyword
            type
                        ima
            bpgrp-num 1 — 1280
ccag-id
            ccag-id.path-id[cc-type]:cc-id
                       keyword
            ccag
            id
                        1 - 8
                        a, b
            path-id
            cc-type
                        .sap-net, .net-sap
            cc-id
                       0 - 4094
lag-id
            lag-id
            lag
                        keyword
            id
                        1 - 200
            0 - 4094
qtag1
            *. 0 — 4094
qtag2
                       0 - 4095
            NNI
vpi
                        0 - 255
            UNI
vci
            1, 2, 5 - 65535
dlci
            16 - 1022
```

port-id — Specifies the physical port ID in the slot/mda/port format.

If the card in the slot has Media Dependent Adapters (MDAs) installed, the *port-id* must be in the slot_number/MDA_number/port_number format. For example 6/2/3 specifies port 3 on MDA 2 in slot 6.

The *port-id* must reference a valid port type. When the *port-id* parameter represents SONET/SDH and TDM channels, the port ID must include the channel ID. A period "." separates the physical port from the *channel-id*. The port must be configured as an access port.

If the SONET/SDH port is configured as clear-channel then only the port is specified.

bundle-id — Specifies the multilink bundle to be associated with this IP interface. The **bundle** keyword must be entered at the beginning of the parameter.

The command syntax must be configured as follows:

bundle-id: **bundle-**type-slot-id/mda-slot.bundle-num

bundle-id value range: 1 — 128

For example:

```
*A:ALA-12>config# port bundle-ppp-5/1.1
*A:ALA-12>config>port# multilink-bundle
```

bgprp-id — Specifies the bundle protection group ID to be associated with this IP interface. The **bpgrp** keyword must be entered at the beginning of the parameter.

The command syntax must be configured as follows:

bpgrp-id: bpgrp-type-bpgrp-num

type: ima bpgrp-num value range: 1 — 1280

For example:

qtag1, qtag2 — Specifies the encapsulation value used to identify the SAP on the port or sub-port. If this parameter is not specificially defined, the default value is 0.

Values qtag1: 0 - 4094 qtag2: * | 0 - 4094

The values depends on the encapsulation type configured for the interface. The following table describes the allowed values for the port and encapsulation types.

Port Type	Encap-Type	Allowed Values	Comments
Ethernet	Null	0	The SAP is identified by the port.
Ethernet	Dot1q	0 — 4094	The SAP is identified by the 802.1Q tag on the port. Note that a 0 qtag1 value also accepts untagged packets on the dot1q port.
Ethernet	QinQ	qtag1: 0 — 4094 qtag2: 0 — 4094	The SAP is identified by two 802.1Q tags on the port. Note that a 0 qtag1 value also accepts untagged packets on the dot1q port.
SONET/SDH	IPCP	-	The SAP is identified by the channel. No BCP is deployed and all traffic is IP.
SONET/SDH TDM	BCP-Null	0	The SAP is identified with a single service on the channel. Tags are assumed to be part of the customer packet and not a service delimiter.
SONET/SDH TDM	BCP-Dot1q	0 — 4094	The SAP is identified by the 802.1Q tag on the channel.
SONET/SDH TDM	Frame Relay	16 — 991	The SAP is identified by the data link connection identifier (DLCI).
SONET/SDH ATM	ATM	vpi (NNI) 0 — 4095 vpi (UNI) 0 — 255 vci 1, 2, 5 — 65535	The SAP is identified by port or by PVPC or PVCC identifier (vpi, vpi/vci, or vpi range)

interval seconds — Configures the interval for each display in seconds.

Default11 secondsValues11 - 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10 **Values** 1 — 999

absolute — When the **absolute** keyword is specified, the absolute rate-per-second value for each statistic is displayed.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

sdp

Syntax sdp {sdp-id | far-end ip-address} [interval seconds] [repeat repeat] [absolute | rate]

Context monitor>service>id service-id

Description This command monitors statistics for a SDP binding associated with this service.

Parameters *sdp-id* — Specify the SDP identifier.

Values 1 — 17407

far-end *ip-address* — The system address of the far-end 7750 SR-Series for the SDP in dotted decimal notation.

interval seconds — Configures the interval for each display in seconds.

 Default
 11 seconds

 Values
 11 — 60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the absolute rate-per-second value for each statistic is displayed.

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

Sample Output

```
A:ALA-12# monitor service id 100 sdp 10 repeat 3
.______
Monitor statistics for Service 100 SDP binding 10
______
At time t = 0 sec (Base Statistics)
______
I. Fwd. Pkts. : 0
                     I. Dro. Pkts. : 0
E. Fwd. Pkts. : 0
                     E. Fwd. Octets : 0
At time t = 11 sec (Mode: Delta)
______
I. Fwd. Pkts. : 0
                     I. Dro. Pkts. : 0
E. Fwd. Pkts. : 0
                     E. Fwd. Octets : 0
At time t = 22 \text{ sec (Mode: Delta)}
______
I. Fwd. Pkts. : 0
                      I. Dro. Pkts. : 0
                     E. Fwd. Octets : 0
E. Fwd. Pkts. : 0
 ______
At time t = 33 \text{ sec (Mode: Delta)}
```

T Find Dkts • 0 T Dro Dkts • 0

A:ALA-12#

vrrp

Syntax vrrp

Context monitor>router

Description This command enables the context to configure criteria to monitor VRRP statistical information for a

VRRP enabled on a specific interface.

instance

Syntax instance interface interface-name vr-id virtual-router-id [interval seconds] [repeat repeat]

[absolute | rate]

Context monitor>router>vrrp

Description Monitor statistics for a VRRP instance.

Parameters interface-name — The name of the existing IP interface on which VRRP is configured.

vr-id virtual-router-id — The virtual router ID for the existing IP interface, expressed as a decimal

integer.

interval seconds — Configures the interval for each display in seconds.

Default 5 seconds

Values 3 — 60

repeat *repeat* — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the **absolute** keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

rate — When the **rate** keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

subscriber

Syntax subscriber sub-ident-string sap sap-id sla-profile sla-profile-name [base | ingress-queue-

id ingress-queue-id | egress-queue-id egress-queue-id] [interval seconds] [repeat repeat]

[absolute | rate]

Context monitor>service

Description This command monitors statistics for a subscriber.

Parameters sub-ident-string — Specifies an existing subscriber identification profile to monitor.

sap sap-id — Specifies the physical port identifier portion of the SAP definition.

Values dlci 16 - 1022

sla-profile sla-profile-name — Specifies an existing SLA profile.

interval seconds — Configures the interval for each display in seconds

Default 11

Values 11 - 60

repeat repeat — Configures how many times the command is repeated.

Default 10

Values 1 — 999

absolute — When the absolute keyword is specified, the raw statistics are displayed, without processing. No calculations are performed on the delta or rate statistics.

Default mode delta

rate — When the rate keyword is specified, the rate-per-second for each statistic is displayed instead of the delta.

base — Monitor base statistics.

ingress-queue-id *ingress-queue-id* — Monitors statistics for this queue.

Values 1 - 32

egress-queue-id — Monitors statistics for this queue.

Values

Sample Output

A:Dut-A# monitor service subscriber alcatel_100 sap 1/2/1:101 sla-profile sla default

Monitor statistics for Subscriber alcatel 100

At time t = 0 sec (Base Statistics)

SLA Profile Instance statistics

Packets

0

Off. HiPrio : 0 Off. LowPrio : 94531

30704535

Octets

```
Off. Uncolor : 0
Queueing Stats (Ingress QoS Policy 1000)
Dro. HiPrio : 0
Dro. LowPrio : 7332
For. InProf : 0
For. OutProf : 87067
                                             2510859
Queueing Stats (Egress QoS Policy 1000)
Dro. InProf : 880
                                             127660
                    : 0
Dro. OutProf : 0 0

For. InProf : 90862 12995616

For. OutProf : 0 0
SLA Profile Instance per Queue statistics
            Packets
                                            Octets
Ingress Queue 1 (Unicast) (Priority)
Off. HiPrio : 0
                                             Ω
Off. LowPrio : 0
Off. Uncolor : 0
Dro. HiPrio : 0
                                             0
                                              0
Dro. HiPrio
Dro. LowPrio
                 : 0
                                              0
                   : 0
For. OutProf
Ingress Queue 2 (Unicast) (Priority)
Off. HiPrio : 0
                                             30704535
                   : 94531
Off. LowPrio
Off. LowPrio : 94531
Off. Uncolor : 0
Dro. HiPrio : 0
Dro. LowPrio : 7332
For. InProf : 0
For. OutProf : 87067
                                  0
0
2510859
                                           28152288
Ingress Queue 3 (Unicast) (Priority)
                                              Ω
Off. HiPrio : 0
                : 0
: 0
Off. LowPrio
Off. Uncolor
                                              0
Dro. HiPrio
Dro. LowPrio : 0
For. InProf : 0
For. OutProf : 0
                                              0
Ingress Queue 11 (Multipoint) (Priority)
Off. HiPrio : 0
                                               0
Off. LowPrio
                    : 0
                                              0
Off. Uncolor : 0
                                              0
                   : 0
Dro. HiPrio
Dro. LowPrio
For. InProf
                     : 0
                                              0
For. OutProf
                     : 0
Egress Queue 1
                                          127660
               : 880
: 0
Dro. InProf
Dro. OutProf
                                             0
                                             12995616
                   : 90862
For. InProf
For. OutProf
                    : 0
Egress Queue 2
Dro. InProf
                   : 0
                                              0
```

```
Dro. OutProf : 0
For. InProf : 0
                                        0
For. OutProf
Egress Queue 3
Dro. InProf
                 . 0
                                        Ω
                : 0
Dro. OutProf
For. OutProf : 0
                                        0
A: Dut.-A#
A:Dut-A# monitor service subscriber alcatel_100 sap 1/2/1:101 sla-profile sla_default
Monitor statistics for Subscriber alcatel 100
At time t = 0 sec (Base Statistics)
SLA Profile Instance statistics
                   Packets
                                       Octets
Off. HiPrio
                : 0
Off. LowPrio : 109099
Off. Uncolor : 0
                                      35427060
Queueing Stats (Ingress QoS Policy 1000)
Dro. HiPrio : 0
Dro. LowPrio : 84
                                       2894798
                 : 8449
Dro. LowPrio
For. InProf : 0
For. OutProf : 100523
                                       32489663
Queueing Stats (Egress QoS Policy 1000)
Dro. InProf : 880
Dro. OutProf : 0
                                       127660
                 : 105578
                                       15104553
For. InProf
______
At time t = 11 \text{ sec (Mode: Rate)}
SLA Profile Instance statistics
                   Packets
                                       Octets
                                      0
Off. HiPrio : 0
Off. LowPrio : 1469
Off. Uncolor : 0
                                       477795
                                       0
                                                           0.00
Queueing Stats (Ingress QoS Policy 1000)
                                       0
Dro. HiPrio : 0
                                                           0.00
                 : 119
                                       40691
0
Dro. LowPrio
                                                           0.03
For. InProf : 0
For. OutProf : 1349
                                       437350
Queueing Stats (Egress QoS Policy 1000)
Dro. InProf : 0
Dro. OutProf : 0
                                                           0.00
                                                           0.00
                 : 1469
                                       209129
                                                           0.16
For. InProf
For. OutProf : 0
                                       0
                                                           0.00
______
```

	s for Subscriber alca	-	
At time t = 0 sec	(Base Statistics)		
	Packets	Octets	
Ingress Queue 1 (Unicast) (Priority)		
)ff. HiPrio	: 0	0	
Off. LowPrio	: 0	0	
ff. Uncolor	: 0	0	
	: 0	0	
Dro. LowPrio	: 0	0	
For. InProf	: 0	0	
		•	
For. OutProf 	service subscriber al	0 catel_100 sap 1/2/1:101 sla-profile	
For. OutProf	service subscriber al	catel_100 sap 1/2/1:101 sla-profile	sla_defa
For. OutProf	service subscriber al s for Subscriber alca (Base Statistics)	catel_100 sap 1/2/1:101 sla-profile	sla_defa
For. OutProf	service subscriber al s for Subscriber alca	catel_100 sap 1/2/1:101 sla-profile	sla_defa
Cor. OutProf	service subscriber al s for Subscriber alca (Base Statistics) Packets	catel_100 sap 1/2/1:101 sla-profiletel_100	sla_defa
Cor. OutProf	service subscriber al s for Subscriber alca (Base Statistics) Packets : 880	catel_100 sap 1/2/1:101 sla-profiletel_100 Octets 127660	sla_defa
For. OutProf	service subscriber al s for Subscriber alca (Base Statistics) Packets	catel_100 sap 1/2/1:101 sla-profiletel_100	sla_defa

Show Commands

alias

Syntax alias

Context <root>

Description This command displays a list of existing aliases.

Output Show Alias Fields — The following table describes alias output fields.

Table 21: Show Alias Output Fields

Label	Description	
Alias-Name	Displays the name of the alias.	
Alias-command-name	The command and parameter syntax that define the alias.	
Number of aliases	The total number of aliases configured on the router.	

Sample Output

A:ALA-103>config>system# show alias

Alias-Name	Alias-command-name	
sri sse ssvpls ssvprn ssi	show router interface show service service-using epipe show service service-using vpls show service service-using vprn show service service-using ies	
Number of aliases : 5		

A:ALA-103>config>system#

File System Management

In This Chapter

This chapter provides information about file system management.

Topics in this chapter include:

- The File System on page 132
 - → Compact Flash Devices on page 132
 - → URLs on page 133
 - → Wildcards on page 135
- File Management Tasks on page 137
 - → Modifying File Attributes on page 137
 - → Creating Directories on page 138
 - → Copying Files on page 139
 - → Moving Files on page 140
 - → Removing Files and Deleting Directories on page 140
 - → Displaying Directory and File Information on page 141

The File System

The 7750 SR OS file system is used to store files used and generated by the system, for example, image files, configuration files, logging files and accounting files.

The file commands allow you to copy, create, move, and delete files and directories, navigate to a different directory, display file or directory contents and the image version.

Compact Flash Devices

The file system is based on a DOS file system. In the 7750 SR-Series, each control processor can have up to three compact flash devices numbered one through three. The names for these devices are:

- cf1:
- cf2:
- cf3:

The above device names are *relative* device names as they refer to the devices local to the control processor with the current console session. As in the DOS file system, the colon (":") at the end of the name indicates it is a device.

The compact flash devices on the 7750 SR-Series routers are removable and have an administrative state (shutdown/no shutdown).

NOTE: To prevent corrupting open files in the file system, you should only remove a compact flash that is administratively shutdown. 7750 SR OS gracefully closes any open files on the device, so it can be safely removed.

URLs

The arguments for the 7750 SR OS file commands are modeled after standard universal resource locator (URL). A URL refers to a file (a *file-url*) or a directory (a *directory-url*).

7750 SR OS supports operations on both the local file system and on remote files. For the purposes of categorizing the applicability of commands to local and remote file operations, URLs are divided into three types of URLs: local, ftp and tftp. The syntax for each of the URL types are listed in Table 22.

Table 22: URL Types and Syntax

URL Type	Syntax	Notes
local-url	[cflash-id:\]path	<i>cflash-id</i> is the compact flash device name. Values: cf1:, cf2:, cf3:
ftp-url	ftp://[username[:password]@]host/path	An absolute ftp path from the root of the remote file system. username is the ftp user name password is the ftp user password host is the remote host path is the path to the directory or file
	ftp://[username[:password]@]host/./path	A relative ftp path from the user's home directory. Note the period and slash ("./") in this syntax compared to the absolute path.
tftp-url	tftp://host[/path]/filename	tftp is only supported for operations on file-urls.

Note that if the host portion of the URL is an IPv6 address, then the address should be enclosed in square brackets. For example:

```
ftp://user:passw@[3ffe::97]/./testfile.txt
tftp://[1111:2222:3333:4444:5555:6666:7777:8888]/./testfile.txt
```

The system accepts either forward slash ("/") or backslash ("\") characters to delimit directory and/or filenames in URLs. Similarly, the 7750 SR OS SCP client application can use either slash or backslash characters, but not all SCP clients treat backslash characters as equivalent to slash characters. In particular, UNIX systems will often times interpret the backslash character as an "escape" character. This can cause problems when using an external SCP client application to send files to the SCP server. If the external system treats the backslash like an escape character, the backslash delimiter will get stripped by the parser and will not be transmitted to the SCP server.

For example, a destination directory specified as "cf1:\dir1\file1" will be transmitted to the SCP server as "cf1:dir1file1" where the backslash escape characters are stripped by the SCP client

The File System

system before transmission. On systems where the client treats the backslash like an "escape" character, a double backslash "\" or the forward slash "\" can typically be used to properly delimit directories and the filename.

Wildcards

7750 SR OS supports the standard DOS wildcard characters. The asterisk (*) can represent zero or more characters in a string of characters, and the question mark (?) can represent any one character.

As in a DOS file system, the wildcard characters can only be used in some of the file commands.

Another example of wildcard usage:

```
A:21# show router mpls lsp 1-63-8*
MPLS LSPs (Originating)
______
LSP Name
            To
                    Fastfail
Adm Opr
Config
______
            213.224.245.8 No
1-63-8-cc
Up Dwn
            213.224.245.8 No
1-63-8-cw
LSPs : 2
______
```

All the commands can operate on the local file system. Table 23 indicates which commands also support remote file operations.

Table 23: File Command Local and Remote File System Support

Command	local-url	ftp-url	tftp-url	
attrib	X			
cd	X	X		
сору	X	X	X	
delete	X	X		
dir	X	X		
md		X		
move	X	X		
rd		X		
repair				
scp	source only			
type	X	X	X	
version	X	X	X	
shutdown				

File Management Tasks

The following sections are basic system tasks that can be performed.

Note that when a file system operation is performed with the copy, delete, move, rd, or scp commands that can potentially delete or overwrite a file system entry, a prompt appears to confirm the action. The **force** keyword performs the copy, delete, move, rd, and scp actions without displaying the confirmation prompt.

- Modifying File Attributes on page 137
- Creating Directories on page 138
- Copying Files on page 139
- Moving Files on page 140
- Removing Files and Deleting Directories on page 140
- Displaying Directory and File Information on page 141
- Repairing the File System on page 143

Modifying File Attributes

The system administrator can change the read-only attribute in the local file. Enter the attrib command with no options to display the contents of the directory and the file attributes. Use the CLI syntax displayed below to modify file attributes:

The following displays an example of the command syntax:

```
Example: # file
    file cf3:\ # attrib
    file cf3:\ # attrib +r BOF.SAV
    file cf3:\ # attrib
```

The following displays the file configuration:

```
A:ALA-1>file cf3:\ # attrib
cf3:\bootlog.txt
cf3:\boot.cfg
cf3:\boot.ldr
cf3:\bootlog_prev.txt
cf3:\bootlog_prev.txt
cf3:\BOF.SAV
A:ALA-1>file cf3:\ # attrib +r BOF.SAV
A:ALA-1>file cf3:\ # attrib
cf3:\bootlog.txt
cf3:\bootlog.txt
cf3:\boot.ldr
cf3:\bootlog_prev.txt

R cf3:\BOF.SAV
```

Creating Directories

Use the md command to create a new directory in the local file system, one level at a time.

Enter the cd command to navigate to different directories.

Use the CLI syntax displayed below to modify file attributes:

```
CLI Syntax: file>
    md file-url
```

The following displays an example of the command syntax:

```
Example: file cf1:\ # md test1
    file cf1:\ # cd test1
    file cf1:\test1\ # md test2
    file cf1:\test1\ # cd test2
    file cf1:\test1\test2\ # md test3
    file cf1:\test1\test2\ # cd test3
    file cf1:\test1\test2\ # cd test3
```

Copying Files

Use the **copy** command to upload or download an image file, configuration file, or other file types to or from a flash card or a TFTP server.

The **scp** command copies files between hosts on a network. It uses SSH for data transfer, and uses the same authentication and provides the same security as SSH.

The source file for the **scp** command must be local. The file must reside on the 7750 SR-Series router. The destination file has to be of the format: user@host:file-name. The destination does not need to be local.

Use the CLI syntax displayed below to copy files:

The following displays an example of the copy command syntax:

Moving Files

Use the move command to move a file or directory from one location to another.

Use the CLI syntax displayed below to move files:

The following displays an example of the command syntax:

```
Example: A:ALA-1>file cf1:\test1\test2\test3\  # move test.cfg cf1:\test1\cf1:\test1\test2\test3\  # cd ..

A:ALA-1>file cf1:\test1\test2\  # cd ..

A:ALA-1>file cf1:\test1\test2\  # cd ..

A:ALA-1>file cf1:\test1\  # dir

Directory of cf1:\test1\  # dir
```

Removing Files and Deleting Directories

Use the delete and rd commands to delete files and remove directories. Directories must be empty in order to delete them. When file or directories are deleted they cannot be recovered.

Use the CLI syntax displayed below to delete files and remove directories:

The following displays an example of the command syntax:

```
A:ALA-1>file cf1:\test1\ # delete test.cfg
A:ALA-1>file cf1:\test1\ # delete abc.cfg
A:ALA-1>file cf1:\test1\test2\ # cd test3
A:ALA-1>file cf1:\test1\test2\test3\ # cd ..
A:ALA-1>file cf1:\test1\test2\ # rd test3
A:ALA-1>file cf1:\test1\test2\ # rd test3
A:ALA-1>file cf1:\test1\test2\ # cd ..
A:ALA-1>file cf1:\test1\ # rd test2
A:ALA-1>file cf1:\test1\ # rd test2
A:ALA-1>file cf1:\test1\ # cd ..
A:ALA-1>file cf1:\ # rd test1
A:ALA-1>file cf1:\ # rd test1
```

Displaying Directory and File Information

Use the **dir** command to display a list of files on a file system.

The **type** command displays the contents of a file.

The **version** command displays the version of a cpm.tim or iom.timfile.

Use the CLI syntax displayed below to display directory and file information:

```
CLI Syntax: file>
dir [file-url]
type file-url
version file-url
```

The following displays an example of the command syntax:

```
A:ALA-1>file cf1:\ # dir
Volume in drive cf1 on slot A nas no label.

Directory of cf1:\
01/01/1980 12:00a 7597 test.cfg
01/01/1980 12:00a 957 b.

08/19/2001 02:14p 230110 BOOTROM.SYS
01/01/1980 12:00a 133 NVRAM.DAT
04/03/2003 05:32a 1709 103.ndx
01/28/2003 05:06a 1341 103.cftg.ndx
01/28/2003 05:06a 20754 103.cftg
04/05/2003 02:20a <DIR> test
15 File(s) 338240 byte
3 Dir(s) 1097728 byte
  Volume in drive cfl on slot A has no label.
                                                        338240 bytes.
                                                       1097728 bytes free.
A:ALA-1>file cf1:\ # type fred.cfg
 # Saved to /cflash1/fred.cfg
 # Generated THU FEB 21 01:30:09 2002 UTC
 exit all
 config
 # Chassis Commands
 #-----
 card 2 card-type faste-tx-32
 exit.
 # Interface Commands
 #-----
 # Physical port configuration
 interface faste 2/1
      shutdown
      mode network
 exit
 interface faste 2/2
     shutdown
 interface faste 2/3
```

File Management Tasks

shutdown
exit
interface faste 2/4
A:ALA-1>file cf1:\ # version boot.tim
TiMOS-L-1.0.B3-8
A:ALA-1>file cf1:\ #

Repairing the File System

Use the repair command to check a compact flash device for errors and repair any errors found.

Use the CLI syntax displayed below to check and repair a compact flash device:

The following displays an example of the command syntax:

```
A:ALA-1>file cf3:\ # repair
Checking drive cf3: on slot A for errors...
Drive cf31: on slot A is OK.
```

File Management Tasks

File Command Reference

Command Hierarchy

Configuration Commands

```
file
     — attrib [+r | -r] file-url
     — attrib
     — cd [file-url]
     — copy source-file-url dest-file-url [force]
     — delete file-url [force]
     — dir [file-url]
     — format cflash cflash-id [reliable]
     — md file-url
     — move old-file-url new-file-url [force]
     — rd file-url [force]
     — repair [cflash-id]
     — scp local-file-url destination-file-url [router router-instance] [force]
     — [no] shutdown [active] [standby]
     — [no] shutdown cflash-id
     — type file-url
     — version file-url [check]
     — vi local-url
```

File Command Reference

Configuration Commands

File System Commands

shutdown

Syntax [no] shutdown [active] [standby]

[no] shutdown [cflash-id]

Context file

Description This command shuts down (unmounts) the specified CPM(s).

Use the **no shutdown** [active] [standby] command to enable one or both CPM.

Use the **no shutdown** [*cflash-id*] command to enable a compact flash (cf1:, cf2:, or cf3:) on the an SF/CPM cardcard. The **no shutdown** command can be issued for a specific slot when no compact flash is present. When a flash card is installed in the slot, the card will be activated upon detection.

In redundant systems, use the **no shutdown** command on cf3: on both SF/CPM cards in order to facilitate synchronization. See the **synchronize** command on **page 387**.

NOTE: The **shutdown** command must be issued prior to removing a flash card. If no parameters are specified, then the drive referred to by the current working directory will be shut down.

LED Status Indicators — The following states are possible for the compact flash:

Operational:

If a compact flash is present in a drive and operational (**no shutdown**), the respective LED is lit green. The LED flickers when the compact flash is accessed.

NOTE: *Do not remove* the compact flash during a read/write operation.

State: admin = up, operational = up, equipped

Flash defective:

If a compact flash is defective, the respective LED blinks amber to reflect the error condition and a trap is raised.

State: admin = up/down, operational = faulty, equipped = no

Flash drive shut down:

When the compact flash drive is shut down and a compact flash present, the LED is lit amber. In this state, the compact flash can be ejected.

State: admin = down, operational = down, equipped = yes

No compact flash present, drive shut down:

If no compact flash is present and the drive is shut down the LED is unlit.

State: admin = down, operational = down, equipped = no

File System Commands

No compact flash present, drive enabled:

If no compact flash is present and the drive is not shut down the LED is unlit.

State: admin = up, operational = down, equipped = no

Ejecting a compact flash:

The compact flash drive should be shut down before ejecting a compact flash card. The LED should turn to solid (not blinking) amber. This is the only mode to safely remove the flash card.

If a compact flash drive is not shut down before a compact flash is ejected, the LED blinks amber for approximately 5 seconds before shutting off.

State: admin = down, operational = down, equipped = yes

The **shutdown** or **no shutdown** state is not saved in the configuration file. Following a reboot all compact flash drives are in their default state.

Default

no shutdown — compact flash device administratively enabled

Parameters

cflash-id — Enter the compact flash slot ID to be shut down or enabled. When a specific cflash-id is specified, then that drive is shutdown. If no cflash-id is specified, the drive referred to by the current working directory is assumed. If a slot number is not specified, then the active CPM is assumed.

Default The current compact flash device

Values cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

active — If active is selected, then all drives on the active CPM are shutdown or enabled.

standby — If **standby** is selected, then all drives on the standby CPM are shutdown or enabled.

Note: When both **active** and **standby** keywords are specified, then all drives on both CPM are shutdown.

File Commands

attrib

Syntax attrib [+r | -r] file-url

attrib

Context file

Description

This command sets or clears/resets the read-only attribute for a file in the local file system. To list all files and their current attributes enter **attrib** or **attrib** \mathbf{x} where \mathbf{x} is either the filename or a wildcard (*).

When an **attrib** command is entered to list a specific file or all files in a directory, the file's attributes are displayed with or without an "R" preceding the filename. The "R" implies that the +r is set and that the file is read-only. Files without the "R" designation implies that the -r is set and that the file is read-write-all. For example:

```
ALA-1>file cf3:\ # attrib
cf3:\bootlog.txt
cf3:\bof.cfg
cf3:\boot.ldr
cf3:\sr1.cfg
cf3:\test
cf3:\bootlog_prev.txt
R cf3:\BOF.SAV
```

Parameters

file-url — The URL for the local file.

Values local-url | remote-url: 255 chars max

local-url: [cflash-id/][file-path]

 $remote-url \\ [ftp://login:pswd@remote-locn/][file-path]$

cf1:,cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

+r — Sets the read-only attribute on the specified file.

-r — Clears/resets the read-only attribute on the specified file.

cd

Syntax cd [file-url]

Context file

Description This command displays or changes the current working directory in the local file system.

Parameters *file-url* — Syntax: [local-url | remote-url (255 chars max)

local-url - [cflash-id/][file-path]

remote-url - [{ftp://|tftp://}login:pswd@remote-locn/][file-path] cf1:,cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3-A:,cf3-B:

File Commands

<none> — Displays the current working directory.

.. — Signifies the parent directory. This can be used in place of an actual directory name in a *directory-url*.

directory-url — The destination directory.

copy

Syntax copy source-file-url dest-file-url [force]

Context file

Description

This command copies a file or all files in a directory from a source URL to a destination URL. At least one of the specified URLs should be a local URL. The optional wildcard (*) can be used to copy multiple files that share a common (partial) prefix and/or (partial) suffix.

When a file is copied to a destination with the same file name, the original file is overwritten by the new file specified in the operation. The following prompt appears if the destination file already exists:

"Overwrite destination file (y/n)?"

For example:

```
To copy a file named srcfile in a directory called test on cf2 in slot B to a file called destfile in a directory called production on cf1 in slot A, the syntax is: srl>file cf2:\ # copy cf2-B/test/srcfile cf1-A/production/destfile

To FTP a file named 121201.cfg in directory mydir stored on cf1 in slot A to a network FTP server with IP address 131.12.31.79 in a directory called backup with a destination file name of 121201.cfg, the FTP syntax is: copy cf1-A/mydir/121201.cfg 131.12.31.79/backup/121201.cfg
```

Parameters

source-file-url — The location of the source file or directory to be copied.

dest-file-url — The destination of the copied file or directory.

force — Forces an immediate copy of the specified file(s).

file copy force executes the command without displaying a user prompt message.

delete

Syntax delete file-url [force]

Context file

Description

This command deletes the specified file.

The optional wildcard "*" can be used to delete multiple files that share a common (partial) prefix and/or (partial) suffix. When the wildcard is entered, the following prompt displays for each file that matches the wildcard:

"Delete file <filename> (v/n)?"

file-url — The file name to delete.

Values *local-url* | *remote-url*: 255 chars max

local-url: [cflash-id/][file-path]

remote-url [ftp://login:pswd@remote-locn/][file-path]

cf1:,cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

force — Forces an immediate deletion of the specified file(s).

file delete * force deletes all the wildcard matching files without displaying a user prompt message.

dir

Syntax dir [file-url]

Context file

Description This command displays a list of files and subdirectories in a directory.

Parameters *file-url* — The path or directory name.

Use the *file-url* with the optional wildcard (*) to reduce the number of files to list.

Default Lists all files in the present working directory

file

Syntax file

Context root

Description The context to enter and perform file system operations. When entering the **file** context, the prompt

changes to reflect the present working directory. Navigating the file system with the cd .. command

results in a changed prompt.

The **exit all** command leaves the file system/file operation context and returns to the <ROOT> CLI context. The state of the present working directory is maintained for the CLI session. Entering the **file**

command returns the cursor to the working directory where the exit command was issued.

format

Syntax format cflash cflash-id [reliable]

Context root>file

Description This command formats the compact flash. The compact flash must be shutdown before starting the

format.

File Commands

Parameters *cflash-id* — The compact flash type.

Values cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

reliable — Enables the reliance file system and disables the default DOS file system. This option is valid only on compact flashes 1 and 2.

md

Syntax md file-url

Context file

Description This command creates a new directory in a file system.

Directories can only be created one level at a time.

Parameters *file-url* — The directory name to be created.

Values *local-url* | *remote-url*: 255 chars max

local-url: [cflash-id/][file-path]

 $remote-url \\ [ftp://login:pswd@remote-locn/][file-path]$

cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

move

Syntax move old-file-url new-file-url [force]

Context file

Description This command moves a local file, system file, or a directory. If the target already exists, the command

fails and an error message displays.

The following prompt appears if the destination file already exists:

"Overwrite destination file (y/n)?"

Parameters *old-file-url* — The file or directory to be moved.

Values *local-url* | *remote-url*: 255 chars max

local-url: [cflash-id/][file-path]

remote-url [ftp://login:pswd@remote-locn/][file-path]

cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

new-file-url — The new destination to place the old-file-url.

Values *local-url* | *remote-url*: 255 chars max

local-url: [cflash-id/][file-path]

remote-url [ftp://login:pswd@remote-locn/][file-path]

cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

force — Forces an immediate move of the specified file(s).

file move force executes the command without displaying a user prompt message.

rd

Syntax rd file-url [force]

Context file

Description Removes (deletes) a directory in a file system. The following message displays: Are you sure (y/n)?

Parameters *file-url* — The directory to be removed.

Values *local-url* | *remote-url*: 255 chars max

local-url: [cflash-id/][file-path]

remote-url [ftp://login:pswd@remote-locn/][file-path]

cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3-A:,cf3-B:

force — Forces an immediate deletion of the specified directory.

rd file-url force executes the command without displaying a user prompt message.

repair

Syntax repair [cflash-id]

Context file

Description This command checks a compact flash device for errors and repairs any errors found.

Parameters

cflash-id — Specify the compact flash slot ID to be shut down or enabled. When a specific cflash-id is specified, then that drive is shutdown. If no cflash-id is specified, the drive referred to by the current working directory is assumed. If a slot number is not specified, then the active SF/CPM-CFM is assumed.

Default The current compact flash device

Values cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

scp

Syntax scp local-file-url destination-file-url [router router-instance] [force]

Context file

Description This command copies a local file to a remote host file system. It uses ssh for data transfer, and uses the same authentication and provides the same security as ssh. The following prompt appears:

"Are you sure (y/n)?" The destination must specify a user and a host.

File Commands

Parameters *local-file-url* — The local source file or directory.

Values [cflash-id/][file-path]: Up to 256 characters.

destination-file-url — The destination file.

Values user@hostname:destination-file

user — The SSH user.

host — The remote host IP address of DNS name.

file-path — The destination path.

router-instance — Specify the router name or service ID.

Values router-name: Base, management

service-id: 1 — 2147483647

Default Base

force — Forces an immediate copy of the specified file.

file scp *local-file-url destination-file-url* [router] **force** executes the command without displaying a user prompt message.

type

Syntax type file-url

Context file

Description Displays the contents of a text file.

Parameters *file-url* — The file contents to display.

version

Syntax version file-url [check]

Context file

Description This command displays the version of a TiMOS cpm.tim or iom.timfile.

Parameters *file-url* — The file name of the target file.

Values local-url | remote-url: 255 characters maximum

local-url: [cflash-id/][file-path]

remote-url: [{ftp://|tftp://}login:pswd@remote-locn/][file-path]

cflash-id: cfl:, cfl-A:, cfl-B:

check — Validates the .tim file.

Sample Output

```
A:Redundancy>file cf3:\ # version ftp://test:tigris@xxx.xxx.xxx.xxx/usr/global/images/6.1/R4/cpm.tim
TiMOS-C-6.1.R4 for 7750
Thu Oct 30 14:21:09 PDT 2008 by builder in /rel6.1/b1/R4/panos/main
A:Redundancy>file cf3:\ # version check ftp://test:tigris@xxx.xxx.xxx.xx/usr/global/images/6.1/R4/cpm.tim
TiMOS-C-6.1.R4 for 7750
Thu Oct 30 14:21:09 PDT 2008 by builder in /rel6.1/b1/R4/panos/main
Validation successful
A:Redundancy>file cf3:\ #
```

νi

Syntax vi local-url

Context file

Description Edit files using the vi editor. Refer to VI Editor on page 38.

Parameters *local-url* — Specifies the local source file or directory.

Values [cflash-id>/]file-path

cflash-id: cf1:, cf2:, cf3:

File Commands

Boot Options

In This Chapter

This chapter provides information about configuring boot option parameters.

Topics in this chapter include:

- System Initialization on page 158
 - → Configuration and Image Loading on page 162
 - Persistence on page 164
- Initial System Startup Process Flow on page 165
- Configuration Notes on page 166

System Initialization

The primary copy of SR OS software is located on a compact flash card. The removable media is shipped with each 7750 SR-Series router and contains a copy of the OS image.



Notes:

- The CPM modules contain three slots for removable compact flash cards. The drives are named Compact Flash Slot #1 (*cf1*), Compact Flash Slot #2 (*cf2*), and Compact Flash Slot #3 (*cf3*). Configurations and executable images can be stored on flash cards or an FTP file location. There are six Compact Flash slots on the 7750 SR-c12, three for CFM-A and three for CFM-B.
- The flash card containing the bootstrap and boot option files *must* be installed in Compact Flash Slot #3 (*cf3*) on the CPM.
- You must have a console connection.

Starting a 7750 SR-Series router begins with hardware initialization (a reset or power cycle). By default, the system searches Compact Flash Slot #3 (cf3) for the boot.ldr file (also known as the bootstrap file). The boot.ldr file is the image that reads and executes the system initialization commands configured in the boot option file (BOF). The default value to initially search for the boot.ldr file on cf3 cannot be modified.

The following is an example of console display output when the boot . 1dr file cannot be located on cf3.

```
(memory test messages)
(serial number information)
Searching for boot.ldr on local drives:
No disk in cf3
No disk in cf3
No disk in cf3
Error - file boot.ldr not found on any drive
Please insert CF containing boot.ldr. Rebooting in 5 seconds.
(5 second wait)
Rebooting...
(memory test messages)
(user presses '2')
Skipping CF power on diagnostics, boot from CF2
(serial number information)
Searching for boot.ldr on local drives:
Searching cf2 for boot.ldr...
********
(normal boot continues)
```

When the bootstrap image is loaded, the BOF is read to obtain the location of the image and configuration files. The BOF must be located on the same compact flash drive as the boot.ldr file.

Figure 3 displays the system initialization sequence.

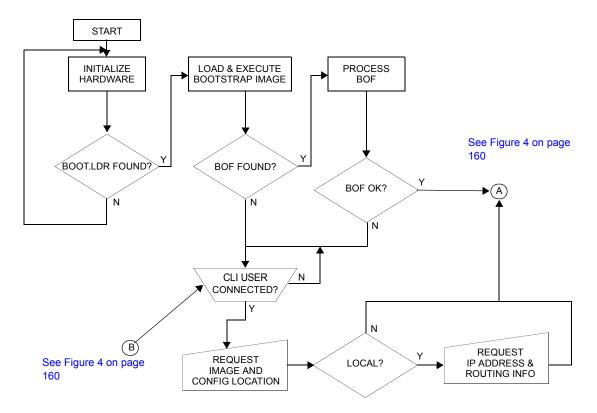


Figure 3: System Initialization - Part 1

Figure 4 displays the compact flash directory structure and file names for the redundant chassis models.

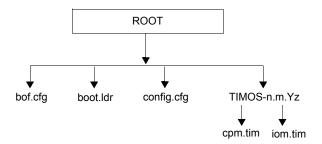


Figure 4: Files on the Compact Flash

Files on the compact flash are:

- bof.cfg Boot option file
- boot.ldr Bootstrap image
- config.cfg Default configuration file
- TIMOS-m.n.Yz:
 - m Major release number
 - n minor release number
 - Y: A Alpha release
 - B Beta release
 - M Maintenance release
 - R Released software
 - z Version number
 - → cpm.tim CPM image file
 - → iom.tim IOM image file

Figure 5 displays the compact flash directory structure and file names for the 1-slot models (non-redundant).

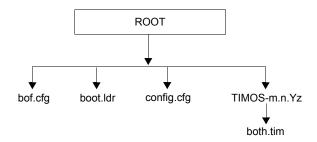


Figure 5: Files on the Compact Flash

Files on the compact flash are:

- bof.cfg Boot option file
- boot.ldr Bootstrap image
- config.cfg Default configuration file
- TIMOS-m.n.Yz:
 - m Major release number
 - n Minor release number
 - Y: A Alpha release
 - B Beta release
 - M Maintenance release
 - R Released software
 - z Version number
 - → both.tim CPM and IOM image file

Configuration and Image Loading

When the system executes the boot.ldr file, the initialization parameters from the BOF are processed. Three locations can be configured for the system to search for the files that contains the runtime image. The locations can be local or remote. The first location searched is the primary image location. If not found, the secondary image location is searched, and lastly, the tertiary image location is searched.

If the BOF cannot be found or loaded, then the system enters a console message dialog session prompting the user to enter alternate file locations and file names.

When the runtime image is successfully loaded, control is passed from the bootstrap loader to the image. The runtime image attempts to locate the configuration file as configured in the BOF. Like the runtime image, three locations can be configured for the system to search for the configuration file. The locations can be local or remote. The first location searched is the primary configuration location. If not found, the secondary configuration location is searched, and lastly, the tertiary configuration location is searched. The configuration file include chassis, IOM, MDA, and port configurations, as well as system, routing, and service configurations.

Figure 6 displays the boot sequence.

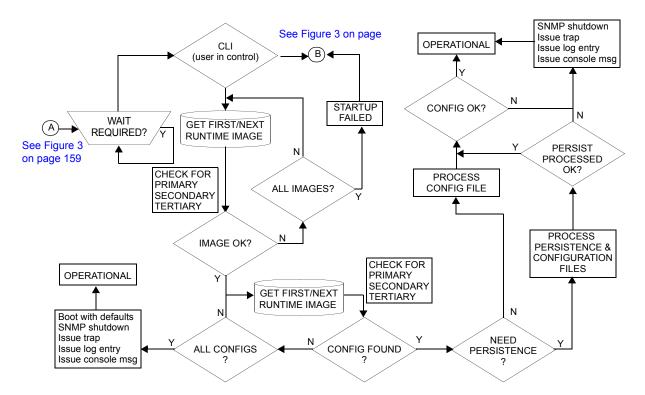


Figure 6: System Initialization - Part 2

The following displays an example of BOF output.

A:ALA-1>bof# show bof

no autonegotiate

duplex full speed 100 address 10.10.xx.xx/20 active wait 3 primary-image cf3:\both.tim primary-config cf3:\test123.cfg primary-dns 192.168.xx.xx

persist on dns-domain test.alcatel.com

A:ALA-1>bof#

Persistence

Optionally, the BOF persist parameter can specify whether the system should preserve system indexes when a save command is executed. During a subsequent boot, the index file is read along with the configuration file. As a result, a number of system indexes are preserved between reboots, including the interface index, LSP IDs, path IDs, etc. If persistence is not required and the configuration file is successfully processed, then the system becomes operational. If persist is required, then a matching x.ndx file must be located and successfully processed before the system can become operational. Matching files (configuration and index files) must have the same filename prefix such as test123.cfg and test123.ndx and are created at the same time when a save command is executed. Note that the persistence option must be enabled to deploy the Network Management System (NMS). The default is off.

Traps, logs, and console messages are generated if problems occur and SNMP shuts down for all SNMP gets and sets, however, traps are issued.

Lawful Intercept

Lawful Intercept (LI) describes a process to intercept telecommunications by which law enforcement authorities can un-obtrusively monitor voice and data communications to combat crime and terrorism with higher security standards of lawful intercept capabilities in accordance with local law and after following due process and receiving proper authorization from competent authorities. The interception capabilities are sought by various telecommunications providers.

As lawful interception is subject to national regulation, requirements vary from one country to another. Alcatel-Lucent's implementation satisfies most national standard's requirements. LI is configurable for all service types.

Initial System Startup Process Flow

Figure 7 displays the process start your system. Note that this example assumes that the boot loader and BOF image and configuration files are successfully located.

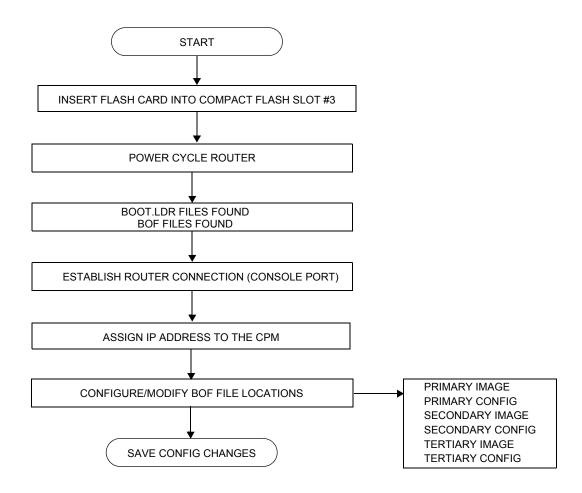


Figure 7: System Startup Flow

Configuration Notes

This section describes BOF configuration caveats.

- For router initialization, the compact flash card must be installed in the Compact Flash #3 slot.
- The loading sequence is based on the order in which it is placed in the configuration file. It is loaded as it is read in at boot time.

For example, for services, if a VPRN service, *service-id* 272, is created first and then an Apipe service, *service-id* 2, created next, the VPRN 272 will be loaded first because it was created first.

Configuring Boot File Options with CLI

This section provides information to configure BOF parameters with CLI.

Topics in this section include:

- Configuring Boot File Options with CLI on page 167
- BOF Configuration Overview on page 168
- Basic BOF Configuration on page 169
- Common Configuration Tasks on page 170
- Configuring BOF Parameters on page 175
- Service Management Tasks on page 176
 - → Viewing the Current Configuration on page 176
 - → Modifying and Saving a Configuration on page 178
 - → Saving a Configuration to a Different Filename on page 180
 - → Rebooting on page 180

BOF Configuration Overview

Alcatel-Lucent 7750 SR-Series routers do not contain a boot EEPROM. The boot loader code is loaded from the boot.ldr file. The BOF file performs the following tasks:

- 1. Sets up the CPM Ethernet port (speed, duplex, auto).
- 2. Assigns the IP address for the CPM Ethernet port.
- 3. Creates static routes for the CPM Ethernet port.
- 4. Sets the console port speed.
- 5. Configures the Domain Name System (DNS) name and DNS servers.
- 6. Configures the primary, secondary, tertiary configuration source.
- 7. Configures the primary, secondary, and tertiary image source.
- 8. Configures operational parameters.

Basic BOF Configuration

The parameters which specify location of the image filename that the router will try to boot from and the configuration file are in the BOF.

The most basic BOF configuration should have the following:

- · Primary address
- Primary image location
- Primary configuration location

Following is a sample of a basic BOF configuration.

7750 SR OS Basic System Configuration Guide

Common Configuration Tasks

The following sections are basic system tasks that must be performed.

- Searching for the BOF on page 171
 - → Accessing the CLI on page 173
 - Console Connection on page 173
- Configuring BOF Parameters on page 175

For details about hardware installation and initial router connections, refer to the specific 7750 SR-Series hardware installation guide.

Searching for the BOF

The BOF should be on the same drive as the boot loader file. If the system cannot load or cannot find the BOF, then the system checks whether the boot sequence was manually interrupted. The system prompts for a different image and configuration location.

The following example displays an example of the output when the boot sequence is interrupted.

```
Hit a key within 3 seconds to change boot parms...
You must supply some required Boot Options. At any prompt, you can type:
  "restart" - restart the query mode.
   "reboot" - reboot.
   "exit" - boot with with existing values.
Press ENTER to begin, or 'flash' to enter firmware update...
Software Location
  You must enter the URL of the TiMOS software.
  The location can be on a Compact Flash device,
  or on the network.
  Here are some examples
     cf31:/timos1.0R1
      ftp://user:passwd@192.168.xx.xxx/./timos1.0R1
      tftp://192.168.xx.xxx/./timos1.0R1
The existing Image URL is 'ftp://vxworks:vxw0rks@192.168.xx.xxx/./rel/0.0/xx'
Press ENTER to keep it.
Software Image URL:
Using: 'ftp://vxworks:vxw0rks@192.168.xx.xxx/./rel/0.0/xx'
Configuration File Location
_____
  You must enter the location of configuration
  file to be used by TiMOS. The file can be on
  a Compact Flash device, or on the network.
  Here are some examples
     cf1:/config.cfg
      ftp://user:passwd@192.168.xx.xxx/./config.cfg
      tftp://192.168.xx.xxx/./config.cfg
The existing Config URL is 'cf31:/config.cfg'
Press ENTER to keep it, or the word 'none' forno Config URL.
Config File URL:
Using: 'cf31:/config.cfg'
Network Configuration
   You specified a network location for either the
```

software or the configuration file. You need to

```
assign an IP address for this system.
                  The IP address should be entered in standard
                  dotted decimal form with a network length.
                      example: 192.168.xx.xxx/24
Displays
              The existing IP address is 192.168.xx.xxx/20. Press ENTER to keep it.
             Enter IP Address:
onno n-
Redundant
             Using: 192.168.xx.xxx/20
Models I
Display on
             The existing Active IP address is 192.168.xx.xxx/20. Press ENTER to keep it.
Redundant
             Enter Active IP Address:
models
              Using: 192.168.xx.xxx/20
               The existing Standby IP address is 192.168.xx.xxx/20. Press ENTER to keep it.
               Enter Standby IP Address (Type 0 ifno ne desired):
               Using: 192.168.xx.xxx/20
               Would you like to add a static route? (yes/no) y
               Static Routes
                  You specified network locations which require
                  static routes to reach. You will be asked to
                  enter static routes until all the locations become
                  reachable.
                  Static routes should be entered in the following format:
                  prefix/mask next-hop ip-address
                      example: 192.168.xx.xxx/16 next-hop 192.168.xx.xxx
               Enter route: 1.x.x.0/24 next-hop 192.168.xx.xxx
               Would you like to add another static route? (yes/no) n
               New Settings
                   primary-image ftp://vxworks:vxw0rks@192.168.xx.xx/./rel/0.0/xx
                  primary-config cf3:/config.cfg
address 192.168.xx.xx/20 active
primary-dns 192.168.xx.xx
dns-domain xxx.xxx.com
                   static-route 1.x.x.0/24 next-hop 192.168.xx.xxx
                   autonegotiate
                   duplex full speed 100
                   speed
                   wait
                   persist
                                    off
               Do you want to overwrite cf3:/bof.cfg with the new settings? (yes/no): y
               Successfully saved the new settings in cf3:/bof.cfg
```

Accessing the CLI

To access the CLI to configure the software for the first time, follow these steps:

- When the SF/CPM is installed and power to the chassis is turned on, the 7750 SR OS software automatically begins the boot sequence.
- When the boot loader and BOF image and configuration files are successfully located, establish a router connection (console session).

Console Connection

To establish a console connection, you will need the following:

- An ASCII terminal or a PC running terminal emulation software set to the parameters shown in the table below.
- A standard serial cable with a male DB9.

Table 24: Console Configuration Parameter Values

Parameter	Value	
Baud Rate	115,200	
Data Bits	8	
Parity	None	
Stop Bits	1	
Flow Control	None	

Figure 8 displays an example of the Console port on a 7750 SR-1 front panel.

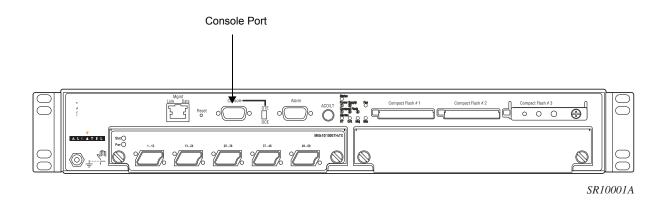


Figure 8: 7750 SR-1 Front Panel Console Port

To establish a console connection:

- **Step 1** Connect the terminal to the Console port on the front panel using the serial cable.
- **Step 2** Power on the terminal.
- **Step 3** Establish the connection by pressing the <Enter> key a few times on your terminal keyboard.
- **Step 4** At the router prompt, enter the login and password.

The default login is admin.

The default password is admin.

Configuring BOF Parameters

The following output displays a BOF configuration:

Service Management Tasks

This section discusses the following service management tasks:

- System Administration Commands on page 176
 - → Viewing the Current Configuration on page 176
 - → Modifying and Saving a Configuration on page 178
 - → Deleting BOF Parameters on page 179
 - → Saving a Configuration to a Different Filename on page 180

System Administration Commands

Use the following administrative commands to perform management tasks.

Viewing the Current Configuration

Use one of the following CLI commands to display the current configuration. The <code>detail</code> option displays all default values. The <code>index</code> option displays only the persistent indices. The <code>info</code> command displays context-level information.

The following displays an example of a configuration file:

```
location "Bldg.1-floor 2-Room 201"
      clli-code "abcdefg1234"
      coordinates "N 45 58 23, W 34 56 12"
      exit
      snmp
      exit
      login-control
         idle-timeout 1440
         motd text "7750-3"
      exit
      time
             shutdown
         exit
          zone UTC
       exit
       thresholds
         rmon
         exit
   exit...
echo "Redundancy Configuration"
#-----
   redundancy
    synchronize boot-env
   exit
...exit all
# Finished FRI Nov 21 15:06:16 2008 UTC
A:7750#
```

Modifying and Saving a Configuration

If you modify a configuration file, the changes remain in effect only during the current power cycle unless a save command is executed. Changes are lost if the system is powered down or the router is rebooted without saving.

- Specify the file URL location to save the running configuration. If a destination is not specified, the files are saved to the location where the files were found for that boot sequence. The same configuration can be saved with different file names to the same location or to different locations.
- The **detail** option adds the default parameters to the saved configuration.
- The **index** option forces a save of the index file.
- Changing the active and standby addresses without reboot standby CPM may cause a boot-env sync to fail.

The following command saves a configuration:

CLI Syntax: bof# save [cflash-id]

Example: A:ALA-1# bof

A:ALA-1>bof# save cf3:

A:ALA-1>bof#

The following command saves the system configuration:

CLI Syntax: admin# save [file-url] [detail] [index]

Example: A:ALA-1# admin save cf3:\test123.cfg

Saving config.# Saved to cf3:\test123.cfg

... complete A:ALA-1#

NOTE: If the persist option is enabled and the admin save file-url command is executed with an FTP path used as the file-url parameter, two FTP sessions simultaneously open to the FTP server. The FTP server must be configured to allow multiple sessions from the same login, otherwise, the configuration and index files will not be saved correctly.

Deleting BOF Parameters

You can delete specific BOF parameters. The **no** form of these commands removes the parameter from configuration. The changes remain in effect only during the current power cycle unless a save command is executed. Changes are lost if the system is powered down or the router is rebooted without saving.

Deleting a BOF address entry is not allowed from a Telnet session.

Use the following CLI syntax to save and remove BOF configuration parameters:

```
CLI Syntax: bof# save [cflash-id]
```

```
Example: A:ALA-1# bof
```

A:ALA-1>bof# save cf3:

A:ALA-1>bof#

CLI Syntax: bof#

```
no address ip-address/mask [active | standby]
no autonegotiate
no console-speed
no dns-domain
no li-local-save
no li-separate
no primary-config
no primary-dns
no primary-image
no secondary-config
no secondary-dns
no secondary-image
no static-route ip-address/mask next-hop ip-address
no tertiary-config
no tertiary-dns
no tertiary-image
```

Saving a Configuration to a Different Filename

Save the current configuration with a unique filename to have additional backup copies and to edit parameters with a text editor. You can save your current configuration to an ASCII file.

Use either of the following CLI syntax to save a configuration to a different location:

CLI Syntax: bof# save [cflash-id]

Example: A:ALA-1# bof

A:ALA-1>bof# save cf3:

A:ALA-1>bof#

or

CLI Syntax: admin# save [file-url] [detail] [index]

Example: A:ALA-1>admin# save cf3:\testABC.cfg

Saving config.# Saved to cf3:\testABC.cfg

... complete
A:ALA-1#

Rebooting

When an **admin>reboot** command is issued, routers with redundant CPM are rebooted as well as the IOMs. Changes are lost unless the configuration is saved. Use the **admin>save** *file-url* command to save the current configuration. If no command line options are specified, the user is prompted to confirm the reboot operation.

Use the following CLI syntax to reboot:

```
CLI Syntax: admin# reboot [active|standby] [now]
```

Example: A:ALA-1>admin# reboot

A:DutA>admin# reboot

Are you sure you want to reboot (y/n)? y

Resetting...OK

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....

BOF Command Reference

Command Hierarchies

Configuration Commands

```
bof
     — [no] addressip-prefix/ip-prefix-length [active | standby]
     - [no] autonegotiate
     — console-speed baud-rate
     — no console-speed
     — dns-domain dns-name
     - no dns-domain
     — duplex {full | half}
     - [no] li-local-save
     - [no] li-separate
     — persist {on | off}
     — primary-config file-url
     - no primary-config
     — primary-dns ip-address
     - no primary-dns
     — primary-image file-url
     — no primary-image
     — save [cflash-id ]
     — secondary-config file-url
     - no secondary-config
     — [no] secondary-dns ip-address
     — secondary-image file-url
     — no secondary-image
     — speed speed
     — [no] static-route ip-prefix/ip-prefix-length next-hop ip-address
     — tertiary-config file-url
     - no tertiary-config
     — [no] tertiary-dns ip-address
     — tertiary-image file-url
     — no tertiary-image
     - wait seconds
```

Show Commands

show

— bof [cflash-id | booted]

— boot-messages

Configuration Commands

File Management Commands

bof

Syntax bof

Context <root>

Description This command creates or edits the boot option file (BOF) for the specified local storage device.

A BOF file specifies where the system searches for runtime images, configuration files, and other operational parameters during system initialization.

BOF parameters can be modified. Changes can be saved to a specified compact flash. The BOF must be located in the root directory of either an internal or external compact flash local to the system and have the mandatory filename of *bof.cfg*.

When modifications are made to in-memory parameters that are currently in use or operating, the changes are effective immediately. For example, if the IP address of the management port is changed, the change takes place immediately.

Only one entry of the BOF configuration command statement can be saved once the statement has been found to be syntactically correct.

When opening an existing BOF that is not the BOF used in the most recent boot, a message is issued notifying the user that the parameters will not affect the operation of the node.

No default boot option file exists. The router boots with the factory default boot sequence and options.

Default none

save

Syntax save [cflash-id]

Context bof

Description This command uses the boot option parameters currently in memory and writes them from the boot option file to the specified compact flash.

The BOF must be located in the root directory of the internal or external compact flash drives local to the system and have the mandatory filename of *bof.cfg*.

If a location is not specified, the BOF is saved to the default compact flash drive (cf3:) on the active CPM (typically the CPM in slot A, but the CPM in slot B could also be acting as the active CPM). The slot name is not case-sensitive. You can use upper or lowercase "A" or "B".

Command usage:

- bof save Saves the BOF to the default drive (cf3:) on the active CPM (either in slot A or B).
- **bof save cf3:** Saves the BOF to cf3: on the active CPM (either in slot A or B).

To save the BOF to a compact flash drive on the standby CPM (for example, the redundant (standby) CPM is installed in slot B), specify -A or -B option.

Command usage:

- bof save cf3-A: Saves the BOF to cf3: on CPM in in slot A whether it is active or standby.
- bof save cf3-B: Saves the BOF to cf3: on CPM in in slot B whether it is active or standby.

The slot name is not case-sensitive. You can use upper or lowercase "A" or "B".

The **bof save** and **show bof** commands allow you to save to or read from the compact flash of the standby CPM. Use the **show card** command to determine the active and standby CPM (A or B).

Default

Saves must be explicitly executed. The BOF is saved to cf3: if a location is not specified.

Parameters

flash-id — The compact flash ID where the bof.cfg is to be saved.

Values cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

Default cf3:

BOF Processing Control

wait

Syntax wait seconds

Context bof

Description This command configures a pause, in seconds, at the start of the boot process which allows system

initialization to be interrupted at the console.

When system initialization is interrupted the operator is allowed to manually override the parameters

defined in the boot option file (BOF).

Only one wait command can be defined in the BOF.

Default 3

Parameters seconds — The time to pause at the start of the boot process, in seconds.

Values 1 — 10

Console Port Configuration

console-speed

Syntax console-speed baud-rate

no console-speed

Context bof

Description This command configures the console port baud rate.

When this command is issued while editing the BOF file used for the most recent boot, both the BOF

file and the active configuration are changed immediately.

The **no** form of the command reverts to the default value.

Default 115200 — console configured for 115,200 bps operation

Parameters baud-rate — The console port baud rate, expressed as a decimal integer.

Values 9600, 19200, 38400, 57600, 115200

Image and Configuration Management

persist

Syntax persist {on | off}

Context bof

Description

This command specifies whether the system will preserve system indexes when a **save** command is executed. During a subsequent boot, the index file is read along with the configuration file. As a result, a number of system indexes are preserved between reboots, including the interface index, LSP IDs, path IDs, etc. This reduces resynchronizations of the Network Management System (NMS) with the affected network element.

In the event that persist is **on** and the reboot with the appropriate index file fails, SNMP is operationally shut down to prevent the management system from accessing and possibly synchronizing with a partially booted or incomplete network element. To enable SNMP access, enter the **config>system>snmp>no shutdown** command.

If **persist** is enabled and the **admin save** <*url*> command is executed with an FTP path used as the <*url*> parameter, two FTP sessions simultaneously open to the FTP server. The FTP server must be configured to allow multiple sessions from the same login, otherwise, the configuration and index files will not be saved correctly.

Notes:

- Persistency files (.ndx) are saved on the same disk as the configuration files and the image files.
- When an operator sets the location for the persistency file, the system will check to ensure that the disk has enough free space. If this there is not enough free space, the persistency will not become active and a trap will be generated. Then, it is up to the operator to free adequate disk space. In the meantime, the system will perform a space availability check every 30 seconds. As soon as the space is available the persistency will become active on the next (30 second) check.

Default off

Parameters

on — Create when saving the configuration.

off — Disables the system index saves between reboots.

primary-config

Syntax primary-config file-url

no primary-config

Context bof

Description This command specifies the name and location of the primary configuration file.

The system attempts to use the configuration specified in **primary-config**. If the specified file cannot be located, the system automatically attempts to obtain the configuration from the location specified in **secondary-config** and then the **tertiary-config**.

Note that if an error in the configuration file is encountered, the boot process aborts.

The **no** form of the command removes the **primary-config** configuration.

Default none

Parameters file-url — The primary configuration file location, expressed as a file URL.

Values file-url [local-url | remote-url] (up to 180 characters)

local-url [cflash-id/][file-path]

remote-url [{ftp://|tftp://} login:pswd@remote-locn/][file-path]

cflash-id cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

primary-image

Syntax primary-image file-url

no primary image

Context bof

Description This command specifies the primary directory location for runtime image file loading.

The system attempts to load all runtime image files configured in the **primary-image** first. If this fails, the system attempts to load the runtime images from the location configured in the **secondary-image**. If the secondary image load fails, the tertiary image specified in **tertiary-image** is used.

All runtime image files (cpm.tim & iom.tim) must be located in the same directory.

The **no** form of the command removes the **primary-image** configuration.

Default none

Parameters *file-url* — The *location-url* can be either local (this CPM) or a remote FTP server.

Values file-url [local-url | remote-url] (up to 180 characters)

local-url [cflash-id/][file-path]

remote-url [{ftp://|tftp://} login:pswd@remote-locn/][file-path]

cflash-id cfl:, cfl-A:, cfl-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

secondary-config

Syntax secondary-config file-url

no secondary-config

Context bof

Description This command specifies the name and location of the secondary configuration file.

The system attempts to use the configuration as specified in **secondary-config** if the primary config cannot be located. If the **secondary-config** file cannot be located, the system attempts to obtain the

configuration from the location specified in the tertiary-config.

Note that if an error in the configuration file is encountered, the boot process aborts.

The **no** form of the command removes the **secondary-config** configuration.

Default none

Parameters *file-url* — The secondary configuration file location, expressed as a file URL.

Values file-url [local-url | remote-url] (up to 180 characters)

local-url [cflash-id/][file-path]

remote-url [{ftp://|tftp://} login:pswd@remote-locn/][file-path]

cflash-id cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

secondary-image

Syntax secondary-image file-url

no secondary-image

Context bof

Description This command specifies the secondary directory location for runtime image file loading.

The system attempts to load all runtime image files configured in the **primary-image** first. If this fails, the system attempts to load the runtime images from the location configured in the **secondary-image**. If the secondary image load fails, the tertiary image specified in **tertiary-image** is used.

All runtime image files (cpm.tim & iom.tim) must be located in the same directory.

The **no** form of the command removes the **secondary-image** configuration.

Default none

Parameters *file-url* — The *file-url* can be either local (this CPM) or a remote FTP server.

Values file-url [local-url | remote-url] (up to 180 characters)

local-url [cflash-id/][file-path]

remote-url [{ftp://|tftp://} login:pswd@remote-locn/][file-path]

cflash-id cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

tertiary-config

Syntax tertiary-config file-url

no tertiary-config

Context bof

Description This command specifies the name and location of the tertiary configuration file.

> The system attempts to use the configuration specified in **tertiary-config** if both the primary and secondary config files cannot be located. If this file cannot be located, the system boots with the

factory default configuration.

Note that if an error in the configuration file is encountered, the boot process aborts.

The **no** form of the command removes the **tertiary-config** configuration.

Default none

Parameters *file-url* — The tertiary configuration file location, expressed as a file URL.

> **Values** local-url [cflash-id/][file-path]

> > cflash-id cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

remote-url

[{ftp://|tftp://} login:pswd@remote-locn/][file-path]

tertiary-image

Syntax 1 4 1 tertiary-image file-url

no tertiary-image

Context bof

Description This command specifies the tertiary directory location for runtime image file loading.

> The system attempts to load all runtime image files configured in the primary-image first. If this fails, the system attempts to load the runtime images from the location configured in the secondaryimage. If the secondary image load fails, the tertiary image specified in tertiary-image is used.

All runtime image files (cpm.tim & iom.tim) must be located in the same directory.

The **no** form of the command removes the **tertiary-image** configuration.

Default none

Parameters file-url — The location-url can be either local (this CPM) or a remote FTP server.

> **Values** file-url [local-url | remote-url] (up to 180 characters)

> > local-url [cflash-id/][file-path]

remote-url [{ftp://|tftp://} login:pswd@remote-locn/][file-path]

cflash-id cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

Management Ethernet Configuration

address

Syntax [no] address ip-prefix/ip-prefix-length [active | standby]

Context bof

Description This command assigns an IP address to the management Ethernet port on the active CPM in the

running configuration and the Boot Option File (BOF) or the standby CPM for systems using

redundant CPMs. Deleting a BOF address entry is not allowed from a Telnet session.

Note that changing the active and standby addresses without reboot standby CPM may cause a boot-

env sync to fail.

An IPv4 address in the BOF is required when configuring an IPv6 address in this

same BOF for use on the management port.

The **no** form of the command deletes the IP address from the CPM Ethernet port.

Default no address — There are no IP addresses assigned to Ethernet ports.

Parameters *ip-prefix/ip-prefix/length* — The destination address of the aggregate route in dotted decimal notation.

Values ipv4-prefix a.b.c.d (host bits must be 0)

ipv4-prefix-length 0 - 32

ipv6-prefix x:x:x:x:x:x:x (eight 16-bit pieces)

x:x:x:x:x:d.d.d.d x: [0 — FFFF]H d: [0 — 255]D

ipv6-prefix-length 0 - 128

active | standby — Specifies which CPM Ethernet address is being configured: the active CPM

Ethernet or the standby CPM Ethernet.

Default active

autonegotiate

Syntax [no] autonegotiate [limited]

Context bof

Description This command enables speed and duplex autonegotiation on the management Ethernet port in the

running configuration and the Boot Option File (BOF).

When autonegotiation is enabled, the link attempts to automatically negotiate the link speed and duplex parameters. If autonegotiation is enabled, then the configured duplex and speed parameters

are ignored.

The **no** form of the command disables the autonegotiate feature on this port.

autonegotiate — Autonegotiation is enabled on the management Ethernet port.

Parameters limited — Specifies ethernet ports to be configurable to use link autonegotiation but with only a

single speed/duplex combination advertised. This allows a specific speed/duplex to be guaran-

teed without having to turn off autonegotiation, which is not allowed for 1000BASE-T.

duplex

Syntax duplex {full | half}

Context bof

Description This command configures the duplex mode of the CPM management Ethernet port when

autonegotiation is disabled in the running configuration and the Boot Option File (BOF).

This configuration command allows for the configuration of the duplex mode of the CPM Ethernet

interface. If the port is configured to autonegotiate this parameter will be ignored.

Default duplex full — Full duplex operation.

Parameters full — Sets the link to full duplex mode.

half — Sets the link to half duplex mode.

li-local-save

Syntax [no] li-local-save

Context bof

Description This command enables the lawful intercept (LI) configuration to be saved locally.

li-separate

Syntax [no] li-separate

Context bof

Description This command enables separate access to lawful intercept (LI) information.

speed

Syntax speed speed

Context bof

Description This command configures the speed for the CPM management Ethernet port when autonegotiation is

disabled in the running configuration and the Boot Option File (BOF).

If the port is configured to autonegotiate this parameter is ignored.

Default speed 100 — 100 M/bps operation.

Parameters 10 — Sets the link to 10 M/bps speed.

100 — Sets the link to 100 M/bps speed.

static-route

Syntax [no] static-route ip-prefix/ip-prefix-length next-hop ip-address

Context bof

Description This command creates a static route entry for the CPM management Ethernet port in the running

configuration and the Boot Option File (BOF).

This command allows manual configuration of static routing table entries. These static routes are only used by traffic generated by the CPM Ethernet port. To reduce configuration, manual address

aggregation should be applied where possible.

A static default (0.0.0.0/0 or ::/0) route cannot be configured on the CPM Ethernet port. A maximum

of 10 static routes can be configured on the CPM port.

The **no** form of the command deletes the static route.

Default No default routes are configured.

Parameters *ip-prefix/ip-prefix-length* — The destination address of the static route in dotted decimal notation.

Values ip-prefix/ip-prefix-length: ipv4-prefix a.b.c.d (host bits must be 0)

ipv4-prefix-le 0 — 32

ipv6-prefix x:x:x:x:x:x:x:x (eight 16-bit pieces)

x:x:x:x:x:d.d.d.d x: [0..FFFF]H d: [0..255]D

ipv6-prefix-le 0 - 128

ip-address: ipv4-address a.b.c.d

ipv6-address x:x:x:x:x:x:x: (eight 16-bit pieces)

x:x:x:x:x:d.d.d.d x: [0..FFFF]H d: [0..255]D

```
mask — The subnet mask, expressed as an integer or in dotted decimal notation. Values 1 — 32 (mask length), 128.0.0.0 — 255.255.255.255 (dotted decimal)
```

next-hop *ip-address* — The next hop IP address used to reach the destination.

DNS Configuration Commands

dns-domain

Syntax dns-domain dns-name

no dns-domain

Context bof

Description This command configures the domain name used when performing DNS address resolution. This is a

required parameter if DNS address resolution is required. Only a single domain name can be configured. If multiple domain statements are configured, the last one encountered is used.

The **no** form of the command removes the domain name from the configuration.

Default no dns-domain — No DNS domain name is configured.

Parameters dns-name — Specifies the DNS domain name up to 32 characters in length.

primary-dns

Syntax primary-dns ip-address

no primary-dns

Context bof

Description This command configures the primary DNS server used for DNS name resolution. DNS name

resolution can be used when executing ping, traceroute, and service-ping, and also when defining file URLs. DNS name resolution is not supported when DNS names are embedded in configuration files.

The **no** form of the command removes the primary DNS server from the configuration.

Default no primary-dns — No primary DNS server is configured.

Parameters *ip-address* — The IP or IPv6 address of the primary DNS server.

Values ipv4-address - a.b.c.d

ipv6-address: x:x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x: [0..FFFF]H d: [0..255]D

interface - 32 chars max, for link local addresses

secondary-dns

[no] secondary-dns ip-address

Context bof

Description This command configures the secondary DNS server for DNS name resolution. The secondary DNS

server is used only if the primary DNS server does not respond.

DNS name resolution can be used when executing ping, traceroute, and service-ping, and also when defining file URLs. DNS name resolution is not supported when DNS names are embedded in configuration files.

The **no** form of the command removes the secondary DNS server from the configuration.

Default no secondary-dns — No secondary DNS server is configured.

Parameters *ip-address* — The IP or IPv6 address of the secondary DNS server.

Values ipv4-address - a.b.c.d

ipv6-address: x:x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x: [0..FFFF]H d: [0..255]D

interface - 32 chars max, for link local addresses

tertiary-dns

Syntax [no] tertiary-dns ip-address

Context bof

Description This command configures the tertiary DNS server for DNS name resolution. The tertiary DNS server

is used only if the primary DNS server and the secondary DNS server do not respond.

DNS name resolution can be used when executing ping, traceroute, and service-ping, and also when defining file URLs. DNS name resolution is not supported when DNS names are embedded in

configuration files.

The **no** form of the command removes the tertiary DNS server from the configuration.

Default no tertiary-dns — No tertiary DNS server is configured.

Parameters *ip-address* — The IP or IPv6 address of the tertiary DNS server.

Values ipv4-address - a.b.c.d

ipv6-address: x:x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x: [0..FFFF]H d: [0..255]D

interface - 32 chars max, for link local addresses

Show Commands

bof

Syntax bof [cflash-id | booted]

Context show

Description This command displays the Boot Option File (BOF) executed on last system boot or on the specified

device

If no device is specified, the BOF used in the last system boot displays. If the BOF has been modified

since the system boot, a message displays.

Parameters *cflash-id.* The cflash directory name. The slot name is not case-sensitive. Use upper or lowercase "A" or "B" for the slot name.

Values cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

booted — Displays the boot option file used to boot the system.

Output Show BOF Fields — The following table describes BOF output fields.

Table 25: Show BOF Output Fields

Label	Description
primary-image	The primary location of the directory that contains the runtime images of both CPM and IOM.
primary-config	The primary location of the file that contains the configuration.
primary-dns	The primary DNS server for resolution of host names to IP addresses.
secondary-image	The secondary location of the directory that contains the runtime images of both CPM and IOM.
secondary-config	The secondary location of the file that contains the configuration.
secondary-dns	The secondary DNS server for resolution of host names to IP addresses.
tertiary-image	The tertiary location of the directory that contains the runtime images of both CPM and IOM.
tertiary-config	The tertiary location of the file that contains the configuration.
address	The IP address and mask associated with the CPM Ethernet port or the secondary CPM port.
tertiary-dns	The tertiary DNS server for resolution of host names to IP addresses.

Table 25: Show BOF Output Fields (Continued)

Label	Description	
persist	on — Persistent indexes between system reboots is enabled. off — Persistent indexes between system reboots is disabled.	
wait	The time configured for the boot to pause while waiting for console input.	
autonegotiate	No autonegotiate — Autonegotiate not enabled. autonegotiate — Autonegotiate is enabled.	
duplex	half - Specifies that the system uses half duplex.	
	full - Specifies that the system uses full duplex.	
speed	The speed of the CPM Ethernet interface.	
console speed	The console port baud rate.	
dns domain	The domain name used when performing DNS address resolution.	
uplinkA-address	Displays the Uplink-A IP address.	
uplinkA-port	Displays the primary port to be used for auto-boot.	
uplinkA-route	Displays the static route associated with Uplink-A.	
uplinkA-vlan	Displays the VLAN ID to be used on Uplink-A.	
uplinkB-address	Displays the Uplink-B IP address.	
uplinkB-port	Displays the secondary port to be used for auto-boot.	
uplinkB-route	Displays the static route associated with Uplink-B.	
uplinkB-vlan	Displays the VLAN ID to be used on Uplink-B.	

Sample Output

```
A:ALA-1# show bof cf3:

BOF on cf3:

autonegotiate

primary-image ftp://test:test@192.168.xx.xx/./both.tim
primary-config ftp://test:test@192.168.xx.xx/./lxx.cfg
secondary-image cf1:/i650/
secondary-config cf1:/config.cfg
address 192.168.xx.xxx/20 active
address 192.168.xx.xxx/20 standby
primary-dns 192.168.xx.xxx
dns-domain test.test.com
autonegotiate
duplex full
speed 100
```

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A:ALA-1#

boot-messages

Syntax boot-messages

Context show

Description This command displays boot messages generated during the last system boot.

Output Show Boot Messages Fields — The following output shows boot message output fields.

Sample Output

```
ALA-## show boot-messages
Boot log started on CPU#0
 Build: X-1.2.B1-7 on Mon Jul 14 14:49:23 2003 by builder
 CPUCTL FPGA version: 2A
Forcing BDB controller to HwSlot\ 0
Performing Power on Diagnostics
>>>Testing mainboard FPGA chain...
JTAG chain length = 2
All requested FPGAs on chain programmed
>>>Validating SDRAM from 0x21f00000 to 0x22000000
>>>Testing SDRAM from 0x02200000 to 0x21f00000
>>>Testing Compact Flash 1... Slot Empty
>>>Testing Compact Flash 2... Slot Empty
>>>Testing Compact Flash 3... OK (TOSHIBA THNCF128MBA)
Wales peripheral FPGA version is 0x13
Hardware Slot 31
Card type in EEPROM is 0x6, 'england r1'
MDA #1: HwType 0x02, 'denmark r1', Serial Number 'de3-52'
MDA #2: HwType 0x16, 'hungary ds3 e3 12 r1', Serial Number 'hun01-02'
Board Serial Number is 'eng02-15'
Chassis type 4 (sr1) found in BP 1 EEProm
Chassis Serial Number is '0203210096'
JTAG chain length = 2
All requested FPGAs on chain programmed
Searching for boot.ldr on local drives:
Searching cf3 for boot.ldr...
***********
   Loaded 0x001bc191 bytes from cf3 to 0x80400000
   Decompressing to address 0x0a000000
Starting code ...
Total Memory: 512MB Chassis Type: srl Card Type: england rl
TiMOS-L-1.2.B1-7 boot/hops/T2.02 Copyright (c) 2000-2003 Alcatel, Inc.
Built on Mon Jul 14 15:15:25 2003 by builder in /rel1.2/b1/B1-7/panos/main
Timos Boot Loader
Time from clock is THU AUG 14 08:39:03 2003 UTC
Error: could not open boot messages file.
Boot messages will not be stored.
Looking for cf3:/bof.cfg ... OK, reading
Contents of Boot Options File on cf3:
   primary-image ftp://vxworks:vxw0rks@192.168.15.1/./rel/0.0/I129
   primary-config cf3:/config.cfg
```

address 192.168.13.48/20 active

primary-dns 192.168.1.254 dns-domain eng.timetra.com

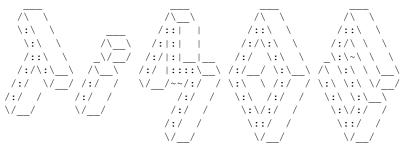
autonegotiate

duplex full speed 100 wait 3 persist off

Hit a key within 1 second to change boot parms...

Primary image location: ftp://vxworks:vxw0rks@192.168.15.1/./rel/0.0/I129
Initializing management port tme0 using IP address 192.168.13.48.
Loading image ftp://vxworks:vxw0rks@192.168.15.1/./rel/0.0/I129/both.tim
Version B-0.0.I129, Wed Aug 13 21:24:57 2003 by builder in /rel0.0/I129/panos/main text:(8906865-->21711576) + data:(587508-->5418992)
Executing TiMOS image at 0x2800000

Total Memory: 512MB Chassis Type: srl Card Type: england_rl TiMOS-B-0.0.I129 both/hops/T2.02 Copyright (c) 2000-2003 Alcatel. All rights reserved. All use subject to applicable license agreements. Built on Wed Aug 13 21:24:57 2003 by builder in /rel0.0/I129/panos/main



Time from clock is THU AUG 14 08:39:11 2003 UTC

Attempting to exec configuration file:

'cf3:/config.cfg' ...
System Configuration

Log Configuration

Card Configuration

Port Configuration

Router (Network Side) Configuration

Service Configuration

Router (Service Side) Configuration

Executed 232 lines in 0.0 seconds from file cf3:\config.cfg

ALA-1#

Show Commands

System Management

In This Chapter

This chapter provides information about configuring basic system management parameters.

Topics in this chapter include:

- System Management Parameters on page 205
 - → System Information on page 205
 - System Name on page 205
 - System Contact on page 205
 - System Location on page 206
 - System Coordinates on page 207
 - Naming Objects on page 207
 - Naming Objects on page 207
 - → System Time on page 208
 - Time Zones on page 208
 - Network Time Protocol (NTP) on page 210
 - SNTP Time Synchronization on page 211
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 - High Availability Features on page 213
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- → Synchronization and Redundancy on page 220
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 - Active and Standby Designations on page 221
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System Management Parameters

System management commands allow you to configure basic system management functions such as the system name, the router's location and coordinates, and CLLI code as well as time zones, Network Time Protocol (NTP), Simple Network Time Protocol (SNTP) properties, CRON and synchronization properties.

It is possible to query the DNS server for IPv6 addresses. By default the DNS names are queried for A-records only (address-preference is IPv4-only). If the address-preference is set to IPv6 first, the DNS server will be queried for AAAA-records first, and if ther is no successful reply, then A-records.

System Information

System information components include:

- System Name on page 205
- System Contact on page 205
- System Location on page 206
- System Coordinates on page 207
- Naming Objects on page 207

System Name

The system name is the MIB II (RFC 1907, *Management Information Base for Version 2 of the Simple Network Management Protocol* (SNMPv2)) sysName object. By convention, this text string is the node's fully-qualified domain name. The system name can be any ASCII printable text string of up to 32 characters.

System Contact

The system contact is the MIB II sysContact object. By convention, this text string is a textual identification of the contact person for this managed node, together with information on how to contact this person. The system contact can be any ASCII printable text string of up to 80 characters.

System Location

The system location is the MIB II sysLocation object which is a text string conventionally used to describe the node's physical location, for example, "Bldg MV-11, 1st Floor, Room 101". The system location can be any ASCII printable text string of up to 80 characters.

System Coordinates

The system coordinates is the Alcatel-Lucent Chassis MIB tmnxChassisCoordinates object. This text string indicates the Global Positioning System (GPS) coordinates of the location of the chassis.

Two-dimensional GPS positioning offers latitude and longitude information as a four dimensional vector:

```
\(\langle direction, hours, minutes, \seconds \rangle \)
```

where *direction* is one of the four basic values: N, S, W, E, *hours* ranges from 0 to 180 (for latitude) and 0 to 90 for longitude, and minutes and seconds range from 0 to 60.

<W, 122, 56, 89> is an example of longitude and <N, 85, 66, 43> is an example of latitude.

System coordinates can be expressed in different notations, examples include:

- N 45 58 23, W 34 56 12
- N37 37' 00 latitude, W122 22' 00 longitude
- N36*39.246' W121*40.121

The system coordinates can be any ASCII printable text string up to 80 characters.

Naming Objects

It is discouraged to configure named objects with a name that starts with "_tmnx_" and with "_" in general.

Common Language Location Identifier

A Common Language Location Identifier (CLLI) code string for the device is an 11-character standardized geographic identifier that uniquely identifies the geographic location of places and certain functional categories of equipment unique to the telecommunications industry. The CLLI code is stored in the Alcatel-Lucent Chassis MIB tmnxChassisCLLICode object.

The CLLI code can be any ASCII printable text string of up to 11 characters.

System Time

7750 SR-Series routers are equipped with a real-time system clock for time keeping purposes. When set, the system clock always operates on Coordinated Universal Time (UTC), but the 7750 SR OS software has options for local time translation as well as system clock synchronization.

System time parameters include:

- Time Zones on page 208
- Network Time Protocol (NTP) on page 210
- SNTP Time Synchronization on page 211
- CRON on page 212

Time Zones

Setting a time zone in 7750 SR OS allows for times to be displayed in the local time rather than in UTC. The 7750 SR OS has both user-defined and system defined time zones.

A user-defined time zone has a user assigned name of up to four printable ASCII characters in length and unique from the system-defined time zones. For user-defined time zones, the offset from UTC is configured as well as any summer time adjustment for the time zone.

The 7750 SR OS system-defined time zones are listed in Table 26 which includes both time zones with and without summer time correction.

Table 26: System-defined Time Zones

Acronym	Time Zone Name	UTC Offset
Europe:		
GMT	Greenwich Mean Time	UTC
BST	British Summer Time	UTC +1
IST	Irish Summer Time	UTC +1*
WET	Western Europe Time	UTC
WEST	Western Europe Summer Time	UTC +1
CET	Central Europe Time	UTC +1
CEST	Central Europe Summer Time	UTC +2
EET	Eastern Europe Time	UTC +2
EEST	Eastern Europe Summer Time	UTC +3

Table 26: System-defined Time Zones (Continued)

Acronym	Time Zone Name	UTC Offset		
MSK	Moscow Time	UTC +3		
MSD	Moscow Summer Time	UTC +4		
US and Cana	US and Canada			
AST	Atlantic Standard Time	UTC -4		
ADT	Atlantic Daylight Time	UTC -3		
EST	Eastern Standard Time	UTC -5		
EDT	Eastern Daylight Saving Time	UTC -4		
ET	Eastern Time	Either as EST or EDT, depending on place and time of year		
CST	Central Standard Time	UTC -6		
CDT	Central Daylight Saving Time	UTC -5		
CT	Central Time	Either as CST or CDT, depending on place and time of year		
MST	Mountain Standard Time	UTC -7		
MDT	Mountain Daylight Saving Time	UTC -6		
MT	Mountain Time	Either as MST or MDT, depending on place and time of year		
PST	Pacific Standard Time	UTC -8		
PDT	Pacific Daylight Saving Time	UTC -7		
PT	Pacific Time	Either as PST or PDT, depending on place and time of year		
HST	Hawaiian Standard Time	UTC -10		
AKST	Alaska Standard Time	UTC -9		
AKDT	Alaska Standard Daylight Saving Time	UTC -8		
Australia				
AWST	Western Standard Time (e.g., Perth)	UTC +8		
ACST	Central Standard Time (e.g., Darwin)	UTC +9.5		
AEST	Eastern Standard/Summer Time (e.g., Canberra)	UTC +10		

Network Time Protocol (NTP)

NTP is the Network Time Protocol defined in RFC 1305, *Network Time Protocol (Version 3) Specification, Implementation and Analysis.* It allows for the participating network nodes to keep time more accurately and more importantly they can maintain time in a more synchronized fashion between all participating network nodes.

NTP uses stratum levels to define the number of hops from a reference clock. The reference clock is considered to be a stratum-0 device that is assumed to be accurate with little or no delay. Stratum-0 servers cannot be used in a network. However, they can be directly connected to devices that operate as stratum-1 servers. A stratum-1 server is an NTP server with a directly-connected device that provides Coordinated Universal Time (UTC), such as a GPS or atomic clock. The 7750 SR-7 and 7750 SR-12 devices cannot act as stratum-1 servers but can act as stratum-2 devices as a network connection to an NTP server is required.

The higher stratum levels are separated from the stratum-1 server over a network path, thus, a stratum-2 server receives its time over a network link from a stratum-1 server. A stratum-3 server receives its time over a network link from a stratum-2 server.

The following NTP elements are supported:

- Server mode In this mode, the node advertises the ability to act as a clock source for
 other network elements. In this mode, the node will, by default, transmit NTP packets in
 NTP version 4 mode.
- Authentication keys Increased security support in carrier and other network has been implemented. Both DES and MD5 authentication are supported as well as multiple keys.
- Operation in symmetric active mode This capability requires that NTP be synchronized
 with a specific node that is considered more trustworthy or accurate than other nodes
 carrying NTP in the system. This mode requires that a specific peer is set.
- Broadcast or multicast modes When operating in these modes, the node will receive or send using either a multicast (default 224.0.1.1) or a broadcast address. Multicast is supported on the MGMT port.
- Alert when NTP server is not available When none of the configured servers are
 reachable on the node, the system reverts to manual timekeeping and issues a critical
 alarm. When a server becomes available, a trap is issued indicating that standard operation
 has resumed.
- NTP and SNTP If both NTP and SNTP are enabled on the node, then SNTP transitions to an operationally down state. If NTP is removed from the configuration or shut down, then SNTP resumes an operationally up state.
- Gradual clock adjustment As several applications (such as Service Assurance Agent (SAA)) can use the clock, and if determined that a major (128 ms or more) adjustment needs to be performed, the adjustment is performed by programmatically stepping the clock. If a minor (less than 128 ms) adjustment must be performed, then the adjustment is

- performed by either speeding up or slowing down the clock.
- In order to facilitate proper operation once the standby CPM takes over from the active CPM it is required that the time on the secondary CPM is synchronized with the clock of the active CPM.
- In order to avoid the generation of too many events/trap the NTP module will rate limit the generation of events/traps to three per second. At that point a single trap will be generated that indicates that event/trap squashing is taking place.

SNTP Time Synchronization

For synchronizing the system clock with outside time sources, the 7750 SR OS includes a Simple Network Time Protocol (SNTP) client. As defined in RFC 2030, SNTP Version 4 is an adaptation of the Network Time Protocol (NTP). SNTP typically provides time accuracy within 100 milliseconds of the time source. SNTP can only receive the time from NTP servers; it cannot be used to provide time services to other systems. SNTP is a compact, client-only version of NTP. SNTP does not authenticate traffic.

SNTP can be configured in both unicast client modes (point-to-point) and broadcast client modes (point-to-multipoint). SNTP should be used only at the extremities of the synchronization subnet. SNTP clients should operate only at the highest stratum (leaves) of the subnet and in configurations where no NTP or SNTP client is dependent on another SNTP client for synchronization. SNTP time servers should operate only at the root (stratum 1) of the subnet and then only in configurations where no other source of synchronization other than a reliable radio clock is available.

In the 7750 SR OS, the SNTP client can be configured for either broadcast or unicast client mode.

CRON

The CRON feature supports the Service Assurance Agent (SAA) functions as well as the ability to schedule turning on and off policies to meet "Time of Day" requirements. CRON functionality includes the ability to specify the commands that need to be run, when they will be scheduled, including one-time only functionality (oneshot), interval and calendar functions, as well as where to store the output of the results. In addition, CRON can specify the relationship between input, output and schedule. Scheduled reboots, peer turn ups, service assurance agent tests and more can all be scheduled with Cron, as well as OAM events, such as connectivity checks, or troubleshooting runs.

CRON features are saved to the configuration file on both primary and backup control modules. If a control module switchover occurs, CRON events are restored when the new configuration is loaded. If a control module switchover occurs during the execution of a cron script, the failover behavior will be determined by the contents of the script.

CRON features run serially with at least 255 separate schedules and scripts. Each instance can support a schedule where the event is executed any number of times.

The following CRON elements are supported:

- Action Parameters for a script including the maximum amount of time to keep the
 results from a script run, the maximum amount of time a script may run, the maximum
 number of script runs to store and the location to store the results.
- Schedule The schedule function configures the type of schedule to run, including one-time only (oneshot), periodic or calendar-based runs. All runs are determined by month, day of month or weekday, hour, minute and interval (seconds).
- Script The script command opens a new nodal context which contains information on a script.
- Time Range ACLs and QoS policy configurations may be enhanced to support time based matching. CRON configuration includes time matching with the 'schedule' subcommand. Schedules are based on events; time-range defines an end-time used as a match criteria.
- Time of Day Time of Day (TOD) suites are useful when configuring many types of time-based policies or when a large number of subscribers or SAPs require the same type of TOD changes. The TOD suite may be configured while using specific ingress or egress ACLs or QoS policies, and is an enhancement of the ingress and egress CLI trees.

High Availability

This section discusses the high availability routing options and features available to service providers that help diminish vulnerability at the network or service provider edge and alleviate the effect of a lengthy outage on IP networks.

High availability is an important feature in service provider routing systems. High availability is gaining momentum due to the unprecedented growth of IP services and applications in service provider networks driven by the demand from the enterprise and residential communities. Downtime can be very costly, and, in addition to lost revenue, customer information and business-critical communications can be lost. High availability is the combination of continuous uptime over long periods (Mean Time Between Failures (MTBF)) and the speed at which failover or recovery occurs (Mean Time To Repair (MTTR).

The popularity of high availability routing is evident at the network or service provider edge where thousands of connections are hosted and rerouting options around a failed piece of equipment can often be limiting. Or, a single access link exists to a customer because of additional costs for redundant links. As service providers converge business-critical services such as real-time voice (VoIP), video, and VPN applications over their IP networks, high availability becomes much more stringent compared to the requirements for best-effort data. Network and service availability become critical aspects when offering advanced IP services which dictates that IP routers that are used to construct the foundations of these networks be resilient to component and software outages.

For high availability configuration information, refer to Synchronization and Redundancy on page 220.

High Availability Features

As more and more critical commercial applications move onto the IP/MPLS networks, providing high availability services becomes increasingly important. This section describes high availability features for routers. Most of these features only apply to routers with two Control Processor Modules (CPM), currently the 7750 SR-7, SR-12, and SR-c12 models.

- Redundancy on page 214
 - → Software Redundancy on page 214
 - → Configuration Redundancy on page 215
 - → Component Redundancy on page 215
 - → Service Redundancy on page 216
 - → Accounting Configuration Redundancy on page 216
- Nonstop Forwarding on page 217

- Nonstop Routing (NSR) on page 217
- CPM Switchover on page 218
- Synchronization on page 219
 - → Configuration and boot-env Synchronization on page 219
 - → State Database Synchronization on page 219

Redundancy

The redundancy features enable the duplication of data elements and software functionality to maintain service continuation in case of outages or component failure.

Refer to the 7750 SR-Series OS Integrated Services Adapter Guide for information about redundancy for the Integrated Service Adapter (ISA).

Software Redundancy

Software outages are challenging even when baseline hardware redundancy is in place. There should be a balance to provide high availability routing otherwise router problems typically propagate not only throughout the service provider network, but also externally to other connected networks possibly belonging to other service providers. This could affect customers on a broad scale. Presently, there are several software availability features that contribute to the percentage of time that a router is available to process and forward traffic.

To fully appreciate high availability you should realize that all routing protocols specify minimum time intervals in which the peer device must receive an acknowledgement before it disconnects the session.

- OSPF default session timeout is approximately 40 seconds. The timeout intervals are configurable.
- BGP default session timeout is approximately 120 seconds. The timeout intervals are configurable.

Therefore, router software has to recover faster than the specified time interval to maintain up time.

Configuration Redundancy

Features configured on the active device CPM are saved on the standby CPM as well. When the active device CPM fails, these features are brought up on the standby device CPM that takes over the mastership.

Even with modern modular and stable software, the failure of route processor hardware or software can cause the router to reboot or cause other service impacting events. In the best circumstances, failure leads to the initialization of a redundant route processor, which hosts the standby software configuration, to become the active processor. The following options are available.

- Warm standby The router image and configuration is already loaded on the standby route processor. However, the standby could still take a few minutes to become effective since it must first re-initialize connections by bringing up Layer 2 connections and Layer 3 routing protocols and then rebuild routing tables.
- Hot standby The router image, configuration, and network state is already loaded on
 the standby and it receives continual updates from the active route processor and the
 swapover is immediate. However, hot standby affects conventional router performance as
 more frequent synchronization increases consumption of system resources. Newer
 generation service routers, like the 7750 SR-Series routers, address this issue because they
 already have extra processing built into the system.

Component Redundancy

7750 SR-Series component redundancy is critical to reduce MTTR for the routing system and primarily consists of the following router features:

- Dual route processor modules For a highly available architecture, redundant route processors (RPs) or Control Processor Modules(CPM) are essential. The route processor calculates the most efficient route to an Internet destination and communicates the best path information to peer routers. Rapid information synchronization between the primary and secondary route processor is crucial to minimize recovery time.
- Dual switch fabric Failover to the backup switch fabric within a minimum time interval, preferably with no loss of traffic.
- Redundant line cards Failover to the backup within a minimum time interval, preferably with no loss of traffic.
- Redundant power supply A power module can be removed without impact on traffic.
- Redundant fan Failure of a fan module without impacting traffic.
- Hot swap Components in a live system can be replaced or become active without taking the system down or affecting traffic flow to/from other modules.

Router hardware architecture plays a key role in the availability of the system. The principle router architecture styles are centralized and distributed. In these architectures, both active and standby route processors, I/O modules (IOMs) (also called line cards), fans, and power supplies maintain a low MTTR for the routing system.

However, in a centralized architecture, packet processing and forwarding is performed in a central shared route processor and the individual IOMs (line cards) are relatively simple. The cards rely solely on the route processor for routing and forwarding intelligence and, should the centralized route processor fail, there is greater impact to the system overall, as all routing and packet forwarding will stop.

In a distributed system, the packet forwarding functionality is situated on each IOM. Distributing the forwarding engines off the central route processor and positioning one on each IOM lowers the impact of route processor failure as the line cards can continue to forward traffic during an outage.

The distributed system is better suited to enable the convergence of business critical services such as real-time voice (VoIP), Video, and VPN applications over IP networks with superior performance and scalability. The centralized architecture can be prone to performance bottleneck issues and limits service offerings through poor scalability which may lead to customer and service SLA violations.

Service Redundancy

All service-related statistics are kept during a switchover. Services, SDPs, and SAPs can be interrupted during a CPM switchover with the following exceptions:

- IES services and GRE services with no keepalives are not interrupted during a CPM switchover.
- Services using MPLS tunnels or spanning tree can be impacted during a CPM switchover.

Accounting Configuration Redundancy

When there is a switchover and the standby CPM becomes active, the accounting servers will be checked and if they are administratively up and capable of coming online (media present, etc.), the standby will be brought online and new accounting files will be created at that point. Users must manually copy the accounting records from the failed CPM.

Nonstop Forwarding

In a control plane failure or a forced switchover event, the router continues to forward packets using the existing stale forwarding information. Nonstop forwarding requires clean control plane and data plane separation. Usually the forwarding information is distributed to the IOMs.

Nonstop forwarding is used to notify peer routers to continue forwarding and receiving packets, even if the route processor (control plane) is not working or is in a switch-over state. Nonstop forwarding requires clean control plane and data plane separation and usually the forwarding information is distributed to the line cards. This method of availability has both advantages and disadvantages. Nonstop forwarding continues to forward packets using the existing stale forwarding information during a failure. This may cause routing loops and black holes, and also requires that surrounding routers adhere to separate extension standards for each protocol. Every router vendor must support protocol extensions for interoperability.

Nonstop Routing (NSR)

With NSR on the 7750 SR-Series routers7210 SAS-Series devices, routing neighbors are unaware of a routing process fault. If a fault occurs, a reliable and deterministic activity switch to the inactive control complex occurs such that routing topology and reachability are not affected, even in the presence of routing updates. NSR achieves high availability through parallelization by maintaining up to date routing state information, at all times, on the standby route processor. This capability is achieved independently of protocols or protocol extensions, providing a more robust solution than graceful restart protocols between network routers.

The NSR implementation on the 7750 SR-Series routers supports all routing protocols. NSR makes it possible to keep the existing sessions (BGP, LDP, OSPF, etc.) during a CPM switchover, including support for MPLS signaling protocols. Peers will not see any change.

Protocol extensions are not required. There are no interoperability issues and there is no need to define protocol extensions for every protocol. Unlike nonstop forwarding and graceful restart, the forwarding information in NSR is always up to date, which eliminates possible blackholes or forwarding loops. This is also called the Alcatel-Lucent Carrier Environment Internet System (ACEIS). NSR is a relatively new high availability technique. However, it is regarded the most promising to ensure IP packets continue to forward once a route processor fails and allows for inservice software upgrades.

Traditionally, addressing high availability issues have been patched through non-stop forwarding solutions. With the implementation of NSR, these limitations are overcome by delivering an intelligent hitless failover solution. This enables a carrier-class foundation for transparent networks, required to support business IP services backed by stringent SLAs. This level of high

availability poses a major issue for conventional routers whose architectural design limits or prevents them from implementing NSR.

The following NSR entities remain intact after a switchover:

- BGP sessions BGP peers should not see any change after the switchover.
 NSR supports all the address families, including IPv4 unicast, VPN-IPv4 unicast, and IPv6 and supports BGP sessions on network ports as well as on the access ports (i.e., VPRN).
- OSPF adjacencies OSPF neighbors do not see any change after the switchover.
- IS-IS adjacencies IS-IS neighbors do not see any change after the switchover.
- RIP session RIP neighbors do not see any change after the switchover.
- Frame Relay data-link connection identifiers.
- ATM VPs/VCs.
- PPP and MLPPP sessions.

CPM Switchover

During a switchover, system control and routing protocol execution are transferred from the active to the standby CPM.

An automatic switchover may occur under the following conditions:

- A fault condition that causes the active CPM to crash or reboot.
- The active CPM is declared down (not responding).
- Online removal of the active CPM.

A manual switchover can occur under the following conditions:

• To force a switchover from an active CPM to a standby, use the admin redundancy force-switchover command. You can configure a batch file that executes after failover by using the config system switchover-exec and admin redundancy force-switchover now CLI commands

Note that with the 7750 SR-1 the admin reboot [now] CLI command does not cause a switchover but a reboot of the entire system.

Synchronization

Synchronization between the CPMs includes the following:

- Configuration and boot-env Synchronization on page 219
- State Database Synchronization on page 219

Configuration and boot-env Synchronization

Configuration and boot-env synchronization are supported in admin>redundancy> synchronize and config>redundancy>synchronize contexts.

State Database Synchronization

If a new standby CPMCFM is inserted into the system, it synchronizes with the active CPM upon a successful boot process.

If the standby CPMCFM is rebooted, it synchronizes with the active CPM upon a successful boot process.

When configuration or state changes occur, an incremental synchronization is conducted from the active CPM to the standby CPM.

If the synchronization fails, the standby does not reboot automatically. The show redundancy synchronization command displays synchronization output information.

If the active and standby are not synchronized for some reason, users can manually synchronize the standby CPM by rebooting the standby by issuing the admin reboot standby command on the active or the standby CPM.

Synchronization and Redundancy

7750 SR-Series routers supporting redundancy (such as the SR-12 and SR-c12 models) use a 1:1 redundancy scheme. Redundancy methods facilitate system synchronization between the active and standby Control Processor Modules (CPMs) so they maintain identical operational parameters to prevent inconsistencies in the event of a CPM failure.

When automatic system synchronization is enabled for an entity, any save or delete file operations configured on the primary, secondary or tertiary choices on the active CPM file system are mirrored in the standby CPM file system.

Although software configurations and images can be copied or downloaded from remote locations, synchronization can only occur locally between compact flash drives (cf1:, cf2:, and cf3:).

Synchronization can occur either:

- Automatically Automatic synchronization is disabled by default. To enable automatic synchronization, the config>redundancy>synchronization command must be specified with either the boot-env parameter or the config parameter.
 - When the boot-env parameter is specified, the BOF, boot.ldr, config, and image files are automatically synchronized. When the config parameter is specified, only the config files are automatically synchronized.
 - Automatic synchronization also occurs whenever the BOF is modified and when an admin>save command is entered with no filename specified.
- Manually To execute synchronization manually, the admin>redundancy>
 synchronization command must be entered with the boot-env parameter or the
 config parameter.
 - When the boot-env parameter is specified, the BOF, boot.ldr, config, and image files are synchronized. When the config parameter is specified, only the config files are synchronized.

The following shows the output displayed during a manual synchronization of configuration files.

```
A:ALA-12>admin>redundancy# synchronize config
Syncing configuration.....
Syncing configuration.....Completed.
A:ALA-12#
```

Active and Standby Designations

Typically, the first Switch Fabric (SF)/CPM card installed in a redundant 7750 SR-Series chassis assumes the role as active, regardless of being inserted in Slot A or B. The next CPM installed in the same chassis then assumes the role as the standby CPM. If two CPM are inserted simultaneously (or almost simultaneously) and are booting at the same time, then preference is given to the CPM installed in Slot A.

If only one CPM is installed in a redundant routerdevice, then it becomes the active CPM regardless of the slot it is installed in.

To visually determine the active and standby designations, the Status LED on the faceplate is lit green (steady) to indicate the active designation. The Status LED on the second CPM faceplate is lit amber to indicate the standby designation.

The following output shows that the CPM installed in Slot A is acting as the active CPM and the CPM installed in Slot B is acting as the standby.

Card Summary					
slot	card	card	card	admin	operational
	allowed	provisioned	equipped	state	state
2	all supported all supported all supported	iom-20g	iom-20g	up	up
A		sfm-400g	sfm-400g	up	up/active
B		sfm-400g	sfm-400g	up	up/standby

The following console message displays when a CPM boots, sees an active CPM, and becomes the standby CPM.

```
Slot A contains the Active CPM
This CPM (Slot B) is the Standby CPM
```

When the Active CPM Goes Offline

When an active CPM goes offline (due to reboot, removal, or failure), the standby CPM takes control without rebooting or initializing itself. It is assumed that the CPMs are synchronized, therefore, there is no delay in operability. When the CPM that went offline boots and then comes back online, it becomes the standby CPM.

When the standby CPM comes online, the following output displays:

```
Active CPM in Slot A has stopped Slot B is now active CPM

Attempting to exec configuration file:
'cf3:/config.cfg' ...

...

Executed 49,588 lines in 8.0 seconds from file cf3:\config.cfg
```

Persistence

The persistence feature allows information learned through DHCP snooping across reboots to be kept. This information can include data such as the IP address, MAC binding information, leaselength information, and ingress sap information (required for VPLS snooping to identify the ingress interface). This information is referred to as the DHCP lease-state information.

When a DHCP message is snooped, there are steps that make the data persistent in a system with dual CPMs. In systems with only one CPM, only Step 1 applies. In systems with dual CPMs, all steps apply.

- When a DHCP ACK is received from a DHCP server, the entry information is written to the
 active CPM Compact Flash. If writing was successful, the ACK is forwarded to the DHCP
 client. If persistency fails completely (bad cflash), a trap is generated indicating that persistency can no longer be guaranteed. If the complete persistency system fails the DHCP
 ACKs are still forwarded to the DHCP clients. Only during small persistency interruptions or
 in overload conditions of the Compact Flash, DHCP ACKs may get dropped and not forwarded to the DHCP clients.
- DHCP message information is sent to the standby CPM and also there the DHCP information is logged on the Compact Flash. If persistency fails on the standby also, a trap is generated.

Network Synchronization

This section describes network synchronization capabilities available on SR and ESS product platforms. These capabilities involve multiple approaches to network timing; namely SDH/SONET, Synchronous Ethernet, and Adaptive clocking. These features address barriers to entry by:

- Providing synchronization quality required by the mobile space; such as radio operations and circuit emulation services (CES) transport.
- Augmenting and potentially replacing the existing (SONET/SDH) timing infrastructure and delivering high quality network timing for time sensitive applications in the wireline space.

Network synchronization is commonly distributed in a hierarchical master-slave topology at the physical layer as shown in Figure 9.

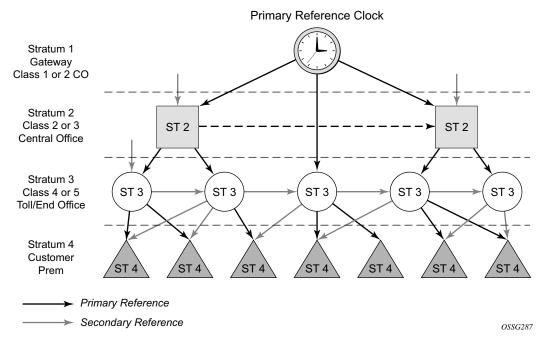


Figure 9: Conventional Network Timing Architecture (North American Nomenclature)

The architecture shown in Figure 9 provides the following benefits:

- Limits the need for high quality clocks at each network element and only requires that they reliably replicate input to remain traceable to its reference.
- Uses reliable physical media to provide transport of the timing signal; it doesn't consume any bandwidth and requires limited additional processing.

The synchronization network is designed so a clock always receives timing from a clock of equal or higher stratum or quality level. This ensures that if an upstream clock has a fault condition (for example, loses its reference and enters a holdover or free-run state) and begins to drift in frequency, the downstream clock will be able to follow it. For greater reliability and robustness, most offices and nodes have at least two synchronization references that can be selected in priority order (such as primary and secondary).

Further levels of resiliency can be provided by designing a capability in the node clock that will operate within prescribed network performance specifications without any reference for a specified timeframe. A clock operating in this mode is said to hold the last known state over (or holdover) until the reference lock is once again achieved. Each level in the timing hierarchy is associated with minimum levels of network performance.

Each synchronization capable port can be independently configured to transmit data using the node reference timing or loop timing. In addition, some TDM channels can use adaptive timing.

Transmission of a reference clock through a chain of Ethernet equipment requires that all equipment supports Synchronous Ethernet. A single piece of equipment that is not capable of performing Synchronous Ethernet breaks the chain. Ethernet frames will still get through but downstream devices should not use the recovered line timing as it will not be traceable to an acceptable stratum source.

Central Synchronization Sub-System

The timing subsystem for the SR/ESS platforms has a central clock located on the CPM (motherboard). The timing subsystem performs many of the duties of the network element clock as defined by Telcordia (GR-1244-CORE) and ITU-T G.781.

The system can select from up to four timing inputs to train the local oscillator. The priority order of these references must be specified. This is a simple ordered list of inputs: {bits, ref1, ref2}. The CPM clock output shall have the ability to drive the clocking for all line cards in the system.

The recovered clock will be able to derive its timing from any of the following:

- OC3/STM1, OC12/STM4, OC48/STM16, OC192/STM64 ports
- T1/E1 CES channel (adaptive clocking)
- Synchronous Ethernet ports
- BITS port on a Channelized OC3/STM1 CES CMA (7710 SR-c4, 7710 SR-c2, and the 7750 SR-c12)
- BITS port on the CPM or CFM module

On 7750 SR-12 and 7750 SR-7systems with redundant CPMs, the system will have two BITS input ports (one per CPM). These BITS input ports provide redundant synchronization inputs from an external BITS/SSU. On systems with cross coupled timing modules, the active CPM shall be capable of using either BITS input port for its synchronization.

All settings of the signal characteristics for the BITS input applies to both ports. When the active CPM considers the BITS input as a possible reference, it will consider first the BITS input port on the active CPM followed the BITS input port on the standby CPM in that relative priority order. This relative priority order is in addition to the user definable ref-order. For example, a ref-order of 'bits-ref1-ref2' would actually be BITS in (active CPM) followed by BITS in (standby CPM) followed by ref1 followed by ref2.

The Table 27 shows the selection followed for two reference in both revertive and non-revertive modes:

Table 27: Revertive, non-Revertive Timing Reference Switching Operation

Status of Reference A	Status of Reference B	Active Reference Non-revertive Case	Active Reference Revertive Case
OK	OK	A	A
Failed	OK	В	В
OK	OK	В	A
OK	Failed	A	A
OK	OK	A	A
Failed	Failed	holdover	holdover
OK	Failed	Α	A
Failed	Failed	holdover	holdover
Failed	OK	В	В
Failed	Failed	holdover	holdover
OK	OK	A or B	A

Synchronous Ethernet

Traditionally, Ethernet-based networks employ the physical layer transmitter clock to be derived from an inexpensive +/-100ppm crystal oscillator and the receiver locks onto it. There is no need for long term frequency stability because the data is packetized and can be buffered. For the same reason there is no need for consistency between the frequencies of different links. However, you can derive the physical layer transmitter clock from a high quality frequency reference by replacing the crystal with a frequency source traceable to a primary reference clock. This would not effect the operation of any of the Ethernet layers, for which this change would be transparent. The receiver at the far end of the link would lock onto the physical layer clock of the received signal, and thus itself gain access to a highly accurate and stable frequency reference. Then, in a manner analogous to conventional hierarchical master-slave network synchronization, this receiver could lock the transmission clock of its other ports to this frequency reference and a fully time synchronous network could be established.

The advantage of using Synchronous Ethernet, compared with methods that rely on sending timing information in packets over an unclocked physical layer, is that it is not influenced by

impairments introduced by the higher levels of the networking technology (packet loss, packet delay variation). Hence, the frequency accuracy and stability may be expected to exceed those of networks with unsynchronized physical layers.

Synchronous Ethernet allows operators to gracefully integrate existing systems and future deployments into conventional industry-standard synchronization hierarchy. The concept behind synchronous Ethernet is analogous to SONET/SDH system timing capabilities. It allows the operator to select any (optical) Ethernet port as a candidate timing reference. The recovered timing from this port will then be used to time the system (for example, the CPM will lock to this provisioned reference selection). The operator then could ensure that any of system output would be locked to a stable traceable frequency source.

The SSM of Synchronous Ethernet uses an Ethernet OAM PDU that uses the slow protocol subtype. For a complete description of the format and processing see ITU-T G.8264

Table 28: Synchronization Message Coding and Source Priorities (Value Received on a Port)

SSM value received on port

SDH interface SyncE interafce in SDH mode	SONET Interface SyncE interface in SONET mode	E1 interface	T1 interface (ESF)	Internal Relative Quality Level
0010 (prc)	0001 (prs)	0010 (prc)	00000100 11111111 (prs)	1. Best quality
	0000 (stu)		00001000 11111111 (stu)	2.
	0111 (st2)		00001100 11111111 (ST2)	3.
0100 (ssua)	0100 (tnc)	0100 (ssua)	01111000 11111111 (TNC)	4.
	1101 (st3e)		01111100 11111111 (ST3E)	5.
1000 (ssub)		1000 (ssub)		6.
	1010 (st3/eec2)		00010000 11111111 (ST3)	7.
1011 (sec/eec1)		1011 (sec)		8. Lowest quality qualified in QL-enabled mode
	1100 (smc)		00100010 11111111 (smc)	9.
			00101000 11111111 (st4)	10.
	1110 (pno)		01000000 11111111 (pno)	11.
1111 (dnu)	1111 (dus)	1111 (dnu)	00110000 11111111 (dus)	12.
Any other	Any other	Any other	N/A	13. QL_INVALID
				14. QL-FAILED
				15. QL-UNC

Table 29: Synchronization Message Coding and Source Priorities (Transmitted by Interface of Type)

SSM values to be transmitted by interface of type

Internal Relative Quality Level	SDH interface SyncE interafce in SDH mode	SONET Interface SyncE interface in SONET mode	E1 interface	T1 interface (ESF)
1. Best quality	0010 (prc)	0001 (PRS)	0010 (prc)	00000100 11111111 (PRS)
2.	0100 (ssua)	0000 (stu)	0100 (ssua)	00001000 11111111 (stu)
3.	0100 (ssua)	0111 (st2)	0100 (ssua)	00001100 11111111 (st2)
4.	0100 (ssua)	0100 (tnc)	0100 (ssua)	01111000 11111111 (tnc)
5.	1000 (ssub)	1101 (st3e)	1000 (ssub)	01111100 11111111 (st3e)
6.	1000 (ssub)	1010 (st3/eec2)	1000 (ssub)	00010000 11111111 (st3)
7.	1011 (sec/eec1)	1010 (st3/eec2)	1011 (sec)	00010000 11111111 (st3)
8. Lowest quality qualified in QL-enabled mode	1011 (sec/ eec1)	1100 (smc)	1011 (sec)	00100010 11111111 (smc)
9.	1111 (dnu)	1100 (smc)	1111 (dnu)	00100010 11111111 (smc)
10.	1111 (dnu)	1111 (dus)	1111 dnu	00101000 11111111 (st4)
11.	1111 (dnu)	1110 (pno)	1111 (dnu)	01000000 11111111 (pno)
12.	1111 (dnu)	1111 (dus)	1111 (dnu)	00110000 11111111 (dus)
13. QL_INVALI D	1111 (dnu)	1111 (dus)	1111 (dnu)	00110000 11111111 (dus)
14. QL-FAILED	1111 (dnu)	1111 (dus)	1111 (dnu)	00110000 11111111 (dus)
15. QL-UNC	1011 (sec/eec1)	1010 (st3/eec2)	1011 (sec)	00010000 11111111 (st3)

System-Wide ATM Parameters

The atm-ping OAM loopback feature can be enabled on an ATM SAP for a period of time configured through the interval and the send-count parameters. When the ATM SAP terminates on IES or VPRN services, a failure of the loopback state machine does not bring down the Layer 3 interface. Only receiving AIS/RDI OAM cells or entering the AIS/RDI state brings down the Layer 3 interface.

The atm-ping OAM loopback feature can be also be enabled on a continuous basis on an ATM SAP terminating on IES or VPRN services. When the loopback state machine fails, the Layer 3 interface is brought down.

The ATM OAM loopback parameters must be first enabled and configured in the **config>system> atm>oam** context and then enabled in the IES or VPRN service interface SAP **atm oam** context.

Refer to the IES and VPRN sections of the 7750 SR OS Services Guide for further information.

Link Layer Discovery Protocol (LLDP)

The IEEE 802.1ab Link Layer Discovery Protocol (LLDP) is a uni-directional protocol that uses the MAC layer to transmit specific information related to the capabilities and status of the local device. Separately from the transmit direction, the LLDP agent can also receive the same kind of information for a remote device which is stored in the related MIB(s).

LLDP itself does not contain a mechanism for soliciting specific information from other LLDP agents, nor does it provide a specific means of confirming the receipt of information. LLDP allows the transmitter and the receiver to be separately enabled, making it possible to configure an implementation so the local LLDP agent can either transmit only or receive only, or can transmit and receive LLDP information.

The information fields in each LLDP frame are contained in a LLDP Data Unit (LLDPDU) as a sequence of variable length information elements, that each include type, length, and value fields (known as TLVs), where:

- Type identifies what kind of information is being sent.
- Length indicates the length of the information string in octets.
- Value is the actual information that needs to be sent (for example, a binary bit map or an alphanumeric string that can contain one or more fields).

Each LLDPDU contains four mandatory TLVs and can contain optional TLVs as selected by network management:

- Chassis ID TLV
- Port ID TLV
- Time To Live TLV
- Zero or more optional TLVs, as allowed by the maximum size of the LLDPDU
- End Of LLDPDU TLV

The chassis ID and the port ID values are concatenated to form a logical identifier that is used by the recipient to identify the sending LLDP agent/port. Both the chassis ID and port ID values can be defined in a number of convenient forms. Once selected however, the chassis ID/port ID value combination remains the same as long as the particular port remains operable.

A non-zero value in the TTL field of the time-to-live TLV tells the receiving LLDP agent how long all information pertaining to this LLDPDU's identifier will be valid so that all the associated information can later be automatically discarded by the receiving LLDP agent if the sender fails to update it in a timely manner. A zero value indicates that any information pertaining to this LLDPDU's identifier is to be discarded immediately.

Note that a TTL value of zero can be used, for example, to signal that the sending port has initiated a port shutdown procedure.

The end of a LLDPDU TLV marks the end of the LLDPDU.

The IEEE 802.1ab standard defines a protocol that:

- Advertises connectivity and management information about the local station to adjacent stations on the same IEEE 802 LAN.
- Receives network management information from adjacent stations on the same IEEE 802 LAN.
- Operates with all IEEE 802 access protocols and network media.
- Establishes a network management information schema and object definitions that are suitable for storing connection information about adjacent stations.
- Provides compatibility with a number of MIBs as depicted in Figure 10.

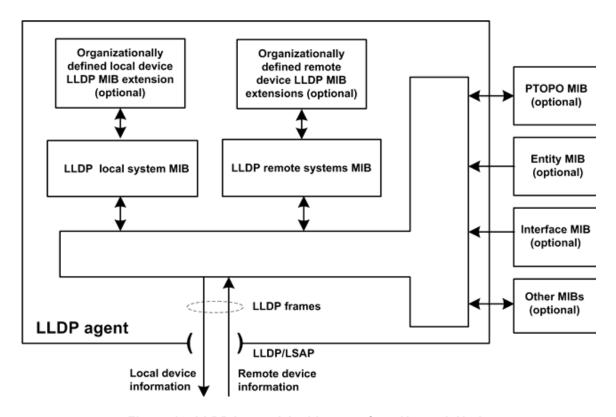


Figure 10: LLDP Internal Architecture for a Network Node

Network operators must be able to discover the topology information in order to detect and address network problems and inconsistencies in the configuration. Moreover, standard-based

tools can address the complex network scenarios where multiple devices from different vendors are interconnected using Ethernet interfaces.

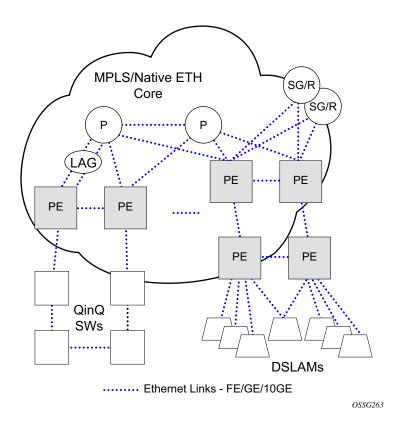


Figure 11: Customer Use Example For LLDP

The example displayed in Figure 11 depicts a MPLS network that uses Ethernet interfaces in the core or as an access/handoff interfaces to connect to different kind of Ethernet enabled devices such as service gateway/routers, QinQ switches, DSLAMs or customer equipment.

IEEE 802.1ab LLDP running on each Ethernet interfaces in between all the above network elements may be used to discover the topology information.

Administrative Tasks

This section contains information to perform administrative tasks.

- Configuring the Chassis Mode on page 235
- Saving Configurations on page 238
- Specifying Post-Boot Configuration Files on page 238
- Network Timing on page 239
- Power Supplies on page 239

Configuring the Chassis Mode

Depending on the chassis type and IOM type, the following modes can be configured:



NOTE: Chassis modes are not available on the 7750 SRc12 router.

- a: This mode corresponds to scaling and feature set associated with iom-20g.
- **b**: This mode corresponds to scaling and feature set associated with iom-20g-b.
- c: This mode corresponds to scaling and feature set associated with iom2-20g.
- **d**: This mode corresponds to scaling and feature set associated with iom3-xp.

If the chassis mode is not explicitly provisioned in the configuration file, the chassis will come up in chassis mode a by default. The behavior for the IOMs is described in the following table:

Table 30: Provisioned IOM Card Behavior

IOM	Behavior			
iom-20g-b	Comes online if provisioned as iom-20g or iom-20g-b.			
iom2-20g	Comes online if provisioned as iom-20g, iom-20g-b or iom2-20g.			
iom3-xp	Comes online if provisioned as iom3-xp.			

To support a particular chassis-mode, all provisioned IOMs must meet the corresponding IOM level.

The chassis Mode corresponds to scaling and feature sets associated with a given card. The base mode is chassis mode A which supports all IOM card types.

IOM cards that are not compatible with more recent chassis modes will be put into an operationally failed state if the configuration chassis mode "force" option is used.

- Chassis mode A corresponds to iom-20g, chassis mode backwards compatible for iom-20g-b, iom2-20g, iom3-xp
- Chassis mode B corresponds to iom-20g-b, chassis mode backwards compatible for iom2-20g, iom3-xp
- Chassis mode C corresponds to iom2-20g, chassis mode backwards compatible for iom3-
- Chassis mode D corresponds to iom3-xp

The force keyword forces an upgrade either from mode a to mode b or d with cards provisioned as



NOTE: The iom-20g is not supported from 5.0R and later but chassis mode A is described for backwards compatibility purposes.

iom-20g or from mode **b** to mode **c** with cards provisioned as iom-20g-b.

The ASAP MDA can only be configured if the IOM2-20g and IOM3-XP is provisioned.

Note that, if you are in chassis-mode d and configure an IOM type as iom2-20g and then downgrade to chassis-mode a or b (must specify force keyword), a warning appears about the IOM downgrade. In this case, the IOM's provisioned type will downgrade to iom-20g-b. Once this is done, the ASAP MDA cannot be configured. The following message appears:

```
*A:138.120.214.68>config>system# chassis-mode b
MINOR: CHMGR #1009 Mode change requires force - card-type iom2-20g in slot 1 would change
       to iom-20g-b *A:138.120.214.68>config>system# chassis-mode b force
MINOR: CHMGR #1010 Can not change mode - mda m1-choc12-as-sfp in 10/1 not supported when
       card changes to iom-20g-b
```

If this is the desired behavior, for example, chassis-mode d is configured and IPv6 is running, you can then downgrade to chassis-mode **a** or **b** if you want to disable IPv6.

```
*A:ALA-48# show chassis
Chassis Information
______
    Name
                                   : ALA-48
  Name
Type
Location
Coordinates
CLLI code
Number of slots
Number of ports
Critical LED state
Major LED state
Minor LED state
                                   : 7750 SR-12
                                   : exit
                                   : N 45 58 23, W 34 56 12
                                   : abcdefg1234
                                   : 12
                                   : 246
                                  : Off
                                  : Off
```

: Off

Over Temperature state : OK

Base MAC address : 14:30:ff:00:00:00

Admin chassis mode : d

Oper chassis mode : d

Hardware Data

Part number : Sim Part#

CLEI code : Sim CLEI

Serial number : sim48

Manufacture date : 01012003

Manufacturing string : Sim MfgString sim48

Manufacturing deviations : Sim MfgDeviation sim48

Time of last boot : 2007/09/24 08:15:17

Current alarm state : alarm cleared

Environment Information

^{*}A:ALA-48#

Saving Configurations

Whenever configuration changes are made, the modified configuration must be saved so they will not be lost when the system is rebooted.

Configuration files are saved by executing explicit command syntax which includes the file URL location to save the configuration file as well as options to save both default and non-default configuration parameters. Boot option file (BOF) parameters specify where the system should search for configuration and image files as well as other operational parameters during system initialization.

For more information about boot option files, refer to the Boot Option Files section of this manual.

Specifying Post-Boot Configuration Files

Two post-boot configuration extension files are supported and are triggered when either a successful or failed boot configuration file is processed. The **boot-bad-exec** and **boot-good-exec** commands specify URLs for the CLI scripts to be run following the completion of the boot-up configuration. A URL must be specified or no action is taken.

For example, after a configuration file is successfully loaded, the specified URL can contain a nearly identical configuration file with certain commands enabled or disabled, or particular parameters specified and according to the script which loads that file.

Network Timing

In Time Domain Multiplexed (TDM)-based networks (for example, SONET or SDH circuit-switched networks), the concept of network timing is used to prevent over-run or under-run issues where circuits are groomed (rebundled) and switched. Hardware exists in each node that takes a common clock derived from an internal oscillator, a specific receive interface or special BITS interface and provides it to each synchronous interface in the system. Usually, each synchronous interface is allowed to choose between using the chassis-provided clock or the clocking recovered from the received signal on the interface. The clocking is used to drive the transmit side of the interface. The appropriate configuration at each node which defines how interface clocking is handled must be considered when designing a network that has a centralized timing source so each interface is operating in a synchronous manner.

The effect of timing on a network is dependent on the nature of the type of traffic carried on the network. With bit-wise synchronous traffic (traditional circuit-based voice or video), non-synchronous transmissions cause a loss of information in the streams affecting performance. With packet-based traffic, the applications expect and handle jitter and latency inherent to packet-based networks. When a packet-based network is used to carry voice or video traffic, the applications use data compression and elasticity buffering to compensate for jitter and latency. The network itself relies on appropriate Quality of Service (QoS) definitions and network provisioning to further minimize the jitter and latency the application may experience.

Power Supplies

7750 SR OS supports a **power-supply** command to configure the type and number of power supplies present in the chassis. The operational status of a power source is always displayed by the LEDs on the Control Processor/Switch Fabric Module (CP/SFM) front panel, but the power supply information must be explicitly configured in order for a power supply alarm to be generated if a power source becomes operationally disabled.

Automatic Synchronization

Use the CLI syntax displayed below to configure synchronization components relating to active-to-standby CPM switchover. In redundant systems, synchronization ensures that the active and standby CPMs have identical operational parameters, including the active configuration, CPM, and IOM images in the event of a failure or reset of the active CPM.

The force-switchover command forces a switchover to the standby CPM card.

To enable automatic synchronization, either the boot-env parameter or the config parameter must be specified. The synchronization occurs when the admin save or bof save commands are executed.

When the boot-env parameter of the synchronize command is specified, the BOF, boot.ldr, config, and image files are automatically synchronized. When the config parameter is specified, only the configuration files are automatically synchronized.

Synchronization also occurs whenever the BOF is modified and when an admin>save command is entered with no filename specified.

Boot-Env Option

The boot-env option enables a synchronization of all the files used in system initialization.

When configuring the system to perform this synchronization, the following occurs:

- 1. The BOF used during system initialization is copied to the same compact flash on the standby CPM (in redundant systems).
 - **Note:** The synchronization parameters on the standby CPM are preserved.
- 2. The primary, secondary, and tertiary images, (provided they are locally stored on the active CPM) are copied to the same compact flash on the standby CPM.
- 3. The primary, secondary, and tertiary configuration files, (provided they are locally stored on the active CPM) are copied to the same compact flash on the standby CPM.

Config Option

The config option synchronizes configuration files by copying the files specified in the active CPM BOF file to the same compact flash on the standby CPM.

Manual Synchronization

The admin redundancy synchronize command performs manual CPM synchronizations. The boot-env parameter synchronizes the BOF, image, and configuration files in redundant systems. The config parameter synchronizes only the configuration files in redundant systems.

Forcing a Switchover

The force-switchover now command forces an immediate switchover to the standby CPM card.

If the active and standby are not synchronized for some reason, users can manually synchronize the standby CPM by rebooting the standby by issuing the admin reboot standby command on the active or the standby CPM.

System Configuration Process Overview

Figure 12 displays the process to provision basic system parameters.

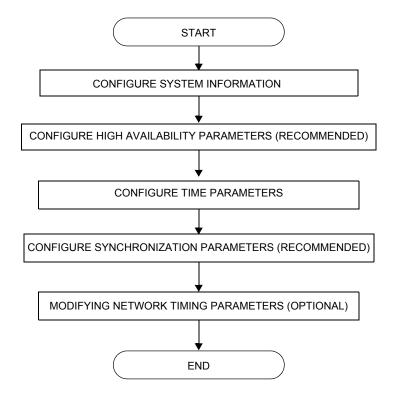


Figure 12: System Configuration and Implementation Flow

Configuration Notes

This section describes system configuration caveats.

General

• The 7750 SR-Series routermust be properly initialized and the boot loader and BOF files successfully executed in order to access the CLI.

Configuration Notes

Configuring System Management with CLI

This section provides information about configuring system management features with CLI.

Topics in this chapter include:

- Basic System Configuration on page 248
- Common Configuration Tasks on page 249
- System Information on page 250
 - → System Information Parameters
 - Name on page 250
 - Contact on page 251
 - Location on page 251
 - CLLI Code on page 251
 - Coordinates on page 252
 - → System Time Elements on page 253
 - Zone on page 253
 - Summer Time Conditions on page 255
 - NTP on page 256
 - SNTP on page 262
 - CRON on page 264
 - → Configuring Synchronization and Redundancy on page 277
 - Configuring Synchronization on page 277
 - Configuring Manual Synchronization on page 278
 - Forcing a Switchover on page 278
 - Configuring Synchronization Options on page 279
 - Configuring Multi-Chassis Redundancy on page 280
- Configuring Power Supply Parameters on page 282
- System Administration Parameters on page 285
 - → Disconnect on page 285
 - → Set-time on page 286
 - → Display-config on page 286
 - → Tech-support on page 288
 - \rightarrow Save on page 288
 - → Reboot on page 289
 - → Post-Boot Configuration Extension Files on page 290

- System Timing on page 293
 - → Edit Mode on page 293
 - → Configuring Timing References on page 294
 - → Using the Revert Command on page 295
 - → Other Editing Commands on page 295
 - → Forcing a Specific Reference on page 296
- Configuring System Monitoring Thresholds on page 297
- Configuring LLDP on page 299

System Management

Saving Configurations

Whenever configuration changes are made, the modified configuration must be saved so the changes will not be lost when the system is rebooted. The system uses the configuration and image files, as well as other operational parameters necessary for system initialization, according to the locations specified in the boot option file (BOF) parameters. For more information about boot option files, refer to the *Boot Option Files* section of this manual.

Configuration files are saved by executing *implicit* or *explicit* command syntax.

- An *explicit* save writes the configuration to the location specified in the save command syntax (the *file-url* option).
- An *implicit* save writes the configuration to the file specified in the primary configuration location.

If the *file-url* option is not specified in the save command syntax, the system attempts to save the current configuration to the current BOF primary configuration source. If the primary configuration source (path and/or filename) changed since the last boot, the new configuration source is used.

The save command includes an option to save both default and non-default configuration parameters (the *detail* option).

The *index* option specifies that the system preserves system indexes when a save command is executed, regardless of the persistent status in the BOF file. During a subsequent boot, the index file is read along with the configuration file. As a result, a number of system indexes are preserved between reboots, including the interface index, LSP IDs, path IDs, etc. This reduces resynchronizations of the Network Management System (NMS) with the affected network element.

If the save attempt fails at the destination, an error occurs and is logged. The system does not try to save the file to the secondary or tertiary configuration sources unless the path and filename are explicitly named with the save command.

Basic System Configuration

This section provides information to configure system parameters and provides configuration examples of common configuration tasks. The minimal system parameters that should be configured are:

- System Information Parameters on page 250
- System Time Elements on page 253

The following example displays a basic system configuration:

```
A:ALA-12>config>system# info
echo "System Configuration "
      name "ALA-12"
       coordinates "Unknown"
       snmp
       exit
       security
               community "private" rwa version both
       exit
       time
               server 192.168.15.221
               no shutdown
           exit
               shutdown
           exit
           zone GMT
       exit
A:ALA-12>config>system#
```

Common Configuration Tasks

This section provides a brief overview of the tasks that must be performed to configure system parameters and provides the CLI commands.

- System Information on page 250
 - \rightarrow Name on page 250
 - → Contact on page 251
 - → Location on page 251
 - → CLLI Code on page 251
 - → Coordinates on page 252
- System Time Elements on page 253
 - \rightarrow Zone on page 253
 - → Summer Time Conditions on page 255
 - \rightarrow NTP on page 256
 - \rightarrow SNTP on page 262
 - → CRON on page 264
 - Time Range on page 267
 - Time of Day on page 271
- Synchronization and Redundancy on page 220
 - → Automatic Synchronization on page 240
 - → Manual Synchronization on page 241
- System Administration Parameters on page 285
 - → Disconnect on page 285
 - → Set-time on page 286
 - → Display-config on page 286
 - → Reboot on page 289
 - \rightarrow Save on page 288
- System Timing on page 293
 - → Configuring Timing References on page 294

System Information

This section covers the basic system information parameters to configure the physical location of the SR-Series, contact information, location information such as the place the router is located such as an address, floor, room number, etc., global positioning system (GPS) coordinates, and system name.

Use the CLI syntax displayed below to configure the following system components:

- System Information Parameters on page 250
- System Time Elements on page 253

General system parameters include:

- Name on page 250
- Contact on page 251
- Location on page 251
- CLLI Code on page 251
- Coordinates on page 252

System Information Parameters

Name

Use the system command to configure a name for the device. The name is used in the prompt string. Only one system name can be configured, if multiple system names are configured the last one encountered overwrites the previous entry. Use the following CLI syntax to configure the system name:

Example: alcatel>config>system# name ALA-12

The following example displays the system name:

Contact

Use the contact command to specify the name of a system administrator, IT staff member, or other administrative entity.

CLI Syntax: config>system

contact contact-name

Example: config>system# contact "Fred Information Technology"

Location

Use the location command to specify the system location of the device. For example, enter the city, building address, floor, room number, etc., where the router is located.

Use the following CLI syntax to configure the location:

CLI Syntax: config>system

location location

Example: config>system# location "Bldg.1-floor 2-Room 201"

CLLI Code

The Common Language Location Code (CLLI code) is an 11-character standardized geographic identifier that is used to uniquely identify the geographic location of a 7750 SR-Series router.

Use the following CLI command syntax to define the CLLI code:

CLI Syntax: config>system

clli-code clli-code

Example: config>system# clli-code abcdefg1234

Coordinates

Use the optional coordinates command to specify the GPS location of the device. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

Use the following CLI syntax to configure the location:

Example: config>system# coordinates "N 45 58 23, W 34 56 12"

The following example displays the configuration output of the general system commands:

System Time Elements

The system clock maintains time according to Coordinated Universal Time (UTC). Configure information time zone and summer time (daylight savings time) parameters to correctly display time according to the local time zone.

Time elements include:

- Zone on page 253
- Summer Time Conditions on page 255
- NTP on page 256
- SNTP on page 262
- CRON on page 264
 - → Time Range on page 267
 - \rightarrow Time of Day on page 271

Zone

The zone command sets the time zone and/or time zone offset for the router. The 7750 SR OS supports system-defined and user-defined time zones. The system-defined time zones are listed in Table 31.

Example: config>system>time# config>system>time# zone GMT

The following example displays the zone output:

```
A:ALA-12>config>system>time# info

ntp
server 192.168.15.221
no shutdown
exit
sntp
shutdown
exit
zone UTC

A:ALA-12>config>system>time#
```

Table 31: System-defined Time Zones

Acronym	Time Zone Name	UTC Offset
Europe:		
GMT	Greenwich Mean Time	UTC
WET	Western Europe Time	UTC
WEST	Western Europe Summer Time	UTC +1 hour
CET	Central Europe Time	UTC +1 hour
CEST	Central Europe Summer Time	UTC +2 hours
EET	Eastern Europe Time	UTC +2 hours
EEST	Eastern Europe Summer Time	UTC +3 hours
MSK	Moscow Time	UTC +3 hours
MSD	Moscow Summer Time	UTC +4 hours
US and Canada:		
AST	Atlantic Standard Time	UTC -4 hours
ADT	Atlantic Daylight Time	UTC -3 hours
EST	Eastern Standard Time	UTC -5 hours
EDT	Eastern Daylight Saving Time	UTC -4 hours
CST	Central Standard Time	UTC -6 hours
CDT	Central Daylight Saving Time	UTC -5 hours
MST	Mountain Standard Time	UTC -7 hours
MDT	Mountain Daylight Saving Time	UTC -6 hours
PST	Pacific Standard Time	UTC -8 hours
PDT	Pacific Daylight Saving Time	UTC -7 hours
HST	Hawaiian Standard Time	UTC -10 hours
AKST	Alaska Standard Time	UTC -9 hours
AKDT	Alaska Standard Daylight Saving Time	UTC -8 hours
Australia an	d New Zealand:	
AWST	Western Standard Time (e.g., Perth)	UTC +8 hours
ACST	Central Standard Time (e.g., Darwin)	UTC +9.5 hours
AEST	Eastern Standard/Summer Time (e.g., Canberra)	UTC +10 hours
NZT	New Zealand Standard Time	UTC +12 hours
NZDT	New Zealand Daylight Saving Time	UTC +13 hours

Summer Time Conditions

The **config>system>time>dst-zone** context configures the start and end dates and offset for summer time or daylight savings time to override system defaults or for user defined time zones.

When configured, the time will be adjusted by adding the configured offset when summer time starts and subtracting the configured offset when summer time ends.

```
CLI Syntax: config>system>time
    dst-zone zone-name
    end {end-week} {end-day} {end-month} [hours-minutes]
    offset offset
    start {start-week} {start-day} {start-month} [hours-minutes]
```

If the time zone configured is listed in Table 31, then the starting and ending parameters and offset do not need to be configured with this command unless there is a need to override the system defaults. The command will return an error if the start and ending dates and times are not available either in Table 31 or entered as optional parameters in this command.

The following example displays the configured parameters.

NTP

Network Time Protocol (NTP) is defined in RFC 1305, *Network Time Protocol (Version 3) Specification, Implementation and Analysis*. It allows for participating network nodes to keep time more accurately and maintain time in a synchronized manner between all participating network nodes.

NTP time elements include:

- Authentication-check on page 256
- Authentication-key on page 257
- Broadcast on page 257
- Broadcastclient on page 258
- Multicast on page 259
- Multicastclient on page 259
- NTP-Server on page 260
- Peer on page 260
- Server on page 261

Authentication-check

The authentication-check command provides for the option to skip the rejection of NTP PDUs that do not match the authentication key or authentication type requirements. The default behavior when authentication is configured is to reject all NTP protocol PDUs that have a mismatch in either the authentication key-id, type, or key.

When authentication-check is configured, NTP PDUs are authenticated on receipt. However, mismatches cause a counter to be increased, one counter for key-id, one for type, and one for key value mismatches.

Example: config>system>time>ntp#

config>system>time>ntp# authentication-check

config>system>time>ntp# no shutdown

Authentication-key

This command configures an authentication key-id, key type, and key used to authenticate NTP PDUs sent to and received from other network elements participating in the NTP protocol. For authentication to work, the authentication key-id, authentication type and authentication key value must match.

Example: config>system>time>ntp#

config>system>time>ntp# authentication-key 1 key A type des config>system>time>ntp# no shutdown

The following example shows NTP disabled with the authentication-key parameter enabled.

Broadcast

The broadcast command is used to transmit broadcast packets on a given subnet.

The following example in the system>time context shows NTP enabled with the broadcast command configured.

```
A:sim1>config>system>time# info detail
------
ntp
no shutdown
authentication-check
ntp-server
broadcast interface int11 version 4 ttl 127
```

```
exit
A:sim1>config>system>time#
```

The following example in the config context shows NTP enabled with the broadcast command configured. At this level, the NTP broadcast commands are displayed at the end of the output after the router interfaces are shown.

Broadcastclient

The broadcastclient command enables listening to NTP broadcast messages on the specified interface.

The following example shows NTP enabled with the broadcastclient parameter enabled.

```
A:ALA-12>config>system>time# info

ntp

broadcastclient interface int11
no shutdown
exit
dst-zone PT
start second sunday april 02:00
end first sunday october 02:00
offset 0
exit
zone UTC

A:ALA-12>config>system>time#
```

Multicast

When configuring NTP the node can be configured to transmit or receive multicast packets on the CPM MGMT port. Broadcast & Multicast messages can easily be spoofed, therefore, authentication is strongly recommended. Multicast is used to configure the transmission of NTP multicast messages. The no construct of this command removes the transmission of multicast address from the configuration.

When transmitting multicast NTP messages the default address of 224.0.1.1 is used.

CLI Syntax: config>system>time>ntp

multicast[version version] [key-id key-id]

Example: config>system>time>ntp#

config>system>time>ntp# multicast
config>system>time>ntp# no shutdown

The following example shows NTP enabled with the multicast command configured.

Multicastclient

This command is used to configure an address to receive multicast NTP messages on the CPM MGMT port. The no construct of this command removes the multicast client. If multicastclient is not configured, all NTP multicast traffic will be ignored.

CLI Syntax: config>system>time>ntp

multicastclient [authenticate]

Example: config>system>time>ntp#

 $\verb|config>system>time>ntp# multicastclient authenticate|\\$

config>system>time>ntp# no shutdown

The following example shows NTP enabled with the multicastclient command configured.

```
A:ALA-12>config>system>time# info

server 192.168.15.221
multicastclient
no shutdown

A:ALA-12>config>system>time##
```

NTP-Server

This command configures the node to assume the role of an NTP server. Unless the server command is used this node will function as an NTP client only and will not distribute the time to downstream network elements. If an authentication key-id is specified in this command, the NTP server requires client packets to be authenticated.

CLI Syntax: config>system>time>ntp

ntp-server [transmit key-id]

Example: config>system>time>ntp#

config>system>time>ntp# ntp-server transmit 1

config>system>time>ntp# no shutdown

The following example shows NTP enabled with the ntp-server command configured.

```
A:siml>config>system>time>ntp# info

no shutdown
ntp-server

A:siml>config>system>time>ntp#
```

Peer

Configuration of an NTP peer configures symmetric active mode for the configured peer. Although any system can be configured to peer with any other NTP node, it is recommended to configure authentication and to configure known time servers as their peers. Use the **no** form of the command to remove the configured peer.

CLI Syntax: config>system>time>ntp

peer ip-address [version version] [key-id key-id]

[prefer]

Example: config>system>time>ntp#

config>system>time>ntp# peer 192.168.1.1 key-id 1

config>system>time>ntp# no shutdown

The following example shows NTP enabled with the peer command configured.

```
A:siml>config>system>time>ntp# info

no shutdown
peer 192.168.1.1 key-id 1

A:siml>config>system>time>ntp#
```

Server

The Server command is used when the node should operate in client mode with the NTP server specified in the address field. Use the **no** form of this command to remove the server with the specified address from the configuration.

Up to five NTP servers can be configured.

Example: config>system>time>ntp#

config>system>time>ntp# server 192.168.1.1 key-id 1

config>system>time>ntp# no shutdown

The following example shows NTP enabled with the server command configured.

A:sim1>config>system>time>ntp# info

no shutdown
server 192.168.1.1 key 1

A:sim1>config>system>time>ntp#

SNTP

SNTP is a compact, client-only version of the NTP. SNTP can only receive the time from SNTP/NTP servers; it cannot be used to provide time services to other systems. SNTP can be configured in either broadcast or unicast client mode.

SNTP time elements include:

- Broadcast-client on page 262
- Server-address on page 263

Broadcast-client

The **broadcast-client** command enables listening at the global device level to SNTP broadcast messages on interfaces with broadcast client enabled.

```
CLI Syntax: config>system>time>sntp
broadcast-client

Example: config>system>time>sntp#
config>system>time>sntp# broadcast-client
config>system>time>sntp# no shutdown
```

The following example shows SNTP enabled with the **broadcast-client** command enabled.

Server-address

The server-address command configures an SNTP server for SNTP unicast client mode.

Example: config>system>time>sntp#
config>system>time# server-address 10.10.0.94 version
1 preferred interval 100

The following example shows SNTP enabled with the **server-address** command configured.

CRON

The CRON command supports the Service Assurance Agent (SAA) functions as well as the ability to schedule turning on and off policies to meet "Time of Day" requirements. CRON functionality includes the ability to specify the commands that need to be run, when they will be scheduled, including one-time only functionality (oneshot), interval and calendar functions, as well as where to store the output of the results. In addition, CRON can specify the relationship between input, output and schedule. Scheduled reboots, peer turn ups, service assurance agent tests and more can all be scheduled with Cron, as well as OAM events, such as connectivity checks, or troubleshooting runs.

CRON elements include:

- Action
- Schedule
- Script
- Time Range
- Time of Day

Action

Parameters for a script including the maximum amount of time to keep the results from a script run, the maximum amount of time a script may run, the maximum number of script runs to store and the location to store the results.

```
Example:config>cron# action test
  config>cron>action# results ftp://172.22.184.249/./sim1/test-results
  config>cron>action# no shut
```

The following example shows a script named "test" receiving an action to store its results in a file called "test-results":

Schedule

The schedule function configures the type of schedule to run, including one-time only (oneshot), periodic or calendar-based runs. All runs are determined by month, day of month or weekday, hour, minute and interval (seconds). If end-time and interval are both configured, whichever condition is reached first is applied.

```
CLI Syntax: config>cron
               schedule schedule-name [owner schedule-owner]
                  action action-name [owner owner-name]
                  count number
                  day-of-month {day-number [..day-number] | all }
                  description description-string
                  end-time [date/day-name] time
                  hour {hour-number [..hour-number] | all}
                  interval seconds
                  minute {minute-number [..minute-number] | all }
                  month {month-number [..month-number] | month-name
                      [..month-name] | all }
                  no shutdown
                  type {periodic|calendar|oneshot}
                  weekday {weekday-number [..weekday-number] | day-name
                      [...day-name]|all|
                  shutdown
Example:
         config>cron# schedule test2
          config>cron>sched# day-of-month 17
          config>cron>sched# end-time 2007/07/17 12:00
          config>cron>sched# minute 0 15 30 45
          config>cron>sched# weekday friday
```

The following example schedules a script named "test2" to run every 15 minutes on the 17th of each month and every Friday until noon on July 17, 2007:

config>cron>sched# shut

```
end-time 2007/07/17 12:00
exit
-----*A:SR-3>config>cron#
```

Script

The script command opens a new nodal context which contains information on a script.

Example: config>cron# script test config>cron>script#

The following example names a script "test":

Time Range

7750 SR ACLs and QoS policy configurations may be enhanced to support time based matching. CRON configuration includes time matching with the 'schedule' sub-command. Schedules are based on events; time-range defines an end-time and will be used as a match criteria.

Time range elements include:

- Create on page 267
- Absolute on page 267
- Daily on page 268
- Weekdays on page 269
- Weekend on page 269
- Weekly on page 270

Create

Use this command to enable the time-range context.

The following example creates a time-range called test1.

CLI Syntax: config>cron>

time-range name create

Example: config>cron# time-range test1 create

config>cron>time-range\$

Absolute

The absolute command configures a start and end time that will not repeat.

CLI Syntax: config>cron>time-range\$

absolute absolute-time end absolute-time

Example: config>cron>time-range\$ absolute start 2006/05/05,11:00 end

2006/05/06,11:01

config>cron>time-range\$

The following example shows an absolute time range beginning on May 5, 2006 at 11:00 and ending May 6, 2006 at 11:01:

A:sim1>config>cron>time-range# show cron time-range detail

Cron time-range details

: test1 Triggers : 0

Status : Inactive
Absolute : start 2006/05/05,11:00 end 2006/05/06,11:01

A:sim1>config>cron>time-range#

Daily

The daily command configures the start and end of a periodic schedule for every day of the week (Sunday through Saturday).

CLI Syntax: config>cron>time-range\$

daily start time-of-day end time-of-day

Example: config>cron>time-range\$ daily start 11:00 end 12:00

config>cron>time-range\$

The following example shows a daily time range beginning at 11:00 and ending at 12:00.

A:sim1>config>cron>time-range# show cron time-range detail

Cron time-range details

Name
Triggers : 0
Status : Inactive

Periodic : daily Start 11:00 End 12:00 ______

A:sim1>config>cron>time-range#

Weekdays

The weekdays command configures the start and end of a periodic schedule for weekdays (Monday through Friday).

CLI Syntax: config>cron>time-range\$

weekdays start time-of-day end time-of-day

Example: config>cron>time-range\$ weekdays start 11:00 end 12:00

config>cron>time-range\$

The following command shows a time range beginning at 11:00 and ending at 12:00. This schedule runs all weekdays during this time period.

Weekend

The weekend command configures the start and end of a periodic schedule for weekends (Saturday and Sunday). The resolution must be at least one minute apart, for example, start at 11:00 and end at 11:01. A start time and end time of 11:00 is invalid.

CLI Syntax: config>cron>time-range\$

weekend start time-of-day end time-of-day

Example: config>cron>time-range\$ weekend start 11:00 end 12:00

config>cron>time-range\$

The following command shows a weekend time range beginning at 11:00am and ending at 12:00pm, both Saturday and Sunday.

To specify 11:00am to 12:00pm on Saturday or Sunday only, use the Absolute parameter for one day, or the Weekly parameter for every Saturday or Sunday accordingly. In addition, see the Schedule parameter to schedule oneshot or periodic events in the config>cron> context.

Common Configuration Tasks

Status : Inactive

Periodic : weekend Start 11:00 End 12:00

Weekly

The weekly command configures the start and end of a periodic schedule for the same day every week, for example, every Friday. The start and end dates must be the same. The resolution must be at least one minute apart, for example, start at 11:00 and end at 11:01. A start time and end time of 11:00 is invalid.

CLI Syntax: config>cron>time-range\$

weekly start time-in-week end time-in-week

Example: config>cron>time-range\$ start fri,01:01 end fri,01:02

config>cron>time-range\$

The following command shows a weekly time range beginning on Friday at 1:01am ending Friday at 1:02am.

A:sim1>config>cron>time-range\$ info

weekly start fri,01:01 end fri,01:02

A:sim1>config>cron>time-range\$

Time of Day

Time of Day (TOD) suites are useful when configuring many types of time-based policies or when a large number of subscribers or SAPs require the same type of TOD changes. The TOD suite may be configured while using specific ingress or egress ACLs or QoS policies, and is an enhancement of the ingress and egress CLI trees.

SAPs

- If a TOD Suite is assigned to a SAP, statistics collection are not collected for that SAP and scheduler overrides cannot be collected on the SAP. If the SAP has an egress aggregate rate limit configured, an egress scheduler policy assignment cannot be applied.
- When an item is configured both on SAP level and in the TOD suite assigned to the SAP, the TOD-suite defined value takes precedence. If a SAP belongs to an IES Interface, TOD Suites are allowed only with generic interfaces (no subscriber, group, redundant, etc.).
- A policy or filter assignment configured directly on a SAP has a lower priority than any
 assignment in a TOD Suite. Hence, it is possible that a new direct configuration has no
 immediate effect. If the configuration is made by CLI, a warning is given.

Multiservice Site

When applying a TOD Suite to a multi-service-site, only the scheduler policy assignment is active. If the multi-service-site has an egress aggregate rate limit configured, any egress scheduler policy assignment cannot be applied. While a TOD Suite is assigned to a multi-service-site, it is not possible to configure a scheduler to override it.

ANCP (Access Node Control Protocol)

Static ANCP string mapping and TOD suites must be configured on separate SAPs or multiservice sites.

Time of day elements include:

- Egress on page 272
- Ingress on page 275

Egress

This command is an enhancement for specific egress policies including filter lists, schedulers and QoS. Use this command to create time-range based associations of previously created filter lists, QoS and scheduler policies. Multiple policies may be included and each must be assigned a different priority; in case time-ranges overlap, the priority will be used to determine the prevailing policy. Only a single reference to a policy may be included without a time-range.

Egress Aggregate Rate Limit

Having an egress aggregate rate limit is incompatible with having a scheduler policy. If a SAP or multi-service-site has a configured egress aggregate rate limit, and the TOD suite assigns a scheduler policy to it, that assignment cannot be applied: the configured aggregate rate limit takes precedence over the TOD suite's scheduler policy assignment.

Egress Multicast Group

SAPs may not have a TOD suite while belonging to an egress multicast group (EMG). Since all SAPs that belong to the same EMG must have the same egress filter, it is imperative to ensure that the TOD Suite does not modify the egress filter assignment.

Filters

In a TOD suite, filters that have entries with time-ranges may not be selected. Similarly, filter entries with a time-range may not be created while a TOD suite refers to that filter. QoS policies and filters referred to by a TOD suite must have scope "template" (default). The following syntax is used to configure TOD-suite egress parameters.

```
CLI Syntax: config

cron

tod-suite tod-suite-name create

egress

filter ip ip-filter-id [time-range time-range-name]

[priority priority]

filter ipv6 ipv6-filter-id[time-range

time-range-name] [priority priority]

filter mac mac-filter-id[time-range time-range-

name] [priority priority]

qos policy-id [time-range time-range-name] [priority priority]

scheduler-policy scheduler-policy-name [time-range time-range-name]
```

Example: config>cron>tod-suite\$ egress filter ip 100 config>cron>tod-suite\$

The following command shows an egress IP filter association with filter ID 100.

Example:config>cron>tod-suite\$ egress qos 101
 config>cron>tod-suite\$

The following command shows an association with egress QoS-SAP policy 101.

```
A:siml>config>qos# sap-egress 101 create
...
A:siml>config>cron>tod-suite# egress qos 101
A:siml>config>cron>tod-suite# info detail
...
no description
egress
qos 101
exit

A:siml>config>cron>tod-suite#
```

Example: config>cron>tod-suite\$ egress scheduler-policy test1 config>cron>tod-suite\$

The following command shows an association with an egress scheduler-policy called test1.

Ingress

This command is an enhancement for specific ingress policies including filter lists, schedulers and QoS policies. Use this command to create time-range based associations of previously created filter lists QoS and scheduler policies. Multiple policies may be included and each must be assigned a different priority; in case time-ranges overlap, the priority will be used to determine the prevailing policy. Only a single reference to a policy may be included without a time-range. To configure a daily time-range across midnight, use a combination of two entries. An entry that starts at hour zero will take over from an entry that ends at hour 24.

Example: config>cron>tod-suite\$ ingress filter ip 100 config>cron>tod-suite\$

The following command shows an ingress IP filter association with filter ID 100.

```
Example: config>cron>tod-suite$ ingress qos 101 config>cron>tod-suite$
```

The following command shows an association with ingress QoS-SAP policy 101.

```
A:siml>config>qos# sap-egress 101 create
...
A:siml>config>cron>tod-suite# ingress qos 101
A:siml>config>cron>tod-suite# info detail
...

no description
ingress
qos 101
exit

A:siml>config>cron>tod-suite#
```

Example: config>cron>tod-suite\$ ingress scheduler-policy test1 config>cron>tod-suite\$

The following command shows an association with an ingress scheduler-policy named test1.

Configuring Synchronization and Redundancy

- Configuring Persistence on page 277
- Configuring Synchronization on page 277
- Configuring Manual Synchronization on page 278
- Forcing a Switchover on page 278
- Configuring Synchronization Options on page 279
- Configuring Multi-Chassis Redundancy on page 280

Configuring Persistence

The following example displays subscriber management system persistence command usage:

```
Example:config>system# persistence
    config>system>persistence# subscriber-mgmt
    config>system>persistence>sub-mgmt# description "cf3:SubMgmt-Test"
    config>system>persistence>sub-mgmt# location cf3:
    config>system>persistence>sub-mgmt# exit

A:ALA-12>config>system>persistence# info

    subscriber-mgmt
    description "cf3:SubMgmt-Test"
    location cf1:
    exit

A:ALA-12>config>system>persistence#
```

Configuring Synchronization

The **switchover-exec** command specifies the location and name of the CLI script file executed following a redundancy switchover from the previously active CPM card.

switchover-exec file-url

Configuring Manual Synchronization

Note that automatic synchronization can be configured in the **config>system> synchronization** context.

Example: admin>redundancy# synchronize config

The following shows the output which displays during a manual synchronization:

```
A:ALA-12>admin# synchronize config

Syncing configuration.....

Syncing configuration.....Completed.
A:ALA-12#
```

Forcing a Switchover

The **force-switchover now** command forces an immediate switchover to the standby CPM card.

Example: admin>redundancy# force-switchover now

A:ALA-12# admin redundancy force-switchover now A:ALA-12# Resetting... $^{2} \label{eq:A:ALA-12}$

If the active and standby are not synchronized for some reason, users can manually synchronize the standby CPM by rebooting the standby by issuing the **admin reboot standby** command on the active or the standby CPM.

Configuring Synchronization Options

Network operators can specify the type of synchronization operation to perform between the primary and secondary CPMs after a change has been made to the configuration files or the boot environment information contained in the boot options file (BOF).

Use the following CLI to configure the boot-env option:

CLI Syntax: config>system

synchronize {boot-env|config}

Example: config>system# synchronize boot-env

The following displays the configuration:

Synchronize Mode : Boot Environment
Synchronize Status : No synchronization
Last Config Sync Time : 2006/06/27 06:19:47
Last Boot Env Sync Time : 2006/06/27 06:19:47

A:ALA-12>config>system#

Use the following CLI to configure the config option:

CLI Syntax: config>system

synchronize {boot-env|config}

Example: config>system# synchronize config

The following example displays the configuration.

Synchronize Mode : Configuration
Synchronize Status : No synchronization
Last Config Sync Time : 2006/06/27 09:17:15
Last Boot Env Sync Time : 2006/06/24 07:16:37

A:ALA-12>config>system#

Configuring Multi-Chassis Redundancy

CLI Syntax: admin>redundancy

config>redundancy#

multi-chassis

peer ip-address

Note: When configuring associated LAG ID parameters, the LAG must be in access mode and LACP must be enabled.

Use the CLI syntax displayed below to configure multi-chassis redundancy features.

```
authentication-key [authentication-key | hash-key]
                      [hash | hash2]
                  description description-string
                  mc-laq
                     hold-on-neighbor-failure duration
                     keep-alive-interval interval
                     lag lag-id lacp-key admin-key system-id system-id [remote-
                         lag lag-id] system-priority system-priority
                     no shutdown
                  no shutdown
                  source-address ip-address
                  sync
                     igmp
                     igmp-snooping
                     port [port-id | lag-id] [sync-tag]
                        range encap-range sync-tag
                     no shutdown
                     srrp
                     sub-mgmt
Example:admin>redundancy#
      config>redundancy# multi-chassis
      config>redundancy>multi-chassis# peer 10.10.10.2 create
      config>redundancy>multi-chassis>peer# description "Mc-Lag peer
10.10.10.2"
      config>redundancy>multi-chassis>peer# mc-lag
      config>redundancy>mc>peer>mc-lag# lag 1 lacp-key 32666 system-id
00:00:00:33:33:33 system-priority 32888
      config>redundancy>mc>peer>mc-lag# no shutdown
      config>redundancy>mc>peer>mc-lag# exit
      config>redundancy>multi-chassis>peer# no shutdown
      config>redundancy>multi-chassis>peer# exit
      config>redundancy>multi-chassis# exit
```

The following displays the configuration:

Configuring Power Supply Parameters

By default, 7750 SR-Series routers are configured as DC-input devices. Traps and alarms are automatically sent if DC power supplies are installed in the power supply slots. In order to generate traps and alarms when AC power supplies are installed in 7750 SR-Series models (except the non-redundant models) the **power-supply** command must be modified. In the non-redundant models, the power supply parameters cannot be modified.

Configuring an existing power supply to none prior to powering off the unit will prevent an alarm from being generated.

There are two power supply positions on the 7750 SR-c12.See the SR-Series-XX Hardware Installation Guides for instructions to install power supplies.

Use the CLI syntax displayed below to modify power supply parameters.

The following example displays the **power-supply** command configuration:

```
A:ALA-12>config>system# info
       name "ALA-12"
        contact "Fred Information Technology"
       location "Bldg.1-floor 2-Room 201"
       clli-code "abcdefg1234"
       coordinates "N 45 58 23, W 34 56 12"
       power-supply 1 dc
        power-supply 2 dc
        lacp-system-priority 1
        sync-if-timing
           ref-order ref1 ref2 bits
           ref1
               shutdown
            exit
                shutdown
            exit
               shutdown
                interface-type ds1 esf
            exit
            commit.
        exit
```

Configuring ATM System Parameters

The ATM context configures system-wide ATM parameters.

The following example shows the ATM configuration.

Configuring Backup Copies

The config-backup command allows you to specify the maximum number of backup versions of configuration and index files kept in the primary location.

For example, assume the **config-backup** *count* is set to **5** and the configuration file is called *xyz.cfg*. When a **save** command is executed, the file *xyz.cfg* is saved with a .1 extension. Each subsequent **config-backup** command increments the numeric extension until the maximum count is reached. The oldest file (**5**) is deleted as more recent files are saved.

```
xyz.cfg
xyz.cfg.1
xyz.cfg.2
xyz.cfg.3
xyz.cfg.4
xyz.cfg.5
xyz.ndx
```

Each persistent index file is updated at the same time as the associated configuration file. When the index file is updated, then the save is performed to *xyz* .*cfg* and the index file is created as *xyz.ndx*. Synchronization between the active and standby SF/CPM is performed for all configurations and their associated persistent index files.

config>system# config-backup 7

The following example shows the configuration.

```
A:ALA-12>config>system>time# info
#------
echo "System Configuration"
#-----
name "ALA-12"
contact "Fred Information Technology"
location "Bldg.1-floor 2-Room 201"
clli-code "abcdefg1234"
coordinates "N 45 58 23, W 34 56 12"
config-backup 7
...
A:ALA-12>config>system>time#
```

System Administration Parameters

Use the CLI syntax displayed below to configure various system administration parameters.

Administrative parameters include:

- Disconnect on page 285
- Set-time on page 286
- Display-config on page 286
- Save on page 288
- Reboot on page 289
- Post-Boot Configuration Extension Files on page 290

Disconnect

The disconnect command immediately disconnects a user from a console, Telnet, FTP, or SSH session.

Note: Configuration modifications are saved to the primary image file.

Example: admin# disconnect

The following example displays the disconnect command results.

```
ALA-1>admin# disconnect ALA-1>admin# Logged out by the administrator Connection to host lost. 
 \label{eq:connection} \text{C:} \  \  \,
```

Set-time

Use the **set-time** command to set the system date and time. The time entered should be accurate for the time zone configured for the system. The system will convert the local time to UTC before saving to the system clock which is always set to UTC. If SNTP or NTP is enabled (no shutdown) then this command cannot be used. The set-time command does not take into account any daylight saving offset if defined.

Example: admin# set-time 2007/02/06 04:10:00

The following example displays the set-time command results.

```
ALA-2# admin set-time 2007/02/06 04:10:00
ALA-2# show time
Thu Feb 2 04:10:04 GMT 2007
ALA-2#
```

Display-config

The **display-config** command displays the system's running configuration.

Example: admin# display-config detail

The following example displays a portion of the **display-config detail** command results.

```
coordinates "N 45 58 23, W 34 56 12"
       chassis-mode d
       config-backup 7
       boot-good-exec "ftp://test:test@192.168.xx.xxx/./1xx.cfg.A"
       boot-bad-exec "ftp://test:test@192.168.xx.xxx/./1xx.cfg.1"
       power-supply 1 dc
       power-supply 2 dc
       lacp-system-priority 1
       no synchronize
       snmp
          shutdown
           engineID "0000197f00000000467ff00"
          packet-size 1500
           general-port 161
       exit
       login-control
           ftp
              inbound-max-sessions 3
           exit.
           telnet
              inbound-max-sessions 5
              outbound-max-sessions 2
           exit
           idle-timeout 1440
           pre-login-message "Property of Service Routing Inc. Unauthorized access prohib-
ited."
           motd text "Notice to all users: Software upgrade scheduled 3/2 1:00 AM"
       exit
       security
           management-access-filter
              default-action permit
               entry 1
                  no description
echo "Mirror Configuration"
#-----
   mirror
       mirror-dest 218 create
           fc be
           no remote-source
           sap 2/1/10:0 create
              egress
                  qos 1
              exit
           no slice-size
           no shutdown
       exit
Finished SAT MAR 06 03:23:05 2004 UTC
A:ALA-12>admin#
```

Tech-support

The tech-support command creates a system core dump. **NOTE**: This command should only be used with explicit authorization and direction from Alcatel-Lucent's Technical Assistance Center (TAC).

Save

The save command saves the running configuration to a configuration file. When the debugsave parameter is specified, debug configurations are saved in the config file. If this parameter is not specified, debug configurations are not saved between reboots.

Example: admin# save ftp://test:test@192.168.x.xx/./1.cfg admin# debug-save debugsave.txt

The following example displays the save command results.

```
A:ALA-1>admin# save ftp://test:test@192.168.x.xx/./lx.cfg
Writing file to ftp://test:test@192.168.x.xx/./lx.cfg
Saving configuration ...Completed.
ALA-1>admin# debug-save ftp://test:test@192.168.x.xx/./debugsave.txt
Writing file to ftp://julie:julie@192.168.x.xx/./debugsave.txt
Saving debug configuration .....Completed.
A:ALA-1>admin#
```

Reboot

The reboot command reboots the router including redundant CPMs and all IOMs in redundant systems. If the now option is not specified, you are prompted to confirm the reboot operation. The **reboot upgrade** command forces an upgrade of the boot ROM and reboot.

Example: admin# reboot now

The following example displays the reboot command results.

```
A:ALA-1>admin# reboot now
Are you sure you want to reboot (y/n)? y
Rebooting...
Using preloaded VxWorks boot loader.
...
```

If synchronization fails, the standby does not reboot automatically. The show redundancy synchronization command displays synchronization output information.

Post-Boot Configuration Extension Files

Two post-boot configuration extension files are supported and are triggered when either a successful or failed boot configuration file is processed. The commands specify URLs for the CLI scripts to be run following the completion of the boot-up configuration. A URL must be specified or no action is taken. The commands are persistent between router (re)boots and are included in the configuration saves (admin>save).

```
CLI Syntax: config>system

boot-bad-exec file-url

boot-good-exec file-url

Example:config>system# boot-bad-exec ftp://test:test@192.168.xx.xxx/./

fail.cfg
config>system# boot-good-exec ftp://test:test@192.168.xx.xxx/./
ok.cfg
```

The following example displays the command output:

```
A:ALA-12>config>system# info
#-----
echo "System Configuration"
      name "ALA-12"
      contact "Fred Information Technology"
      location "Bldg.1-floor 2-Room 201"
      clli-code "abcdefg1234"
      coordinates "N 45 58 23, W 34 56 12"
      config-backup 7
      boot-good-exec "ftp://test:test@192.168.xx.xxx/./ok.cfg"
      boot-bad-exec "ftp://test:test@192.168.xx.xxx/./fail.cfg"
      power-supply 1 dc
      power-supply 2 dc
      lacp-system-priority 1
      sync-if-timing
         begin
         ref-order ref1 ref2 bits
_____
A:ALA-12>config>system#
```

Show Command Output and Console Messages

The show>system>information command displays the current value of the bad/good exec URLs and indicates whether a post-boot configuration extension file was executed when the system was booted. If an extension file was executed, the show>system>information command also indicates if it completed successfully or not.

```
ALA-12>config>system# show system information
   System Information
 System Name : ALA-12
System Contact : Fred Information Technology
System Location : Bldg.1-floor 2-Room 201
System Coordinates : N 45 58 23, W 34 56 12
System Up Time : 1 days, 04:59:33.56 (hr:min:sec)

        SNMP Port
        : 161

        SNMP Engine ID
        : 0000197f000000000467ff00

        SNMP Max Message Size
        : 1500

SNMP Admin State : Disabled SNMP Oper State : Disabled
SNMP Index Boot Status : Not Persistent
BOF Source : cfl:
Image Source : primary
Config Source : primary
BOF Source
                     : cf1:
Last Booted Config File: ftp://test:test@192.168.xx.xxx/./12.cfg
Last Boot Cfg Version : THU MAR 04 22:39:03 2004 UTC
Last Boot Config Header: # TiMOS B-0.0.1323 - Copyright (c) 2000-2004 Alcatel.
                         # All rights reserved. All use subject to applicable 1
                        icense agreements. # Built on Sun Feb 29 21:43:13 PST
                        2004 by builder in /rel0.0/I323/panos/main # Generated
                         THU MAR 04 22:39:03 2004 UTC
Last Boot Index Version: N/A
Last Boot Index Header : N/A
Last Saved Config : N/A
Time Last Saved : N/A
Changes Since Last Save: Yes
Time Last Modified : 2004/03/06 03:30:45
Max Cfg/BOF Backup Rev : 7
Cfg-OK Script : ftp://test:test@192.168.xx.xxx/./ok.cfg
Cfg-OK Script Status : not used
Cfg-Fail Script : ftp://test:test@192.168.xx.xxx/./fail.cfg
Cfg-Fail Script Status : not used
Management IP Addr : 192.168.xx.xxx/20
DNS Server : 192.168.1.254
DNS Domain : eng.timetra.com
BOF Static Routes :
BOF Static Routes
                     Next Hop
______
ALA-12>config>system#
```

When executing a post-boot configuration extension file, status messages are output to the CONSOLE screen prior to the "Login" prompt.

Following is an example of a failed boot-up configuration that caused a boot-bad-exec file containing another error to be executed:

```
Attempting to exec configuration file:
'ftp://test:test@192.168.xx.xxx/./12.cfg' ...
System Configuration
Log Configuration
MAJOR: CLI #1009 An error occurred while processing a CLI command -
File ftp://test:test@192.168.xx.xxx/./12.cfg, Line 195: Command "log" failed.
CRITICAL: CLI #1002 An error occurred while processing the configuration file.
The system configuration is missing or incomplete.
MAJOR: CLI #1008 The SNMP daemon is disabled.
If desired, enable SNMP with the 'config>system>snmp no shutdown' command.
Attempting to exec configuration failure extension file:
'ftp://test:test@192.168.xx.xxx/./fail.cfg' ...
Config fail extension
Enabling SNMP daemon
MAJOR: CLI #1009 An error occurred while processing a CLI command -
File ftp://test:test@192.168.xx.xxx/./fail.cfg, Line 5: Command "abc log" failed.
TiMOS-B-x.0.Rx both/hops ALCATEL SR 7750 Copyright (c) 2000-2009 Alcatel-Lucent.
All rights reserved. All use subject to applicable license agreements.
Built on Thu Nov 207 19:19:11 PST 2008 by builder in /rel5x.0/b1/Rx/panos/main
```

System Timing

In the event that network timing is required for the synchronous interfaces in the 7750 SR-Series, a timing subsystem is utilized to provide a clock to all synchronous interfaces within the system.

This section describes the commands used to configure and control the timing subsystem.

Use the CLI syntax displayed below to:

- Edit Mode on page 293
- Configuring Timing References on page 294
- Using the Revert Command on page 295
- Other Editing Commands on page 295
- Forcing a Specific Reference on page 296

Edit Mode

To enter the mode to edit timing references, you must enter the **begin** keyword at the **config>system>sync-if-timing#** prompt.

Use the following CLI syntax to enter the edit mode:

The following error message displays when the you try to modify **sync-if-timing** parameters without entering **begin** first.

```
A:ALA-12>config>system>sync-if-timing>ref1# source-port 2/1/1
MINOR: CLI The sync-if-timing must be in edit mode by calling begin before any changes can be made.
MINOR: CLI Unable to set source port for ref1 to 2/1/1.
A:ALA-12>config>system>sync-if-timing>ref1#
```

Configuring Timing References

Use the following CLI syntax to configure timing reference parameters. Note that the source port specified for **ref1** and **ref2** is dependent on the 7750 SR-Series model type and chassis slot.

Note: For the SR-c12, the ref1 and ref2 cannot both be from the same slot.

7750 Model	Ref1/Slots	Ref2/Slots	
SR-1	Not enabled	Not enabled	
SR-7	1 — 2	3 — 5	
SR-12	1 — 5	6 — 10	
SR-c12	No restriction	No restriction	

Note that the SR-c12, ref1 and ref2 cannot be from the same slot.

The following displays a timing reference configuration example:

ALA-12>config>system>sync-if-timing#

Using the Revert Command

The revert command allows the clock to revert to a higher priority reference if the current reference goes offline or becomes unstable. When the failed reference becomes operational, it is eligible for selection.

When mode is non-revertive, a failed clock source is not selected again.

Other Editing Commands

Other editing commands include:

- commit This command saves changes made to the timing references during a session.
 Modifications are not persistent across system boots unless this command is entered.
- abort This command discards changes that have been made to the timing references during a session.

Forcing a Specific Reference

You can force the system synchronous timing output to use a specific reference.

Note: The **debug sync-if-timing force-reference** command should only be used to test and debug problems. Network synchronization problems may appear if network elements are left with this manual override setting. Once the system timing reference input has been forced, it may be cleared using the **no force-reference** command.

When the command is executed, the current system synchronous timing output is immediately referenced from the specified reference input. If the command forces the BITS input, then both CPMs will select their local BITS input ports; otherwise, the standby CPM locks to the output of the active CPM clock.

Note: The 7750 SR-c12 does not have the ability for the standby to look to the active. In this chassis, the **force** command is activated on both the active and standby CPM and each locks to the specified reference.

If the specified input is not available (shutdown), or in a disqualified state, the timing output will enter a holdover state based on the previous input reference.

On a CPM activity switch, the force command is cleared and normal reference selection is determined.

Debug configurations are not saved between reboots.

Example: debug>sync-if-timing# force-reference

Configuring System Monitoring Thresholds

Creating Events

The **event** command controls the generation and notification of threshold crossing events configured with the **alarm** command. When a threshold crossing event is triggered, the **rmon event** configuration optionally specifies whether an entry in the RMON-MIB log table be created to record the occurrence of the event. It can also specify whether an SNMP notification (trap) be generated for the event. There are two notifications for threshold crossing events, a rising alarm and a falling alarm.ping-address

Creating an event entry in the RMON-MIB log table does not create a corresponding entry in the event logs. However, when the event is set to trap the generation of a rising alarm or falling alarm notification creates an entry in the event logs and that is distributed to whatever log destinations are configured: console, session, memory, file, syslog, or SNMP trap destination. The logger message includes a rising or falling threshold crossing event indicator, the sample type (absolute or delta), the sampled value, the threshold value, the *rmon-alarm-id*, the associated *rmon-event-id* and the sampled SNMP object identifier.

The **alarm** command configures an entry in the RMON-MIB alarm table. The **alarm** command controls the monitoring and triggering of threshold crossing events. In order for notification or logging of a threshold crossing event to occur there must be at least one associated **rmon event** configured.

The agent periodically takes statistical sample values from the MIB variable specified for monitoring and compares them to thresholds that have been configured with the **alarm** command. The **alarm** command configures the MIB variable to be monitored, the polling period (interval), sampling type (absolute or delta value), and rising and falling threshold parameters. If a sample has crossed a threshold value, the associated 'event' is generated.

Preconfigured CLI threshold commands are available. Preconfigured commands hide some of the complexities of configuring RMON alarm and event commands and perform the same function. In particular, the preconfigured commands do not require the user to know the SNMP object identifier to be sampled. The preconfigured threshold configurations include memory warnings and alarms and compact flash usage warnings and alarms.

To create events, use the following CLI:

Example: config>system>thresholds# cflash-cap-warn cf1-B: rising-threshold 2000000 falling-threshold 1999900 interval 240 trap startup-alarm either

Example: config>system>thresholds# memory-use-alarm rising-threshold 50000000 falling-threshold 45999999 interval 500 both startup-alarm either

Example: config>system>thresh# rmon

Example: config>system>thresh>rmon# event 5 both description "alarm testing" owner "Timos CLI"

The following example displays the command output:

Configuring LLDP

The following output displays LLDP defaults:

```
A:testSr1>config>system>lldp# info detail

no tx-interval
no tx-hold-multiplier
no reinit-delay
no notification-interval
no tx-credit-max
no message-fast-tx
no message-fast-tx-init
no shutdown

A:testSr1>config>system>lldp#
```

The following example shows an LLDP port configuration.

```
*A:ALA-48>config>port>ethernet>lldp# info
dest-mac nearest-bridge
admin-status tx-rx
tx-tlvs port-desc sys-cap
tx-mgmt-address system
exit

*A:ALA-48>config>port>ethernet>lldp#
```

The following example shows a global system LLDP configuration.

```
A:ALA-48>config>system>lldp# info

tx-interval 10
tx-hold-multiplier 2
reinit-delay 5
notification-interval 10

A:ALA-48>config>system>lldp#
```

System Command Reference

Command Hierarchies

Configuration Commands

- System Information Commands on page 301
- System Alarm Commands on page 303
- Hardware Configuration Commands on page 304
- Persistence Commands on page 304
- System Time Commands on page 305
- Cron Commands on page 306
- System Synchronization Commands on page 309
- System Administration (Admin) Commands on page 308
- High Availability (Redundancy) Commands on page 310
- LLDP System Commands on page 312
- LLDP Ethernet Port Commands on page 312
- Show Commands on page 313
- Debug Commands on page 314
- Clear Commands on page 314
- Tools Commands on page 315

System Information Commands

```
config
     — system
              — atm
                       — atm-location-id
                       — oam
                                — loopback-period period
                                — retry-down retries
                                — retry-up retries
              — boot-bad-exec file-url

    no boot-bad-exec

               boot-good-exec file-url
               no boot-good-exec
               — chassis-mode {chassis-mode} [force]
               — clli-code clli-code

    no clli-code

               — config-backup count

    no config-backup

               contact contact-name
              — no contact
```

```
    coordinates coordinates
    no coordinates
    dns
    address-pref {ipv4-only | ipv6-first}
    no address-pref
    [no] enable-icmp-vse
    lacp-system-priority lacp-system-priority
    no lacp-system-priority
    [no] l4-load-balancing
    lsr-load-balancing {lbl-only | lbl-ip| ip-only}
    no lsr-load-balancing
    location location
    no location
    name system-name
    no name
```

System Alarm Commands

config system thresholds — **cflash-cap-alarm** cflash-id **rising-threshold** [**falling-threshold** | interval seconds [rmon-event-type] [startup-alarm alarm-type] — **no cflash-cap-alarm** cflash-id — **cflash-cap-warn** cflash-id **rising-threshold** [falling-threshold threshold] interval seconds [rmon-event-type] [startup-alarm alarm-type] — no cflash-cap-warn cflash-id — memory-use-alarm rising-threshold threshold [falling-threshold threshold] interval seconds [rmon-event-type] [startup-alarm alarm-type] — memory-use-warn rising-threshold threshold [falling-threshold threshold] interval seconds [rmon-event-type] [startup-alarm alarm-type] — no memory-use-alarm — [no] rmon — **alarm** rmon-alarm-id **variable-oid** oid-string **interval** seconds [sample-type] [startup-alarm alarm-type] [rising-event rmon-event-id rising-threshold

owner-string]
— **no alarm** rmon-alarm-id

owner-string]no event rmon-event-id

threshold] [falling event rmon-event-id falling-threshold threshold] [owner

event rmon-event-id [event-type] [description description-string] [owner

Hardware Configuration Commands

Persistence Commands

```
config

— system

— persistence

— dhcp-server

— description description-string
— no description
— location cflash-id
— no location

— subscriber-mgmt
— description
— no description
— no description
— location cflash-id
— no location
— location cflash-id
— no location
```

System Time Commands

```
root
     — admin
              — set-time [date] [time]
config
     — system
               — time
                       — [no] ntp
                                 — [no] authentication-check
                                 — authentication-key key-id key key [hash | hash2] type {des | message-digest}
                                 — no authentication-key key-id
                                 — [no] broadcast [router router-name] {interface ip-int-name} [key-id key-id]
                                    [version version] [ttl ttl]
                                 — broadcastclient [router router-name] {interface ip-int-name} [authenticate]
                                 — [no] multicast [version version] [key-id key-id]
                                 — [no] multicastclient [authenticate]
                                 — [no] ntp-server [transmit key-id]
                                 — [no] peer ip-address [version version] [key-id key-id] [prefer]
                                 — [no] server ip-address [version version] [key-id key-id] [prefer]
                                 — [no] shutdown
                        — [no] sntp
                                 — [no] broadcast-client
                                 — server-address ip-address [version version-number] [normal | preferred]
                                    [interval seconds]
                                 — no server-address ip-address
                                 - [no] shutdown
                       — [no] dst-zone [std-zone-name | non-std-zone-name]
                                 — end {end-week} {end-day} {end-month} [hours-minutes]
                                 — offset offset
                                 — start {start-week} {start-day} {start-month} [hours-minutes]
                        — zone std-zone-name | non-std-zone-name [hh [:mm]]
                        — no zone
```

Cron Commands

```
config
       [no] cron
               — [no] action action-name [owner owner-name]
                        — expire-time {seconds | forever}
                       — lifetime {seconds | forever}
                        — max-completed unsigned
                        — [no] results file-url
                        — [no] script script-name [owner owner-name]
                        — [no] shutdown
               — [no] schedule schedule-name [owner owner-name]
                        — [no] action action-name [owner owner-name]
                        — [no] day-of-month {day-number [..day-number] all}
                        — count number
                        — [no] description description-string
                        — [no] end-time [date|day-name] time
                        — [no] hour {..hour-number [..hour-number]|all}
                        — [no] interval seconds
                        — [no] minute {minute-number [..minute-number]|all}
                        — [no] month {month-number [..month-number]|month-name [..month-name]|all}
                        — [no] shutdown
                        — type {schedule-type}
                        — [no] weekday {weekday-number [..weekday-number]|day-name [..day-name]|all}
               [no] script [no] script script-name [owner owner-name]
                        — [no] description description-string
                        — [no] location file-url
                       — [no] shutdown
               — [no] time-range name
                        — absolute start start-absolute-time end end-absolute-time
                        — no absolute start start-absolute-time
                        — daily start start-time-of-day end end-time-of-day

    no daily start start-time-of-day

                        — weekdays start start-time-of-day end end-time-of-day
                        — no weekdays start start-time-of-day
                        — weekend start start-time-of-day end end-time-of-day
                        — no weekend start start-time-of-day
                        — weekly start start-time-in-week end end-time-in-week
                        — no weekly start start-time-in-week
               — [no] tod-suite
                       — egress
                                 — filter ip ip-filter-id [time-range time-range-name] [priority priority]
                                 — filter ipv6 ipv6-filter-id [time-range time-range-name] [priority priority]
                                 — filter mac mac-filter-id [time-range time-range-name] [priority priority]
                                 — no filter ip ip-filter-id [time-range time-range-name]
                                 — no filter ipv6 ipv6-filter-id [time-range time-range-name]
                                 — no filtermac mac-filter-id [time-range time-range-name
                                 — qos policy-id [time-range time-range-name] [priority priority]
                                 — no qos policy-id [time-range time-range-name]
                                 — scheduler-policy scheduler-policy-name [time-range time-range-name] [pri-
                                     ority priority
                                 — no scheduler-policy scheduler-policy-name [time-range time-range-name]
                       — ingress
                                  filter ip ip-filter-id [time-range time-range-name] [priority priority]
                                 — filter ipv6 ipv6-filter-id [time-range time-range-name] [priority priority]
```

- **filter mac** mac-filter-id [time-range time-range-name] [priority priority]
- **no filter ip** *ip-filter-id* [**time-range** *time-range-name*]
- **no filter ipv6** *ipv6-filter-id* [**time-range** *time-range-name*]
- **no filtermac** *mac-filter-id* [time-range time-range-name
- **qos** policy-id [time-range time-range-name] [priority priority]
- no qos policy-id [time-range time-range-name]
- scheduler-policy scheduler-policy-name [time-range time-range-name] [priority priority]
- **no scheduler-policy** scheduler-policy-name [time-range time-range-name]

System Administration (Admin) Commands

```
root

- admin

- application-assurance
- upgrade

- debug-save file-url
- disconnect {address ip-address | username user-name | console | telnet | ftp | ssh}
- display-config [detail | index]
- [no] enable-tech
- radius-discovery
- force-discover [svc-id service-id]
- reboot [active | standby | upgrade] [now]
- redundancy
- save [file-url] [detail] [index]
- synchronize [boot-env | config]
- tech-support [file-url]
```

System Synchronization Commands

The following commands apply to the 7750 SR-7, and 7750 SR-12 models.

```
config
     — system
             - sync-if-timing
                      — abort
                      — begin
                      - bits
                               — interface-type {ds1 [{esf | sf}] | e1 [{pcm30crc | pcm31crc}]}
                               — no interface-type
                               - [no] shutdown
                      — commit
                      — ref-order first second [third]
                      - no ref-order
                      - ref1
                               — [no] shutdown
                               — source-port port-id
                               — no source-port
                      - ref2
                               - [no] shutdown
                               — source-port port-id
                               — no source-port
                      — [no]
```

The following commands apply to the 7750 SR-c12 models.

```
config
     — system
              — sync-if-timing
                      — abort
                      — begin
                      — commit
                      — ref-order first second [third]
                       — no ref-order
                       — ref1
                               — bits-interface-type {ds1 [{esf | sf}] | e1 [{pcm30crc | pcm31crc}]}
                               — no bits-interface-type
                               - [no] shutdown
                               — source-bits slot/mda
                               — no source-bits
                               — source-port port-id
                               - no source-port
                       - ref2
                               — bits-interface-type {ds1 [{esf | sf}] | e1 [{pcm30crc | pcm31crc}]}
                               — no bits-interface-type
                                — [no] shutdown
                               — source-bits slot/mda
                               - no source-bits
                               — source-port port-id
                               - no source-port
                       — [no]
```

High Availability (Redundancy) Commands

```
root
      admin

    redundancy

                       — force-switchover [now]
                       — synchronize {boot-env | config}
config
       system
              — switchover-exec file-url
              — no switchover-exec
     - redundancy

    multi-chassis

                       — [no] peer ip-address
                                — authentication-key [authentication-key | hash-key] [hash | hash2]
                                — no authentication-key
                                — description description-string
                                - no description
                                - [no] mc-endpoint
                                         - [no] bfd-enable
                                         — boot-timer interval
                                         — no boot-timer
                                         — hold-on-neighbor-failure multiplier
                                         - no hold-on-neighbor-failure
                                         — keep-alive-interval interval
                                         — no keep-alive-interval
                                         - [no] passive-mode
                                         — [no] shutdown
                                         — system-priority value
                                         no system-priority
                                - [no] mc-lag
                                         — hold-on-neighbor-failure multiplier
                                         - no hold-on-neighbor-failure
                                         — keep-alive-interval interval
                                         - no keep-alive-interval
                                         — lag lag-id lacp-key admin-key system-id system-id [remote-lag lag-
                                            id] system-priority system-priority
                                         — no lag lag-id
                                         — [no] shutdown
                                - mc-ring
                                         — ring sync-tag [create]
                                         — no ring sync-tag
                                                  - in-band-control-path
                                                          — dst-ip ip-address
                                                           - no dst-ip
                                                           — interface ip-int-name
                                                          — no interface
                                                           — service-id service-id
                                                          - no service-id
                                                  — [no] path-b
                                                           — [no] range vlan-range
                                                  — [no] path-excl
                                                           — [no] range vlan-range
                                                  — ring-node ring-node-name [create]
```

```
— no ring-node ring-node-name
                                          — connectivity-verify
                                             — dst-ip ip-address
                                              — no dst-ip
                                              — interval interval
                                              - no interval
                                              — service-id service-id
                                              — no service-id
                                              — [no] shutdown
                                              — src-ip ip-address
                                              — no src-ip
                                              — src-mac ieee-address
                                              — no src-mac
                                              — vlan [0..4094]
                                              — no vlan
                                  - [no] shutdown
                 — peer-name name
                 - no peer-name
                 — [no] shutdown
                 — source-address ip-address
                 — no source-address
                 — [no] sync
                         — [no] igmp
                         — [no] igmp-snooping
                         — [no] local-dhcp-server
                         — [no] mc-ring
                         — [no] mld-snooping
                         — port [port-id | lag-id] [sync-tag sync-tag]
                         — no port [port-id | lag-id]
                                  — range encap-range [sync-tag sync-tag]
                                  — no range encap-range
                         — [no] shutdown
                         — [no] srrp
                         — [no] sub-mgmt
- bgp-multi-homing
        — boot-timer seconds
        — no boot-timer
        — site-activation-timer seconds
        - no site-activation-timer
— synchronize {boot-env | config}
```

LLDP System Commands

```
configure
     — system
              — Ildp
                      — message-fast-tx time
                       — no message-fast-tx
                       — message-fast-tx-init count
                       — no message-fast-tx-init
                       — notification-interval time
                       — no notification-interval
                       — reinit-delay time
                       - no reinit-delay
                       — [no] shutdown
                       — tx-credit-max count
                       — no tx-credit-max
                       — tx-hold-multiplier multiplier
                       - no tx-hold-multiplier
                       — tx-interval interval
                       — no tx-interval
```

LLDP Ethernet Port Commands

```
configure

— port port-id

— ethernet

— lldp

— dest-mac {nearest-bridge | nearest-non-tpmr | nearest-customer}

— admin-status {rx | tx | tx-rx | disabled}

— [no] notification

— tx-mgmt-address [system]

— no tx-mgmt-address

— tx-tlvs [port-desc] [sys-name] [sys-desc] [sys-cap]

— no tx-tlvs
```

Show Commands

```
show
     — chassis [environment] [power-supply] [ccm]
     — cron
              — action
              — schedule
              — script
              — tod-suite tod-suite-name [detail] associations failed-associations
              — time-range name associations [detail]
     redundancy
              - multi-chassis
                       — all [detail]
                       — mc-endpoint statistics
                       — mc-endpoint peer [ip-address] statistics
                       — mc-endpoint endpoint [mcep-id] statistics
                       — mc-endpoint peer [ip-address]
                       — mc-lag [lag lag-id]
                                — peer [peer ip-address [lag lag-id]] mc-lag
                                — statistics
                       — mc-ring peer ip-address statistics
                       — mc-ring peer ip-address [ring sync-tag [detail|statistics]]
                       — mc-ring peer ip-address ring sync-tag ring-node [ring-node-name [detail|statistics]]
                       - mc-ring global-statistics
                       — sync [port port-id | lag-id]
                                — peer [port port-id]
                                — detail
              — synchronization
     — time
     — system
              — connections [address ip-address [interface interface-name]] [port port-number] [detail]
              — cpu [sample-period seconds]
              — information
              — load-balancing-alg [detail]
              - memory-pools
              — ntp
              — sntp
              — switch-fabric
              — sync-if-timing
              - thresholds
              — time
     — uptime
```

Clear Commands

```
clear

    application-assurance

              — group isa-aa-group-id statistics
              — group isa-aa-group-id status
     redundancy
              - multi-chassis
                       — mc-endpoint endpoint [mcep-id] statistics
                       - mc-endpoint statistics
                       — mc-endpoint peer [ip-address] statistics
                       — mc-lag [peer ip-address [lag lag-id]]
                        - mc-ring
                                 — debounce peer ip-address ring sync-tag
                                 — ring-nodes peer ip-address ring sync-tag
                                 — statistics
                                          — global
                                          — peer ip-address
                                          — ring peer ip-address ring sync-tag
                                          — ring-node peer ip-address ring sync-tag node ring-node-name
                        — sync-database peer ip-address all application application
                        — sync-database peer ip-address { port port-id | lag-id | sync-tag sync-tag } application
                           application
                        — sync-database peer ip-address port port-id | lag-id sync-tag sync-tag application appli-
     — screen action-name [owner owner-name]
     — system sync-if-timing {ref1 | ref2 | bits}
     - trace log
```

Debug Commands

```
debug

- sync-if-timing
- force-reference {ref1 | ref2 | bits}
- no force-reference
- [no] system
- http-connections [host-ip-address/mask]
- no http-connections
- ntp [router router-name] [interface ip-int-name]
- persistence
```

Tools Commands

```
tools

- dump

- redundancy

- multi-chassis

- mc-endpoint peer ip-address

- mc-ring

- mc-ring

- mc-ring peer ip-address [ring sync-tag]

- srrp-sync-database [instance instance-id] [peer ip-address]

- sync-database [peer ip-address] [port port-id | lag-id] [sync-tag sync-tag]

[application application] [detail] [type type]
```

System Command Reference

System Command Reference

Generic Commands

shutdown

Syntax [no] shutdown

Context config>system>time>ntp

config>system>time>sntp config>cron>action config>cron>sched config>cron>script

config>redundancy>multi-chassis>peer

config>redundancy>multi-chassis>peer>mc-lag config>redundancy>multi-chassis>peer>sync config>redundancy>mc>peer>mcr>node>cv

config>system>lldp

config>redundancy>multi-chassis>peer>mc-ep

Description This command administratively disables the entity. When disabled, an entity does not change, reset,

or remove any configuration settings or statistics.

The operational state of the entity is disabled as well as the operational state of any entities contained

within. Many objects must be shut down before they may be deleted.

The **no** form of this command places the entity into an administratively enabled state.

Default no shutdown

description

Syntax description description-string

no description

Context config>cron>sched

config>redundancy>multi-chassis>peer

Description This command creates a text description stored in the configuration file for a configuration context.

The description command associates a text string with a configuration context to help identify the

content in the configuration file.

The **no** form of this command removes the string from the configuration.

Default No description associated with the configuration context.

Parameters

string — The description character string. Allowed values are any string up to 80 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

System Information Commands

atm

Syntax atm

Context config>system

Description This command enables the context to configure system-wide ATM parameters.

atm-location-id

Syntax atm-location-id location-id

Context config>system

Description This command indicates the location ID for ATM OAM.

Refer to the 7750 SR OS Services Guide for information about ATM QoS policies and ATM-related

service parameters.

Default no atm-location-id

Parameters location-id — Specify the 16 octets that identifies the system loopback location ID as required by the

ATM OAM Loopback capability. This textual convention is defined in ITU-T standard I.610.

Invalid values include a location ID where the first octet is: 00, FF, 6A Acceptable *location-ids* include values where the first octet is: 01, 03

Other values are not accepted.

oam

Syntax oam

Context config>system>atm

Description This command configures system-wide ATM parameters.

loopback-period

Syntax loopback-period period

no loopback-period

Context config>system>atm>oam

Description This command specifies the number of seconds between periodic loopback attempts on an ATM

endpoint that has periodic loopback enabled.

Parameters period — Specify the time, in seconds, between periodic loopback attempts.

Values 1 - 40Default 10

retry-down

Syntax retry-down retries

no retry-down

Context config>system>atm>oam

Description Specifies the number of OAM loopback attempts that must fail after the periodic attempt before the

endpoint will transition to AIS-LOC state.

The retry values are configured on a system wide basis and are affective on the next period cycle of any ATM VC SAP using **periodic-loopback**, if changed. The timeout for receiving a loopback response from the remote peer and declaring the loopack failed is 1 second and is not configurable.

Parameters retries — Specify the number of failed loopback attempts before an ATM VC goes down.

Values 0 - 10 (A zero value means that the endpoint will transition to AIS-LOC state

immediately if the periodic loopback attempt fails.)

Default 4

retry-up

Syntax retry-up retries

no retry-up

Context config>system>atm>oam

Description This command specifies the number of consecutive OAM loopback attempts that must succeed after

the periodic attempt before the endpoint will transition the state to up.

Parameters retries — Specify the number of successful loopback replies before an ATM VC goes up.

Values 0 - 10 (A zero value means that the endpoint will transition to the up state imme-

diately if the periodic loopback attempt succeeds.)

Default 2

boot-bad-exec

Syntax boot-bad-exec file-url

no boot-bad-exec

Context config>system

Description Use this command to configure a URL for a CLI script to exec following a failure of a boot-up

configuration. The command specifies a URL for the CLI scripts to be run following the completion

of the boot-up configuration. A URL must be specified or no action is taken.

The commands are persistent between router (re)boots and are included in the configuration saves

(admin>save).

Default no boot-bad-exec

Parameters file-url — Specifies the location and name of the CLI script file executed following failure of the

boot-up configuration file execution. When this parameter is not specified, no CLI script file is

executed.

Values file url: local-url | remote-url: 255 chars max

local-url: [cflash-id/][file-path]

remote-url: [{ftp://} login:pswd@remote-locn/][file-path]

remote-locn [hostname | ipv4-address | [ipv6- address]]

ipv4-address a.b.c.d

ipv6-address - x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x - [0..FFFF]H d - [0..255]D

interface - 32 chars max, for link local addresses

cflash-id: cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

Related Commands

exec command on page 59 — This command executes the contents of a text file as if they were CLI

commands entered at the console.

boot-good-exec

Syntax boot-good-exec file-url

no boot-good-exec

Context config>system

Description Use this command to configure a URL for a CLI script to exec following the success of a boot-up

configuration.

Default no boot-good-exec

Parameters file-url — Specifies the location and name of the file executed following successful completion of the

boot-up configuration file execution. When this parameter is not specified, no CLI script file is

executed.

Values file url: local-url | remote-url: 255 chars max

> local-url: [cflash-id/][file-path]

remote-url: [{ftp://} login:pswd@remote-locn/][file-path]

remote-locn [hostname | ipv4-address | [ipv6- address]]

ipv4-address a.b.c.d

ipv6-address x:x:x:x:x:x:x[-interface]

x:x:x:x:x:x:d.d.d.d[-interface]

x - [0..FFFF]H d - [0..255]D

interface - 32 chars max, for link local addresses

cflash-id: cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3-A:,cf3-B:

Related Commands **exec command on page 59** — This command executes the contents of a text file as if they were CLI commands entered at the console.

chassis-mode

chassis-mode [chassis-mode] [force] Syntax

Context config>system

Description This command configures the chassis scaling and feature set.

> Note that, if you are in chassis-mode d and configure an IOM type as iom2-20g and then downgrade to chassis-mode a or b (must specify force keyword), a warning appears about the IOM downgrade. In this case, the IOM's provisioned type will downgrade to iom-20g-b. Once this is done, the ASAP MDA cannot be configured.

> The ASAP MDA can only be configured if the iom2-20g IOM type is provisioned and equipped and the chassis mode is configured as **a** or **b**.

> If this is the desired behavior, for example, chassis-mode d is configured and IPv6 is running, you can then downgrade to chassis-mode **a** or **b** if you want to disable IPv6.

For chassis mode d, the default must be changed from the default mode a which assumes the least available features. Mode **d** enables the new feature sets available with newer generations of IOMs. Chassis mode d supports the P2/Q2/T2-based IOMs products and the extensive queuing/policing/ bandwidth. Mode **d** assumes that the **iom3-xp** is installed.

Default

Parameters *chassis-mode* — Specify the one of the following chassis modes:

a: This mode corresponds to scaling and feature set associated with iom-20g.

b: This mode corresponds to scaling and feature set associated with iom-20g-b.

c: This mode corresponds to scaling and feature set associated with iom2-20g.

d: This mode corresponds to scaling and feature set associated with iom3-xp.

If the chassis mode is not explicitly provisioned in the configuration file, the chassis will come up in chassis mode a by default. The behavior for the IOMs is described in the following table:

Table 32: Chassis Mode Behavior

IOM	Behavior
iom-20g-b	Comes online if provisioned as iom-20g or iom-20g-b.
iom2-20g	Comes online if provisioned as iom-20g, iom-20g-b or iom2-20g.
iom-10g	Comes online if provisioned as iom-10g.
iom3-xp	Comes online if provisioned as iom3-xp.

force — Forces an upgrade from mode a to mode b or d, or an upgrade from mode b to mode d.

clli-code

Parameters

Syntax clli-code clli-code

no clli-code

Context config>system

Description This command creates a Common Language Location Identifier (CLLI) code string for the 7750 SR-

Series router. A CLLI code is an 11-character standardized geographic identifier that uniquely identifies geographic locations and certain functional categories of equipment unique to the

telecommunications industry.

No CLLI validity checks other than truncating or padding the string to eleven characters are performed.

Only one CLLI code can be configured, if multiple CLLI codes are configured the last one entered overwrites the previous entry.

The **no** form of the command removes the CLLI code.

Default none — No CLLI codes are configured.

Boldan none to eller codes are configured.

clli-code — The 11 character string CLLI code. Any printable, seven bit ASCII characters can be used within the string. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes. If more than 11 characters are entered, the string is

truncated. If less than 11 characters are entered the string is padded with spaces.

config-backup

Syntax config-backup count

no config-backup

Context config>system

Description This command configures the maximum number of backup versions maintained for configuration files and BOF.

For example, assume the **config-backup** *count* is set to 5 and the configuration file is called *xyz.cfg*. When a **save** command is executed, the file *xyz.cfg* is saved with a .1 extension. Each subsequent **config-backup** command increments the numeric extension until the maximum count is reached.

xyz.cfg xyz.cfg.1 xyz.cfg.2 xyz.cfg.3 xyz.cfg.4 xyz.cfg.5 xyz.ndx

Each persistent index file is updated at the same time as the associated configuration file. When the index file is updated, then the save is performed to *xyz.cfg* and the index file is created as *xyz.ndx*. Synchronization between the active and standby CPM is performed for all configurations and their associated persistent index files.

The **no** form of the command returns the configuration to the default value.

Default 5

Parameters *count* — The maximum number of backup revisions.

Values 1 — 9

contact

Syntax contact contact-name

no contact

Context config>system

Description This command creates a text string that identifies the contact name for the device.

Only one contact can be configured, if multiple contacts are configured the last one entered will

overwrite the previous entry.

The **no** form of the command reverts to default.

Default none — No contact name is configured.

Parameters contact-name — The contact name character string. The string can be up to 80 characters long. Any printable, seven-bit ASCII characters can be used within the string. If the string contains special

characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

coordinates

Syntax coordinates coordinates

no coordinates

Context config>system

Description This command creates a text string that identifies the system coordinates for the device location. For

example, the command coordinates "37.390 -122.0550" is read as latitude 37.390 north and

longitude 122.0550 west.

Only one set of coordinates can be configured. If multiple coordinates are configured, the last one

entered overwrites the previous entry.

The **no** form of the command reverts to the default value.

Default none — No coordinates are configured.

Parameters coordinates — The coordinates describing the device location character string. The string may be up

to 80 characters long. Any printable, seven-bit ASCII characters can be used within the string. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes. If the coordinates are subsequently used by an algorithm that locates the exact

position of this node then the string must match the requirements of the algorithm.

dns

Syntax dns

Context config>system

Description This command configures DNS settings.

address-pref

Syntax address-pref {ipv4-only | ipv6-first}

no address-pref

Context config>system>dns

Description This command configures the DNS address resolving order preference. By default DNS names are

queried for A-records only (address-preference is IPv4-only). If the address-preference is set to IPv6-first, the DNS server will be queried for AAAA-records (IPv6) first and if a successful replied is not

received, then the DNS server is queried for A-records.

enable-icmp-vse

Syntax [no] enable-icmp-vse

Context config>system

Description This command enables vendor specific extensions to ICMP.

I4-load-balancing

Syntax [no] I4-load-balancing

Context config>system

Description

This command configures system-wide Layer 4 load balancing. The configuration at system level can enable or disable load balancing based on Layer 4 fields. If enabled, Layer 4 source and destination port fields will be included in hashing calculation for TCP/UDP packets.

The hashing algorithm addresses finer spraying granularity where many hosts are connected to the network.

To address more efficient traffic distribution between network links (forming a LAG group), a hashing algorithm extension takes into account L4 information (i.e., src/dst L4-protocol port).

The hashing index can be calculated according to the following algorithm:

```
If [(TCP or UDP traffic) & enabled]
hash (<TCP/UDP ports>, <IP addresses>)
else if (IP traffic)
hash (<IP addresses>)
else
hash (<MAC addresses>)
endif
```

This algorithm will be applied to all packets received on network and access ports (Layer 2 and Layer 3) with two exceptions

- MPLS LSR switched packets will be load balanced using a hash of the label stack, incoming port, and system IP address.
- Packets of point-to-point services (Epipe) will be hashed based on the service ID.

Use of Layer 4 information (TCP/UDP ports) will not be used in following cases:

- Fragmented packets.
- · Packets received from a VPRN tunnel.

Default no l4-load-balancing

Isr-load-balancing

Syntax | Isr-load-balancing {Ibl-only | Ibl-ip | ip-only}

no Isr-load-balancing

Context config>system

Description This command configures system-wide LSR load balancing.

Hashing can be enabled on IP header at an LSR for spraying labeled IP packets over multiple equal cost paths in ECMP in an LDP LSP and/or over multiple links of a LAG group in all types of LSPs.

In previous releases, the LSR hash routine operated on the label stack only. However, this lacked the granularity to provide hashing on the IP header if a packet is IPv4. An LSR will consider a packet to be IPv4 if the first nibble following the bottom of the label stack is 4. This feature is supported for IPv4 support only and on IOM-3 and IMMs only. IPv6 packets are hashed on label stack only. The

hash on label and IPv4 header can be enabled or disabled at the system level only

Default disabled

lacp-system-priority

Syntax lacp-system-priority lacp-system-priority

no lacp-system-priority

Context config>system

Description This command configures the Link Aggregation Control Protocol (LACP) system priority on

aggregated Ethernet interfaces. LACP allows the operator to aggregate multiple physical interfaces to

form one logical interface.

Default 32768

Parameters *lacp-system-priority* — Specifies the LACP system priority.

Values 1 — 65535

location

Syntax location location

no location

Context config>system

Description This command creates a text string that identifies the system location for the device.

Only one location can be configured. If multiple locations are configured, the last one entered

overwrites the previous entry.

The **no** form of the command reverts to the default value.

Default none — No system location is configured.

Parameters location — Enter the location as a character string. The string may be up to 80 characters long. Any

printable, seven-bit ASCII characters can be used within the string. If the string contains special

characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

name

Syntax name system-name

no name

Context config>system

Description This command creates a system name string for the device.

For example, system-name parameter ALA-1 for the name command configures the device name as

ALA-1.

ABC>config>system# name "ALA-1"

ALA-1>config>system#

Only one system name can be configured. If multiple system names are configured, the last one

encountered overwrites the previous entry.

The **no** form of the command reverts to the default value.

Default The default system name is set to the chassis serial number which is read from the backplane

EEPROM.

Parameters system-name — Enter the system name as a character string. The string may be up to 32 characters

long. Any printable, seven-bit ASCII characters can be used within the string. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double

quotes.

switchover-exec

Syntax switchover-exec file-url

no switchover-exec

Context config>system

Description This command specifies the location and name of the CLI script file executed following a redundancy

switchover from the previously active CPM card. A switchover can happen because of a fatal failure

or by manual action.

The CLI script file can contain commands for environment settings, debug and mirroring settings,

and other commands not maintained by the configuration redundancy.

When the *file-url* parameter is not specified, no CLI script file is executed.

Default none

Parameters *file-url* — Specifies the location and name of the CLI script file.

Values file url: local-url | remote-url: 255 chars max

local-url: [cflash-id/][file-path]

remote-url: [{ftp://|tftp://} login:pswd@remote-locn/][file-path]

cflash-id: cf1:, cf1-A:, cf1-B:, cf2:, cf2-A:, cf2-B:, cf3:, cf3-A:, cf3-B:

System Alarm Commands

alarm

Syntax alarm rmon-alarm-id variable-oid oid-string interval seconds [sample-type] [startup-alarm

alarm-type] [rising-event rmon-event-id rising-threshold] [falling-event rmon-

event-id falling threshold threshold] [owner owner-string]

no alarm rmon-alarm-id

Context config>system>thresholds>rmon

Description The alarm command configures an entry in the RMON-MIB alarmTable. The alarm command controls the monitoring and triggering of threshold crossing events. In order for notification or logging of a threshold crossing event to occur there must be at least one associated rmon>event

configured.

The agent periodically takes statistical sample values from the MIB variable specified for monitoring and compares them to thresholds that have been configured with the alarm command. The alarm command configures the MIB variable to be monitored, the polling period (interval), sampling type (absolute or delta value), and rising and falling threshold parameters. If a sample has crossed a threshold value, the associated event is generated.

Use the **no** form of this command to remove an rmon-alarm-id from the configuration.

Parameters

rmon-alarm-id — The rmon-alarm-id is a numerical identifier for the alarm being configured. The number of alarms that can be created is limited to 1200.

Default None Values 1 − 65535

variable-oid oid-string — The oid-string is the SNMP object identifier of the particular variable to be sampled. Only SNMP variables that resolve to an ASN.1 primitive type of integer (integer, Integer32, Counter32, Counter64, Gauge, or TimeTicks) may be sampled. The oid-string may be expressed using either the dotted string notation or as object name plus dotted instance identifier. For example, "1.3.6.1.2.1.2.2.1.10.184582144" or "ifInOctets.184582144".

The oid-string has a maximum length of 255 characters

Default None

interval seconds — The interval in seconds specifies the polling period over which the data is sampled and compared with the rising and falling thresholds. When setting this interval value, care should be taken in the case of 'delta' type sampling - the interval should be set short enough that the sampled variable is very unlikely to increase or decrease by more than 2147483647 - 1 during a single sampling interval. Care should also be taken not to set the interval value too low to avoid creating unnecessary processing overhead.

Default None

Values 1 — 2147483647

sample-type — Specifies the method of sampling the selected variable and calculating the value to be compared against the thresholds.

Default Absolute

Values absolute — Specifies that the value of the selected variable will be compared

directly with the thresholds at the end of the sampling interval.

delta — Specifies that the value of the selected variable at the last sample will be subtracted from the current value, and the difference compared with the thresholds.

startup-alarm *alarm-type* — Specifies the alarm that may be sent when this alarm is first created.

If the first sample is greater than or equal to the rising threshold value and 'startup-alarm' is equal to 'rising' or 'either', then a single rising threshold crossing event is generated.

If the first sample is less than or equal to the falling threshold value and 'startup-alarm' is equal to 'falling' or 'either', a single falling threshold crossing event is generated.

Default either

Values rising, falling, either

rising-event *rmon-event-id* — The identifier of the the **rmon>event** that specifies the action to be taken when a rising threshold crossing event occurs.

If there is no corresponding 'event' configured for the specified rmon-event-id, then no association exists and no action is taken.

If the 'rising-event rmon-event-id' has a value of zero (0), no associated event exists.

If a 'rising event rmon-event' is configured, the CLI requires a 'rising-threshold' to also be configured.

Default 0

Values 0 — 65535

rising-threshold *threshold* — Specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated startup-alarm is equal to rising or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal the 'falling-threshold' value.

Default 0

Values -2147483648 — 2147483647

falling-event *rmon-event-id* — The identifier of the **rmon>event** that specifies the action to be taken when a falling threshold crossing event occurs. If there is no corresponding event configured for the specified rmon-event-id, then no association exists and no action is taken. If the falling-event has a value of zero (0), no associated event exists.

If a 'falling event' is configured, the CLI requires a 'falling-threshold to also be configured.

Default 0

Values -2147483648 — 2147483647

falling-threshold — Specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated 'startup-alarm' is equal to 'falling' or 'either'.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value rises above this threshold and reaches greater than or equal the **rising-threshold** value.

Default (

Values -2147483648 — 2147483647

owner owner — The owner identifies the creator of this alarm. It defaults to "TiMOS CLI". This parameter is defined primarily to allow entries that have been created in the RMON-MIB alarmTable by remote SNMP managers to be saved and reloaded in a CLI configuration file. The owner will not normally be configured by CLI users and can be a maximum of 80 characters long.

Default TiMOS CLI

Configuration example:

alarm 3 variable-oid ifInOctets.184582144 interval 20 sample-type delta start-alarm either rising-event 5 rising-threshold 10000 falling-event 5 falling-threshold 9000 owner "TiMOS CLI"

cflash-cap-alarm

Syntax cflash-cap-alarm cflash-id rising-threshold threshold [falling-threshold threshold]

interval seconds [rmon-event-type] [startup-alarm alarm-type]

no cflash-cap-alarm cflash-id

Context config>system>thresholds

Description This command enables capacity monitoring of the compact flash specified in this command. The

severity level is alarm. Both a rising and falling threshold can be specified.

The **no** form of this command removes the configured compact flash threshold alarm.

Parameters cflash-id — The cflash-id specifies the name of the cflash device to be monitored.

Values cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

rising-threshold — Specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated 'startup-alarm' is equal to 'rising' or 'either'.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal the 'falling-threshold' value.

Default (

Values -2147483648 — 2147483647

falling-threshold threshold — Specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated startup-alarm is equal to falling or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value raises above this threshold and reaches greater than or equal the rising-threshold value.

Default 0

Values -2147483648 — 2147483647

interval seconds — Specifies the polling period, in seconds, over which the data is sampled and compared with the rising and falling thresholds.

Values 1 — 2147483647

rmon-event-type — Specifies the type of notification action to be taken when this event occurs.

Values

log — An entry is made in the RMON-MIB log table for each event occurrence. This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the **show>system>thresholds** CLI command.

trap — A TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations which may be CONSOLE, telnet session , memory log, cflash file, syslog, or SNMP trap destinations logs.

both — Both a entry in the RMON-MIB logTable and a TiMOS logger event are generated.

none — No action is taken.

Default both

startup-alarm alarm-type — Specifies the alarm that may be sent when this alarm is first created.

If the first sample is greater than or equal to the rising threshold value and startup-alarm is equal to rising or either, then a single rising threshold crossing event is generated.

If the first sample is less than or equal to the falling threshold value and startup-alarm is equal to falling or either, a single falling threshold crossing event is generated.

Default either

Values rising, falling, either

Configuration example:

cflash-cap-alarm cfl-A: rising-threshold 50000000 falling-threshold 49999900 interval 120 rmon-event-type both start-alarm rising.

cflash-cap-warn

Syntax cflash-cap-warn cflash-id rising-threshold threshold [falling-threshold threshold]

interval seconds [rmon-event-type] [startup-alarm alarm-type]

no cflash-cap-warn cflash-id

Context config>system>thresholds

Description This command enables capacity monitoring of the compact flash specified in this command. The severity level is warning. Both a rising and falling threshold can be specified. The no form of this

command removes the configured compact flash threshold warning.

Parameters cflash-id — The cflash-id specifies the name of the cflash device to be monitored.

> **Values** cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

rising-threshold — Specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated startup-alarm is equal to rising or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal the fallingthreshold value.

Default 0

Values -2147483648 — 2147483647

falling-threshold threshold — Specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated startup-alarm is equal to falling or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value raises above this threshold and reaches greater than or equal the risingthreshold value.

Default

Values -2147483648 — 2147483647

interval seconds — Specifies the polling period over which the data is sampled and compared with the rising and falling thresholds.

1 - 2147483647Values

rmon-event-type — Specifies the type of notification action to be taken when this event occurs.

Values

log — In the case of log, an entry is made in the RMON-MIB log table for each event occurrence. This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the show>system>thresholds CLI command.

trap — In the case of trap, a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.

both — In the case of both, both a entry in the RMON-MIB logTable and a TiMOS logger event are generated.

none — In the case of none, no action is taken.

Default both

startup-alarm *alarm-type* — Specifies the alarm that may be sent when this alarm is first created. If the first sample is greater than or equal to the rising threshold value and startup-alarm is equal to rising or either, then a single rising threshold crossing event is generated. If the first sample is less than or equal to the falling threshold value and startup-alarm is equal to falling or either, a single falling threshold crossing event is generated.

Values rising, falling, either

Default either

Configuration example:

cflash-cap-warn cf1-B: rising-threshold 2000000 falling-threshold 1999900 interval 240 rmonevent-type trap start-alarm either

event

Syntax event rmon-event-id [event-type] [description description-string] [owner owner-string]

no event rmon-event-id

Context config>system>thresholds>rmon

Description

The event command configures an entry in the RMON-MIB event table. The event command controls the generation and notification of threshold crossing events configured with the alarm command. When a threshold crossing event is triggered, the **rmon>event** configuration optionally specifies if an entry in the RMON-MIB log table should be created to record the occurrence of the event. It may also specify that an SNMP notification (trap) should be generated for the event. The RMON-MIB defines two notifications for threshold crossing events: Rising Alarm and Falling Alarm.

Creating an event entry in the RMON-MIB log table does not create a corresponding entry in the TiMOS event logs. However, when the <event-type> is set to trap, the generation of a Rising Alarm or Falling Alarm notification creates an entry in the TiMOS event logs and that is distributed to whatever TiMOS log destinations are configured: CONSOLE, session, memory, file, syslog, or SNMP trap destination.

The TiMOS logger message includes a rising or falling threshold crossing event indicator, the sample type (absolute or delta), the sampled value, the threshold value, the RMON-alarm-id, the associated RMON-event-id and the sampled SNMP object identifier.

Use the **no** form of this command to remove an rmon-event-id from the configuration.

Parameters

rmon-event-type — The rmon-event-type specifies the type of notification action to be taken when this event occurs.

Values

log — In the case of log, an entry is made in the RMON-MIB log table for each event occurrence.

This does **not** create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the **show>system>thresholds** CLI command.

trap — In the case of trap, a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.

both — In the case of both, both a entry in the RMON-MIB logTable and a TiMOS logger event are generated.

none — In the case of none, no action is taken.

Default both

description — The description is a user configurable string that can be used to identify the purpose of this event. This is an optional parameter and can be 80 characters long. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

Default An empty string.

owner owner — The owner identifies the creator of this alarm. It defaults to "TiMOS CLI". This parameter is defined primarily to allow entries that have been created in the RMON-MIB alarmTable by remote SNMP managers to be saved and reloaded in a CLI configuration file. The owner will not normally be configured by CLI users and can be a maximum of 80 characters long.

Default TiMOS CLI

Configuration example:

Default event 5 rmon-event-type both description "alarm testing" owner "TiMOS CLI"

memory-use-alarm

Syntax memory-use-alarm rising-threshold threshold [falling-threshold threshold] interval

seconds [rmon-event-type] [startup-alarm alarm-type]

no memory-use-alarm

Context config>system>thresholds

Description The memory thresholds are based on monitoring the TIMETRA-SYSTEM-MIB sgiMemoryUsed

object. This object contains the amount of memory currently used by the system. The severity level is

Alarm. The absolute sample type method is used.

The **no** form of this command removes the configured memory threshold warning.

Parameters

rising-threshold — Specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated startup-alarm is equal to rising or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal the fallingthreshold value.

Default

Values -2147483648 — 2147483647

falling-threshold — Specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated startup-alarm is equal to falling or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value raises above this threshold and reaches greater than or equal the risingthreshold threshold value.

Default

Values -2147483648 — 2147483647

interval seconds — Specifies the polling period over which the data is sampled and compared with the rising and falling thresholds.

Values 1 - 2147483647

rmon-event-type — Specifies the type of notification action to be taken when this event occurs.

Values

log — In the case of log, an entry is made in the RMON-MIB log table for each event occurrence. This does not create an OS logger entry. The RMON-MIB log table entries can be viewed using the CLI command.

trap — In the case of trap, a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log

destinations which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.

both — In the case of both, both a entry in the RMON-MIB logTable and a TiMOS logger event are generated.

none — In the case of none, no action is taken.

Default both

startup-alarm *alarm-type* — Specifies the alarm that may be sent when this alarm is first created. If the first sample is greater than or equal to the rising threshold value and startup-alarm is equal to rising or either, then a single rising threshold crossing event is generated. If the first sample is less than or equal to the falling threshold value and startup-alarm is equal to falling or either, a single falling threshold crossing event is generated.

Values rising, falling, either

Default either

Configuration example:

memory-use-alarm rising-threshold 50000000 falling-threshold 45999999 interval 500 rmonevent-type both start-alarm either

memory-use-warn

Parameters

Syntax memory-use-warn rising-threshold threshold [falling-threshold threshold] interval

seconds [rmon-event-type] [startup-alarm alarm-type]

no memory-use-warn

Context config>system>thresholds

Description The memory thresholds are based on monitoring MemoryUsed object. This object contains the

amount of memory currently used by the system. The severity level is Alarm.

The absolute sample type method is used.

The **no** form of this command removes the configured compact flash threshold warning.

. . .

rising-threshold threshold — The rising-threshold specifies a threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is

generated. A single threshold crossing event will also be generated if the first sample taken is greater than or equal to this threshold and the associated startup-alarm is equal to rising or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value falls below this threshold and reaches less than or equal the falling-threshold value.

Default 0

Values -2147483648 — 2147483647

falling-threshold — The falling-threshold specifies a threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single threshold crossing event will be generated. A single threshold crossing event will also be generated if the first sample taken is less than or equal to this threshold and the associated startup-alarm is equal to falling or either.

After a rising threshold crossing event is generated, another such event will not be generated until the sampled value raises above this threshold and reaches greater than or equal the rising-threshold threshold value.

Default 0

Values -2147483648 — 2147483647

interval seconds — The interval in seconds specifies the polling period over which the data is sampled and compared with the rising and falling thresholds.

Values 1 — 2147483647

rmon-event-type — Specifies the type of notification action to be taken when this event occurs.

Values log

log — In the case of log, an entry is made in the RMON-MIB log table for each event occurrence.

This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the **show>system>thresholds** CLI command.

trap — In the case of trap, a TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs.

both — In the case of both, both a entry in the RMON-MIB logTable and a TiMOS logger event are generated.

none — In the case of none, no action is taken.

Default both

Values log, trap, both, none

startup-alarm *alarm-type* — Specifies the alarm that may be sent when this alarm is first created. If the first sample is greater than or equal to the rising threshold value and startup-alarm is equal to rising or either, then a single rising threshold crossing event is generated. If the first sample is less than or equal to the falling threshold value and startup-alarm is equal to falling or either, a single falling threshold crossing event is generated.

Default either

Values rising, falling, either

Configuration example:

memory-use-warn rising-threshold 500000 falling-threshold 400000 interval 800 rmon-event-type log start-alarm falling

System Alarm Commands

rmon

Syntax rmon

Context config>system>thresholds

Description This command creates the context to configure generic RMON alarms and events.

Generic RMON alarms can be created on any SNMP object-ID that is valid for RMON monitoring

(for example, an integer-based datatype).

The configuration of an event controls the generation and notification of threshold crossing events

configured with the alarm command.

thresholds

Syntax thresholds

Context config>system

Description This command enables the context to configure monitoring thresholds.

Hardware Configuration Commands

power-supply

Syntax power-supply [power-supply-id] [type]

Context config>system

Description This command specifies the power supply slot ID and the power type. This allows for the proper

generation of traps and LED management.

Specify the **none** keyword when a power supply unit is removed from an 7750 SR-Series chassis or if

a power supply slot will not be populated.

If this command is not configured the LEDs will indicate the installed power supplies but traps will

not be issued and alarms will not raised because the desired behavior is not known.

If this command is not modified to reflect the current power configuration when a unit is removed or

the power type is changed, alarms will be generated.

Parameters power-supply-id — Specifies the identifier for a power supply tray in the chassis.

Values $1 \mid 2$ — Specifies the power supply slot ID.

type — Specifies the type of power supply for a platform. Based on the value assigned to this object, various power supply monitoring signals are interpreted. For example, if a platform is provisioned to use DC power supplies, then the signal that indicates an AC power supply is missing can be ignored. This is required for proper generation of traps and LED management.

Values dc — Specifies that the power supply slot is DC.

ac — Specifies that the power supply slot is AC.

none — Specifies that no power supply unit is installed in the given power supply slot.

single — Specifies that one AC power supply unit is installed in the power supply slot

multiple — Specifies that more than one AC power supply unit is installed in the power supply slot.

Date and Time Commands

set-time

Syntax set-time [date] [time]

Context admin

Description This command sets the local system time.

The time entered should be accurate for the time zone configured for the system. The system will convert the local time to UTC before saving to the system clock which is always set to UTC. This

command does not take into account any daylight saving offset if defined.

Parameters date — The local date and time accurate to the minute in the YYYY/MM/DD format.

Values *YYYY* is the four-digit year

MM is the two-digit month DD is the two-digit date

time — The time (accurate to the second) in the hh:mm[:ss] format. If no seconds value is entered, the seconds are reset to :00.

Default 0

Values *hh* is the two-digit hour in 24 hour format (00=midnight, 12=noon)

mm is the two-digit minute

time

Syntax time

Context config>system

Description This command enables the context to configure the system time zone and time synchronization

parameters.

Network Time Protocol Commands

ntp

Syntax [no] ntp

Context config>system>time

Description This command enables the context to configure Network Time Protocol (NTP) and its operation. This

protocol defines a method to accurately distribute and maintain time for network elements. Furthermore this capability allows for the synchronization of clocks between the various network

elements. Use the no form of the command to stop the execution of NTP and remove its

configuration.

Default none

authentication-check

Syntax [no] authentication-check

Context config>system>time>ntp

Description This command provides the option to skip the rejection of NTP PDUs that do not match the

authentication key-id, type or key requirements. The default behavior when authentication is configured is to reject all NTP protocol PDUs that have a mismatch in either the authentication key-

id, type or key.

When **authentication-check** is enabled, NTP PDUs are authenticated on receipt. However, mismatches cause a counter to be increased, one counter for type and one for key-id, one for type,

value mismatches. These counters are visible in a show command.

The no form of this command allows authentication mismatches to be accepted; the counters however

are maintained.

Default authentication-check — Rejects authentication mismatches.

authentication-key

Syntax authentication-key key-id (key key) [hash | hash2] type (des | message-digest)

no authentication-key key-id

Context config>system>time>ntp

Description This command sets the authentication key-id, type and key used to authenticate NTP PDUs sent to or

received by other network elements participating in the NTP protocol. For authentication to work, the

authentication key-id, type and key value must match.

The no form of the command removes the authentication key.

Default none

Parameters

key-id — Configure the authentication key-id that will be used by the node when transmitting or receiving Network Time Protocol packets.

Entering the authentication-key command with a key-id value that matches an existing configuration key will result in overriding the existing entry.

Recipients of the NTP packets must have the same authentication key-id, type, and key value in order to use the data transmitted by this node. This is an optional parameter.

Default None **Values** 1 − 255

key — The authentication key associated with the configured key-id, the value configured in this parameter is the actual value used by other network elements to authenticate the NTP packet.

The key can be any combination of ASCII characters up to 8 characters in length (unencrypted). If spaces are used in the string, enclose the entire string in quotation marks ("").

hash — Specifies the key is entered in an encrypted form. If the hash or hash2 parameter is not used, the key is assumed to be in a non-encrypted, clear text form. For security, all keys are stored in encrypted form in the configuration file with the hash or hash2 parameter specified.

hash2 — Specifies the key is entered in a more complex encrypted form that involves more variables then the key value alone, this means that hash2 encrypted variable can't be copied and pasted. If the hash or hash2 parameter is not used, the key is assumed to be in a non-encrypted, clear text form. For security, all keys are stored in encrypted form in the configuration file with the hash or hash2 parameter specified.

type — This parameter determines if DES or message-digest authentication is used.

This is a required parameter; either DES or message-digest must be configured.

Values

des — Specifies that DES authentication is used for this key message-digest — Specifies that MD5 authentication in accordance with RFC 2104 is used for this key.

broadcast

Syntax broadcast [router router-name] {interface ip-int-name} [key-id key-id] [version version]

[**ttl** *ttl*]

no broadcast [router router-name] {interface ip-int-name}

Context config>system>time>ntp

Description This command configures the node to transmit NTP packets on a given interface. Broadcast and

multicast messages can easily be spoofed, thus, authentication is strongly recommended.

The **no** form of this command removes the address from the configuration.

Parameters router — Specifies the router name used to transmit NTP packets. Base is the default. Select

management to use the management port (Ethernet port on the CPM).

Values Base, management

Default Base

ip-int-name — Specifies the local interface on which to transmit NTP broadcast packets. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

Values 32 character maximum

key-id key-id — Identifies the configured authentication key and authentication type used by this node to receive and transmit NTP packets to and from an NTP server and peers. If an NTP packet is received by this node both authentication key and authentication type must be valid otherwise the packet will be rejected and an event/trap generated.

Values 1 - 255Default

none

version version — Specifies the NTP version number that is generated by this node. This parameter does not need to be configured when in client mode in which case all versions will be accepted.

Values 1 - 4Default 4

ttl *ttl* — Specifies the IP Time To Live (TTL) value.

Values 1 - 255Default none

broadcastclient

Syntax **broadcastclient** [router router-name] {interface ip-int-name} [authenticate]

no broadcastclient [router router-name] {interface ip-int-name}

Context config>system>time>ntp

Description When configuring NTP, the node can be configured to receive broadcast packets on a given subnet.

Broadcast and multicast messages can easily be spoofed, thus, authentication is strongly

recommended. If broadcast is not configured then received NTP broadcast traffic will be ignored. Use

the **show** command to view the state of the configuration.

The **no** form of this command removes the address from the configuration.

Parameters router *router-name* — Specifies the router name used to receive NTP packets.

> Values Base, management

Default Base

interface *ip-int-name* — Specifies the local interface on which to receive NTP broadcast packets. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

Values 32 character maximum **authenticate** — Specifies whether or not to require authentication of NTP PDUs. When enabled, NTP PDUs are authenticated upon receipt.

multicast

Syntax multicast [version version] [key-id key-id]

no multicast

Context config>system>time>ntp

Description This command configures NTP the node to transmit multicast packets on the CPMCCM MGMT

port. Broadcast and multicast messages can easily be spoofed; authentication is strongly

recommended.

The **no** form of this command removes the multicast address from the configuration.

Parameters version version — Specifies the NTP version number that is generated by this node. This parameter does not need to be configured when in client mode in which case all three versions are accepted.

Values 2 — 4

Default 4

key-id — Specifies the configured authentication key and authentication type used by this version to transmit NTP packets. If this command is omitted from the configuration, packets are sent un-encrypted.

Values 1 — 255

Default None

multicastclient

Syntax multicastclient [authenticate]

no multicastclient

Context config>system>time>ntp

Description This command configures the node to receive multicast NTP messages on the CPMCCM MGMT

port. If multicastclient is not configured, received NTP multicast traffic will be ignored. Use the show

command to view the state of the configuration.

The no construct of this message removes the multicast client for the specified interface from the

configuration.

Parameters authenticate — This optional parameter makes authentication a requirement. If authentication is

required, the authentication key-id received must have been configured in the "authentication-

key" command, and that key-id's type and key value must also match.

ntp-server

Syntax ntp-server [transmit key-id]

no ntp-server

Context config>system>time>ntp

Description This command configures the node to assume the role of an NTP server. Unless the server command

is used, this node will function as an NTP client only and will not distribute the time to downstream

network elements.

Default no ntp-server

Parameters *key-id* — If specified, requires client packets to be authenticated.

Values 1-255 **Default** None

peer

Syntax peer ip-address [key-id key-id] [version version] [prefer]

no peer ip-address

Context config>system>time>ntp

Description Configuration of an NTP peer configures symmetric active mode for the configured peer. Although

any system can be configured to peer with any other NTP node it is recommended to configure

authentication and to configure known time servers as their peers.

The **no** form of the command removes the configured peer.

Parameters *ip-address* — Configure the IP address of the peer that requires a peering relationship to be set up.

This is a required parameter.

Default None

Values Any valid IP-address

key-id — Successful authentication requires that both peers must have configured the same

authentication key-id, type and key value.

Specify the *key-id* that identifies the configured authentication key and authentication type used by this node to transmit NTP packets to an NTP peer. If an NTP packet is received by this node, the authentication key-id, type, and key value must be valid otherwise the packet will be rejected

and an event/trap generated.

Default None **Values** 1-255

version *version* — Specify the NTP version number that is generated by this node. This parameter does not need to be configured when in client mode in which case all three nodes are accepted.

Default 4

Values 2 — 4

prefer — When configuring more than one peer, one remote system can be configured as the preferred peer. When a second peer is configured as preferred, then the new entry overrides the old entry.

server

Syntax server ip address [key-id key-id] [version version] [prefer]

no server ip address

Context config>system>time>ntp

Description This command is used when the node should operate in client mode with the ntp server specified in the address field of this command. The no construct of this command removes the server with the

specified address from the configuration.

Up to five NTP servers can be configured.

Parameters *ip-address* — Configure the IP address of a node that acts as an NTP server to this network element. This is a required parameter.

Values Any valid IP address

key-id — Enter the key-id that identifies the configured authentication key and authentication type used by this node to transmit NTP packets to an NTP server. If an NTP packet is received by this node, the authentication key-id, type, and key value must be valid otherwise the packet will be rejected and an event/trap generated. This is an optional parameter.

Values 1 — 255

version *version* — Use this command to configure the NTP version number that is expected by this node. This is an optional parameter

Default 4

Values 2 — 4

prefer — When configuring more than one peer, one remote system can be configured as the preferred peer. When a second peer is configured as preferred, then the new entry overrides the old entry.

SNTP Commands

sntp

Syntax [no] sntp

Context config>system>time

Description This command creates the context to edit the Simple Network Time Protocol (SNTP).

SNTP can be configured in either broadcast or unicast client mode. SNTP is a compact, client-only version of the NTP. SNTP can only receive the time from SNTP/NTP servers. It cannot be used to provide time services to other systems.

The system clock is automatically adjusted at system initialization time or when the protocol first starts up.

When the time differential between the SNTP/NTP server and the system is more than 2.5 seconds, the time on the system is gradually adjusted.

SNTP is created in an administratively enabled state (no shutdown).

The **no** form of the command removes the SNTP instance and configuration. SNTP does not need to

be administratively disabled when removing the SNTP instance and configuration.

Default no sntp

broadcast-client

Syntax [no] broadcast-client

Context config>system>time>sntp

Description This command enables listening to SNTP/NTP broadcast messages on interfaces with broadcast

client enabled at global device level.

When this global parameter is configured then the **ntp-broadcast** parameter must be configured on

selected interfaces on which NTP broadcasts are transmitted.

SNTP must be shutdown prior to changing either to or from broadcast mode.

The **no** form of the command disables broadcast client mode.

Default no broadcast-client

server-address

Syntax server-address ip-address [version version-number] [normal | preferred]

[interval seconds] no server-address

Context config>system>time>sntp

Description This command creates an SNTP server for unicast client mode.

Parameters *ip-address* — Specifies the IP address of the SNTP server.

version *version-number* — Specifies the SNTP version supported by this server.

Values 1 - 3Default 3

normal | **preferred** — Specifies the preference value for this SNTP server. When more than one time-server is configured, one server can have preference over others. The value for that server should be set to **preferred**. Only one server in the table can be a preferred server.

Default normal

interval seconds — Specifies the frequency at which this server is queried.

Values 64 — 1024

Default 64

CRON Commands

cron

Syntax cron

Context config

Description This command creates the context to create scripts, script parameters and schedules which support the

Service Assurance Agent (SAA) functions.

CRON features are saved to the configuration file on both primary and backup control modules. If a control module switchover occurs, CRON events are restored when the new configuration is loaded. If a control module switchover occurs during the execution of a cron script, the failover behavior will

be determined by the contents of the script.

action

Syntax [no] action action-name [owner action-owner]

Context config>cron

config>cron>sched

Description This command configures action parameters for a script.

Default none

Parameters action action-name — Specifies the action name.

Values Maximum 32 characters.

owner *action-owner* — Specifies the owner name.

Default TiMOS CLI

expire-time

Syntax expire-time {seconds | forever}

Context config>cron>action

Description This command configures the maximum amount of time to keep the results from a script run.

Parameters seconds — Specifies the maximum amount of time to keep the results from a script run.

Values 1 — 21474836 **Default** 3600 (1 hour)

forever — Specifies to keep the results from a script run forever.

lifetime

Syntax lifetime {seconds | forever}

Context config>cron>action

Description This command configures the maximum amount of time the script may run.

Parameters seconds — Specifies the maximum amount of time to keep the results from a script run.

Values 1 — 21474836 **Default** 3600 (1 hour)

forever — Specifies to keep the results from a script run forever.

max-completed

Syntax max-completed unsigned

Context config>cron>action

Description This command specifies the maximum number of completed sessions to keep in the event execution

log. If a new event execution record exceeds the number of records specified this command, the

oldest record is deleted.

The **no** form of this command resets the value to the default.

Parameters unsigned — Specifies the maximum number of completed sessions to keep in the event execution log.

Values 0 — 255

Default 1

results

Syntax [no] results file-url

Context config>cron>action

Description This command specifies the location where the system writes the output of an event script's

execution.

The **no** form of this command removes the file location from the configuration.

Parameters *file-url* — Specifies the location where the system writes the output of an event script's execution.

Values file url: local-url | remote-url: 255 chars max

local-url: [cflash-id/][file-path]

remote-url: [{ftp://} login:pswd@remote-locn/][file-path]

remote-locn [hostname | ipv4-address | [ipv6- address]]

ipv4-address a.b.c.d

ipv6-address - x:x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface] x - [0..FFFF]H

d - [0..255]D

interface - 32 chars max, for link local addresses

cflash-id: cfl:, cfl-A:,cfl-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

script

Syntax [no] script script-name [owner owner-name]

Context config>cron>action

Description This command creates action parameters for a script including the maximum amount of time to keep

the results from a script run, the maximum amount of time a script may run, the maximum number of

script runs to store and the location to store the results.

The **no** form of this command removes the script parameters from the configuration.

Default none — No server-address is configured.

Parameters script script-name — The script command in the action context connects and event to the script

which will run when the event is triggered.

owner *owner-name* — Owner name of the schedule.

Default TiMOS CLI

The **no** form of this command removes the script entry from the action context.

schedule

Syntax [no] schedule schedule-name [owner owner-name]

Context config>cron

Description This command configures the type of schedule to run, including one-time only (oneshot), periodic or

calendar-based runs. All runs are determined by month, day of month or weekday, hour, minute and

interval (seconds).

The **no** form of the command removes the context from the configuration.

Default none

Parameters *schedule-name* — Name of the schedule.

owner *owner-name* — Owner name of the schedule.

count

Syntax count number

Context config>cron>sched

Description This command configures the total number of times a CRON "interval" schedule is run. For example,

if the interval is set to 600 and the count is set to 4, the schedule runs 4 times at 600 second intervals.

Parameters *number* — The number of times the schedule is run.

Values 1 — 65535 **Default** 65535

day-of-month

Syntax [no] day-of-month {day-number [..day-number] all}

Context config>cron>sched

Description

This command specifies which days of the month that the schedule will occur. Multiple days of the month can be specified. When multiple days are configured, each of them will cause the schedule to trigger. If a day-of-month is configured without configuring month, weekday, hour and minute, the event will not execute.

Using the **weekday** command as well as the **day-of-month** command will cause the script to run twice. For example, consider that "today" is Monday January 1. If "Tuesday January 5" is configured, the script will run on Tuesday (tomorrow) as well as January 5 (Friday).

The **no** form of this command removes the specified day-of-month from the list.

Parameters

day-number — The positive integers specify the day of the month counting from the first of the month. The negative integers specify the day of the month counting from the last day of the month. For example, configuring **day-of-month -5**, **5** in a month that has 31 days will specify the schedule to occur on the 27th and 5th of that month.

Integer values must map to a valid day for the month in question. For example, February 30 is not a valid date.

Values 1 - 31, -31 - 1 (maximum 62 day-numbers)

all — Specifies all days of the month.

end-time

Syntax [no] end-time [date | day-name] time

Context config>cron>sched

Description This command is used concurrently with type **periodic** or **calendar**. Using the type of **periodic**, end-

time determines at which interval the schedule will end. Using the type of calendar, end-time

determines on which date the schedule will end.

When **no end-time** is specified, the schedule runs forever.

Parameters *date* — Specifies the date to schedule a command.

Values YYYY:MM:DD in year:month:day number format

day-name — Specifies the day of the week to schedule a command.

Values sunday|monday|tuesday|wednesday|thursday|friday|saturday

time — Specifies the time of day to schedule a command.

Values hh:mm in hour:minute format

hour

Syntax [no] hour {..hour-number [..hour-number]| all}

Context config>cron>sched

Description This command specifies which hour to schedule a command. Multiple hours of the day can be

specified. When multiple hours are configured, each of them will cause the schedule to trigger. Dayof-month or weekday must also be specified. All days of the month or weekdays can be specified. If an hour is configured without configuring month, weekday, day-of-month, and minute, the event will

not execute.

The **no** form of this command removes the specified hour from the configuration.

Parameters *hour-number* — Specifies the hour to schedule a command.

Values 0 — 23 (maximum 24 hour-numbers)

all — Specifies all hours.

interval

Syntax [no] interval seconds

Context config>cron>sched

Description This command specifies the interval between runs of an event.

Parameters seconds — The interval, in seconds, between runs of an event.

Values 30 — 4,294,967,295

minute

Syntax [no] minute {minute-number [..minute-number]| all}

Context config>cron>sched

Description This command specifies the minute to schedule a command. Multiple minutes of the hour can be

specified. When multiple minutes are configured, each of them will cause the schedule to occur. If a minute is configured, but no hour or day is configured, the event will not execute. If a minute is configured without configuring month, weekday, day-of-month, and hour, the event will not execute.

The **no** form of this command removes the specified minute from the configuration.

Parameters *minute-number* — Specifies the minute to schedule a command.

Values 0 — 59 (maximum 60 minute-numbers)

all — Specifies all minutes.

month

Syntax [no] month {month-number [..month-number]|month-name [..month-name]| all}

Context config>cron>sched

Description This command specifies the month when the event should be executed. Multiple months can be

specified. When multiple months are configured, each of them will cause the schedule to trigger. If a month is configured without configuring weekday, day-of-month, hour and minute, the event will not

execute.

The **no** form of this command removes the specified month from the configuration.

Parameters month-number — Specifies a month number.

Values 1 —12 (maximum 12 month-numbers)

all — Specifies all months.

month-name — Specifies a month by name

Values january, february, march, april, may, june, july, august, september, october, novem-

ber, december (maximum 12 month names)

type

Syntax type {schedule-type}

Context config>cron>sched

Description This command specifies how the system should interpret the commands contained within the

schedule node.

Parameters schedule-type — Specify the type of schedule for the system to interpret the commands contained

within the schedule node.

Values periodic — Specifies a schedule which runs at a given interval. interval must be

specified for this feature to run successfully.

calendar — Specifies a schedule which runs based on a calendar. weekday, month, day-of-month, hour and minute must be specified for this feature to run success-

fully.

oneshot — Specifies a schedule which runs one time only. As soon as the first event specified in these parameters takes place and the associated event occurs, the schedule enters a shutdown state. month, weekday, day-of-month, hour and minute

must be specified for this feature to run successfully.

Default periodic

weekday

Syntax [no] weekday {weekday-number [..weekday-number]|day-name [..day-name]| all}

Context config>cron>sched

Description This command specifies which days of the week that the schedule will fire on. Multiple days of the

week can be specified. When multiple days are configured, each of them will cause the schedule to occur. If a weekday is configured without configuring month, day-of-month, hour and minute, the

event will not execute.

Using the **weekday** command as well as the **day-of month** command will cause the script to run twice. For example, consider that "today" is Monday January 1. If "Tuesday January 5" is configured, the script will run on Tuesday (tomorrow) as well as January 5 (Friday).

The **no** form of this command removes the specified weekday from the configuration.

Parameters day-number — Specifies a weekday number.

Values 1 —7 (maximum 7 week-day-numbers)

day-name — Specifies a day by name

Values sunday, monday, tuesday, wednesday, thursday, friday, saturday (maximum 7 week-

day names)

all — Specifies all days of the week.

Date and Time Commands

script

Syntax [no] script script-name [owner owner-name]

Context config>cron>script

Description This command configures the name associated with this script.

Parameters *script-name* — Specifies the script name.

location

Syntax [no] location file-url

Context config>cron>script

Description This command configures the location of script to be scheduled.

Parameters file-url — Specifies the location where the system writes the output of an event script's execution.

Values file url: local-url | remote-url: 255 chars max

local-url: [cflash-id/][file-path]

remote-url: [{ftp://} login:pswd@remote-locn/][file-path]

remote-locn [hostname | ipv4-address | [ipv6- address]]

ipv4-address a.b.c.d

ipv6-address - x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x - [0..FFFF]H d - [0..255]D

interface - 32 chars max, for link local addresses

cflash-id: cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

Time Range Commands

time-range

Syntax [no] time-range name

Context config>cron

Description This command configures a time range.

The **no** form of the command removes the *name* from the configuration.

Default none

Parameters name — Configures a name for the time range up to 32 characters in length.

absolute

Syntax absolute start start-absolute-time end end-absolute-time

no absolute start absolute-time

Context config>cron>time-range

Description This command configures an absolute time interval that will not repeat.

The **no** form of the command removes the absolute time range from the configuration.

Parameters start absolute-time — Specifies starting parameters for the absolute time-range.

Values absolute-time: year/month/day,hh:mm

year: 2005 - 2099month: 1 - 12day: 1 - 31hh: 0 - 23mm: $\begin{bmatrix} 0 - 59 \end{bmatrix}$

end absolute-time — Specifies end parameters for the absolute time-range.

Values absolute-time: year/month/day,hh:mm

year: 2005 - 2099 month: 1 - 12 day: 1 - 31 hh: 0 - 23 mm: 0 - 59

daily

Syntax daily start start-time-of-day end end-time-of-day

no daily start start-time-of-day

Context config>cron>time-range

Description This command configures the start and end of a schedule for every day of the week. To configure a

daily time-range across midnight, use a combination of two entries. An entry that starts at hour zero

will take over from an entry that ends at hour 24.

The **no** form of the command removes the daily time parameters from the configuration.

Parameters *start-time-of-day* — Specifies the starting time for the time range.

Values Syntax: hh:mm

 $\begin{array}{ccc} hh & 0 - 23 \\ mm & 0 - 59 \end{array}$

end-time-of-day — Specifies the ending time for the time range.

Values Syntax: hh:mm

hh 0 — 24 mm 0 — 59

weekdays

Syntax weekdays start start-time-of-day end end-time-of-day

no weekdays start start-time-of-day

Context config>cron>time-range

Description This command configures the start and end of a weekday schedule.

The **no** form of the command removes the weekday parameters from the configuration.

Parameters *start-time-of-day* — Specifies the starting time for the time range.

Values Syntax: hh:mm

 $\begin{array}{ccc} hh & 0 - 23 \\ mm & 0 - 59 \end{array}$

end-time-of-day — Specifies the ending time for the time range.

Values Syntax: hh:mm

 $\begin{array}{ccc} hh & 0 - 24 \\ mm & 0 - 59 \end{array}$

weekend

Syntax weekend start start-time-of-day end end-time-of-day

no weekend start start-time-of-day

Context config>cron>time-range

Description This command configures a time interval for every weekend day in the time range.

The resolution must be at least one minute apart, for example, start at 11:00 and end at 11:01. An 11:00 start and end time is invalid. This example configures a start at 11:00 and an end at 11:01 on both Saturday and Sunday.

The **no** form of the command removes the weekend parameters from the configuration.

Parameters *start-time-of-day* — Specifies the starting time for the time range.

Values Syntax: hh:mm

hh 0 - 23 mm 0 - 59

end-time-of-day — Specifies the ending time for the time range.

Values Syntax: hh:mm

hh 0 - 24 mm 0 - 59

weekly

Syntax weekly start start-time-in-week end end-time-in-week

no weekly start start-time-in-week

Context config>cron>time-range

Description This command configures a weekly periodic interval in the time range.

The **no** form of the command removes the weekly parameters from the configuration.

Parameters *start-time-in-week* — Specifies the start day and time of the week.

Values Syntax: day,hh:mm

day sun, mon, tue, wed, thu, fri, sat

sunday, monday, tuesday, wednesday, thursday, friday,

saturday hh 0-23

mm 0 — 59

end-time-in-week — Specifies the end day and time of the week.

Values Syntax: day,hh:mm

Values day sun, mon, tue, wed, thu, fri, sat

sunday, monday, tuesday, wednesday, thursday, friday,

saturday

$$\begin{array}{cc} \text{hh} & 0 - 24 \\ \text{mm} & 0 - 59 \end{array}$$

weekly start time-in-week end time-in-week — This parameter configures the start and end of a schedule for the same day every week, for example, every Friday. The start and end dates must be the same. The resolution must be at least one minute apart, for example, start at 11:00 and end at 11:01. A start time and end time of 11:00 is invalid.

Values
$$00 - 23, 00 - 59$$

Default no time-range

Time of Day Commands

tod-suite

Syntax [no] tod-suite tod-suite name create

Context config>cron

Description This command creates the tod-suite context.

Default no tod-suite

egress

Syntax egress

Context config>cron>tod-suite

Description This command enables the TOD suite egress parameters.

ingress

Syntax ingress

Context config>cron>tod-suite

Description This command enables the TOD suite ingress parameters.

filter

Syntax filter ip ip-filter-id [time-range time-range-name] [priority priority]

filter ipv6 ipv6-filter-id [time-range time-range-name] [priority priority] filter mac mac-filter-id [time-range time-range-name] [priority priority]

no ip ip-filter-id [time-range time-range-name]

no filter ipv6 ipv6-filter-id [time-range time-range-name] no filter mac mac-filter-id [time-range time-range-name]

Context config>cron>tod-suite>egress

config>cron>tod-suite>ingress

Description This command creates time-range based associations of previously created filter policies. Multiple

policies may be included and each must be assigned a different priority; in case time-ranges overlap, the priority will be used to determine the prevailing policy. Only a single reference to a policy may be

included without a time-range.

Parameters

ip-filter *ip-filter-id* — Specifies an IP filter for this tod-suite.

Values 1 — 65535

ipv6-filter *ipv6-filter-id* — Specifies an IPv6 filter for this tod-suite.

Values 1 — 65535

time-range *time-range-name* — Name for the specified time-range. If the time-range is not populated the system will assume the assignment to mean "all times". Only one entry without a time-range is allowed for every type of policy. The system does not allow the user to specify more than one policy with the same time-range and priority.

Values Up to 32 characters

priority *priority* — Priority of the time-range. Only one time-range assignment of the same type and priority is allowed.

Values 1 — 10

mac mac-filter-id — Specifies a MAC filter for this tod-suite.

Values 1 — 65535

qos

Syntax qos policy-id [time-range time-range-name] [priority priority]

no qos policy-id [time-range time-range-name] [

Context config>cron>tod-suite>egress

config>cron>tod-suite>ingress

Description This command creates time-range based associations of previously created QoS policies. Multiple

policies may be included and each must be assigned a different priority; in case time-ranges overlap, the priority will be used to determine the prevailing policy. Only a single reference to a policy may be

included without a time-range.

The no form of the command reverts to the

Parameters policy-id — Specifies an egress QoS policy for this tod-suite.

Values 1 — 65535

time-range *time-range-name* — Name for the specified time-range. If the time-range is not populated the system will assume the assignment to mean "all times". Only one entry without a time-range is allowed for every type of policy. The system does not allow the user to specify

more than one policy with the same time-range and priority.

Values Up to 32 characters

Default "NO-TIME-RANGE" policy

priority *priority* — Priority of the time-range. Only one time-range assignment of the same type and priority is allowed.

Values 1 — 10

Default 5

scheduler-policy

Syntax [no] scheduler-policy scheduler-policy-name [time-range time-range-name] [priority

priority]

Context config>cron>tod-suite>egress

config>cron>tod-suite>ingress

Description This command creates time-range based associations of previously created scheduler policies.

Multiple policies may be included and each must be assigned a different priority; in case time-ranges overlap, the priority will be used to determine the prevailing policy. Only a single reference to a

policy may be included without a time-range.

Parameters *scheduler-policy-name* — Specifies a scheduler policy for this tod-suite.

Values Up to 32 characters

time-range *time-range-name* — Specifies the name for a time-range. If the time-range is not populated the system will assume the assignment to mean "all times". Only one entry without a time-range is allowed for every type of policy. The system does not allow the user to specify

more than one policy and the same time-range and priority.

Values Up to 32 characters

priority *priority* — Specifies the time-range priority. Only one time-range assignment of the same type and priority is allowed.

Values 1 — 10

System Time Commands

dst-zone

Syntax [no] dst-zone [std-zone-name | non-std-zone-name]

Context config>system>time

Description This command configures

This command configures the start and end dates and offset for summer time or daylight savings time to override system defaults or for user defined time zones.

When configured, the time is adjusted by adding the configured offset when summer time starts and subtracting the configured offset when summer time ends.

If the time zone configured is listed in Table 26, System-defined Time Zones, on page 208, then the starting and ending parameters and offset do not need to be configured with this command unless it is necessary to override the system defaults. The command returns an error if the start and ending dates and times are not available either in Table 26 on or entered as optional parameters in this command.

Up to five summer time zones may be configured, for example, for five successive years or for five different time zones. Configuring a sixth entry will return an error message. If no summer (daylight savings) time is supplied, it is assumed no summer time adjustment is required.

The **no** form of the command removes a configured summer (daylight savings) time entry.

Default none — No summer time is configured.

Parameters std-zone-name -

std-zone-name — The standard time zone name. The standard name must be a system-defined zone in Table 26. For zone names in the table that have an implicit summer time setting, for example MDT for Mountain Daylight Saving Time, the remaining start-date, end-date and offset parameters need to be provided unless it is necessary to override the system defaults for the time zone.

Values std-zone-name ADT, AKDT, CDT, CEST, EDT, EEST, MDT, PDT, WEST

non-std-zone-name — The non-standard time zone name. Create a user-defined name created using the **zone** command on page 369

Values 5 characters maximum

end

Syntax end {end-week} {end-day} {end-month} [hours-minutes]

Context config>system>time>dst-zone

Description This command configures start of summer time settings.

Parameters *end-week* — Specifies the starting week of the month when the summer time will end.

Values first, second, third, fourth, last

Default first

end-day — Specifies the starting day of the week when the summer time will end.

sunday, monday, tuesday, wednesday, thursday, friday, saturday **Values**

Default sunday

end-month — The starting month of the year when the summer time will take effect.

Values january, february, march, april, may, june, july, august, september, october, novem-

ber, december}

Default january

hours — Specifies the hour at which the summer time will end.

0 - 24**Values**

Default 0

minutes — Specifies the number of minutes, after the hours defined by the hours parameter, when the summer time will end.

0 - 59Values

Default 0

offset

Syntax offset offset

Context config>system>time>dst-zone

Description This command specifies the number of minutes that will be added to the time when summer time

takes effect. The same number of minutes will be subtracted from the time when the summer time

ends.

Parameters offset — The number of minutes added to the time at the beginning of summer time and subtracted at

the end of summer time, expressed as an integer.

Default 60

Values 0 - 60

start

Syntax start {start-week} {start-day} {start-month} [hours-minutes]

Context config>system>time>dst-zone

Description This command configures start of summer time settings.

Parameters

start-week — Specifies the starting week of the month when the summer time will take effect.

Values first, second, third, fourth, last

Default first

start-day — Specifies the starting day of the week when the summer time will take effect.

Default sunday

Values sunday, monday, tuesday, wednesday, thursday, friday, saturday

start-month — The starting month of the year when the summer time will take effect.

Values january, february, march, april, may, june, july, august, september, october, novem-

ber, december

Default january

hours — Specifies the hour at which the summer time will take effect.

Default 0

minutes — Specifies the number of minutes, after the hours defined by the *hours* parameter, when the summer time will take effect.

Default (

zone

Syntax zone [std-zone-name | non-std-zone-name] [hh [:mm]]

no zone

Context config>system>time

- .

7750 SR OS supports system-defined and user-defined time zones. The system-defined time zones

are listed in Table 26, System-defined Time Zones, on page 208.

For user-defined time zones, the zone and the UTC offset must be specified.

This command sets the time zone and/or time zone offset for the device.

The **no** form of the command reverts to the default of Coordinated Universal Time (UTC). If the time zone in use was a user-defined time zone, the time zone will be deleted. If a **dst-zone** command has been configured that references the zone, the summer commands must be deleted before the zone can be reset to UTC.

Default

zone utc - The time zone is set for Coordinated Universal Time (UTC).

Parameters

Description

std-zone-name — The standard time zone name. The standard name must be a system-defined zone in Table 26. For zone names in the table that have an implicit summer time setting, for example MDT for Mountain Daylight Saving Time, the remaining start-date, end-date and offset parameters need to be provided unless it is necessary to override the system defaults for the time zone.

For system-defined time zones, a different offset cannot be specified. If a new time zone is needed with a different offset, the user must create a new time zone. Note that some system-

defined time zones have implicit summer time settings which causes the switchover to summer time to occur automatically; configuring the **dst-zone** parameter is not required.

A user-defined time zone name is case-sensitive and can be up to 5 characters in length.

Values A user-defined value can be up to 4 characters or one of the following values:

GMT, BST, IST, WET, WEST, CET, CEST, EET, EEST, MSK, MSD, AST, ADT, EST, EDT, ET, CST, CDT, CT, MST, MDT, MT, PST, PDT, PT, HST, AKST,

AKDT, WAST, CAST, EAST

non-std-zone-name — The non-standard time zone name.

Values Up to 5 characters maximum.

hh [:mm] — The hours and minutes offset from UTC time, expressed as integers. Some time zones do not have an offset that is an integral number of hours. In these instances, the minutes-offset must be specified. For example, the time zone in Pirlanngimpi, Australia UTC + 9.5 hours.

Default hours: 0

minutes: 0

Values hours: -11 — 11

minutes: 0 — 59

System Synchronization Configuration Commands

sync-if-timing

Syntax sync-if-timing

Context config>system

Description This command creates or edits the context to create or modify timing reference parameters.

This command is not enabled in the 7750 SR-1.

Default not enabled (The ref-order must be specified in order for this command to be enabled.)

abort

Syntax abort

Context config>system>sync-if-timing

This command is required to discard changes that have been made to the synchronous interface

timing configuration during a session.

Default No default

begin

Syntax begin

Context config>system>sync-if-timing

Description This command is required in order to enter the mode to create or edit the system synchronous

interface timing configuration.

Default No default

bits

Syntax bits

Context config>system>sync-if-timing

Description This command enables the context to configure parameters for the Building Integrated Timing Supply

(BITS).

Default disabled

commit

Syntax commit

Context config>system>sync-if-timing

Description This command is required in order to save the changes made to the system synchronous interface

timing configuration.

Default No default

interface-type

Syntax interface-type {ds1 [{esf | sf}] | e1 [{pcm30crc | pcm31crc}]}

no interface-type

Context config>system>sync-if-timing>ref1

config>system>sync-if-timing>ref2

Description This command configures the Building Integrated Timing Source (BITS) timing reference.

The **no** form of the command reverts to the default configuration.

Default ds1 esf

Parameters ds1 esf — Specifies Extended Super Frame (ESF). This is a framing type used on DS1 circuits that

consists of 24 192-bit frames, The 193rd bit provides timing and other functions.

ds1 sf — Specifies Super Frame (SF), also called D4 framing. This is a common framing type used on DS1 circuits. SF consists of 12 192-bit frames. The 193rd bit provides error checking and

other functions. ESF supersedes SF.

e1 pcm30crc — Specifies the pulse code modulation (PCM) type. PCM30CRC uses PCM to

separate the signal into 30 user channels with CRC protection.

e1 pcm31crc — Specifies the pulse code modulation (PCM) type. PCM31CRC uses PCM to

separate the signal into 31 user channels with CRC protection.

bits-interface-type

Syntax bits-interface-type {ds1 [{esf | sf}] | e1 [{pcm30crc | pcm31crc}]}

no bits-interface-type

Context config>system>sync-if-timing>bits

Description This command configures the Building Integrated Timing Source (BITS) timing reference.

The **no** form of the command reverts to the default configuration.

Default ds1 esf

Parameters

- **ds1 esf** Specifies Extended Super Frame (ESF). This is a framing type used on DS1 circuits that consists of 24 192-bit frames, The 193rd bit provides timing and other functions.
- **ds1 sf** Specifies Super Frame (SF), also called D4 framing. This is a common framing type used on DS1 circuits. SF consists of 12 192-bit frames. The 193rd bit provides error checking and other functions. ESF supersedes SF.
- **e1 pcm30crc** Specifies the pulse code modulation (PCM) type. PCM30CRC uses PCM to separate the signal into 30 user channels with CRC protection.
- e1 pcm31crc Specifies the pulse code modulation (PCM) type. PCM31CRC uses PCM to separate the signal into 31 user channels with CRC protection.

ref-order

Syntax ref-order first second [third]

no ref-order

Context config>system>sync-if-timing

Description

The synchronous equipment timing subsystem can lock to different timing reference inputs, those specified in the **ref1**, **ref2** and **bits** command configuration. This command organizes the priority order of the timing references.

If a reference source is disabled, then the clock from the next reference source as defined by **reforder** is used. If the reference sources are disabled, then clocking is derived from a local oscillator.

Note that if a sync-if-timing reference is linked to a source port that is operationally down, the port will no longer be qualified as a valid reference.

On the 7750 SR7 and 7750 SR12, the bits input port on both the active CPM and standby CPM (if present) are accessible by the active standby. Wherever bits appears in the ref-order, the order of the two bits ports will be active CPM followed by standby CPM.

The **no** form of the command resets the reference order to the default values.

Default bits ref1 ref2

Parameters

first — Specifies the first timing reference to use in the reference order sequence.

Values ref1, ref2, bits

second — Specifies the second timing reference to use in the reference order sequence.

Values ref1, ref2, bits

third — Specifies the third timing reference to use in the reference order sequence.

Values ref1, ref2, bits

ref1

Syntax ref1

Context config>system>sync-if-timing

Description This command enables the context to configure parameters for the first timing reference.

The timing reference for **ref1** must be specified for the following chassis slots:

7750 Model	Ref1/Slots
SR-1	Not enabled
SR-7	1 — 2
SR-12	1 — 5
SR-c12	No restriction

Note that ref1 and ref2 cannot be configured on the same MDA/CMA for the SR-c12.

ref2

Syntax ref2

Context config>system>sync-if-timing

Description

This command enables the context to configure parameters for the second timing reference. The timing reference for **ref2** must be specified for the following chassis slots.

Note: For the SR-c12, the ref1 and ref2 cannot both be from the same slot.

7750 Model	Ref2/Slots
SR-1	Not enabled
SR-7	3 — 5
SR-12	6 — 10
SR-c12	No restriction

Note that ref1 and ref2 cannot be configured on the same MDA/CMA for the SR-c12.

revert

Syntax [no] revert

Context config>system>sync-if-timing

Description This command allows the clock to revert to a higher priority reference if the current reference goes

offline or becomes unstable. When the failed r eference becomes operational, it is eligible for

selection. When the mode is non-revertive, a failed clock source is not selected again.

Default no revert

source-bits

Syntax source-bits slot/mda

no source-bits

Context config>system>sync-if-timing>ref1

config>system>sync-if-timing>ref2

Description This comand configures the source bits for the first (ref1) or second (ref2) timing reference. Note that

this command is only applicable to the 7750 SR-c12 chassis.

Parameters slot/mda — Specifies the chassis slot and MDA containing the BITS port to be used as one of the two

timing reference sources in the system timing subsystem.

Values slot: 1

mda: 1 — 12

source-port

Syntax source-port port-id

no source-port

Context config>system>sync-if-timing>ref1

config>system>sync-if-timing>ref2

Description This command configures the source port for timing reference **ref1** or **ref2**. If the port is unavailable

or the link is down, then the reference sources are re-evaluated according to the reference order

configured in the ref-order command.

On a channelized interface a T1 or an E1 can be specified as the source-port for either ref1 or ref2.

The only type of T1 or E1 that can be used as a reference is one that has adaptive timing.

The timing reference for **ref1** and **ref2** must be specified for ports in the following chassis slots:

7750 Model	Ref1/Slots	Ref2/Slots	
SR-1	Not enabled	Not enabled	
SR-7	1 — 2	3 — 5	
SR-12	1 — 5	6 — 10	
SR-c12	No restriction	No restriction	

Note that ref1 and ref2 cannot be configured on the same MDA/CMA for the SR-c12.

Parameters

port-id — Identify the physical port in the slot/mda/port format.

Generic Commands

shutdown

Syntax [no] shutdown

Context config>system>time>sntp

config>system>sync-if-timing>ref1 config>system>sync-if-timing>ref2 config>system>sync-if-timing>bits

Description This command administratively disables an entity. When disabled, an entity does not change, reset, or

remove any configuration settings or statistics.

The operational state of the entity is disabled as well as the operational state of any entities contained

within. Many objects must be shut down before they may be deleted.

The **no** form of this command administratively enables an entity.

Unlike other commands and parameters where the default state is not indicated in the configuration file, the **shutdown** and **no shutdown** states are always indicated in system generated configuration

files.

The **no** form of the command places an entity in an administratively enabled state.

description

Syntax description description-string

no description

Context config>system>persistence>sub-mgmt

config>system>persistence>dhcp-server

Description The command allows the user to configure a string that can be used to identify the purpose of this

event. This is an optional parameter and can be 80 characters long. If the string contains special

characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

System Administration Commands

admin

Syntax admin

Context <ROOT>

Description The context to configure administrative system commands. Only authorized users can execute the

commands in the admin context.

Default none

application-assurance

Syntax application-assurance

Context admin

Description This command enables the context to perform application-assurance operations.

upgrade

Syntax upgrade

Context admin>app-assure

Description This command loads a new protocol list from the isa-aa.tim file into the CPM.

Note that an ISA-AA reboot is required.

debug-save

Syntax debug-save file-url

Context admin

Description This command saves existing debug configuration. Debug configurations are not preserved in

configuration saves.

Default none

Parameters *file-url* — The file URL location to save the debug configuration.

Values file url: local-url | remote-url: 255 chars max

local-url: [cflash-id/][file-path], 200 chars max, including the cflash-id

directory length, 99 chars max each

remote-url: [{ftp://} login:pswd@remote-locn/][file-path]

remote-locn [hostname | ipv4-address | [ipv6- address]]

ipv4-address a.b.c.d

ipv6-address - x:x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x - [0..FFFF]H d - [0..255]D

interface - 32 chars max, for link local addresses

255 chars max, directory length 99 chars max each

cflash-id: cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3-A:,cf3-B:

disconnect

Syntax disconnect {address ip-address | username user-name | console | telnet | ftp | ssh}

Context admin

Description This command disconnects a user from a console, Telnet, FTP, or SSH session.

If any of the console, Telnet, FTP, or SSH options are specified, then only the respective console,

Telnet, FTP, or SSH sessions are affected.

If no console, Telnet, FTP, or SSH options are specified, then all sessions from the IP address or from

the specified user are disconnected.

Any task that the user is executing is terminated. FTP files accessed by the user will not be removed.

A major severity security log event is created specifying what was terminated and by whom.

Default none — No disconnect options are configured.

Parameters address *ip-address* — The IP address to disconnect, specified in dotted decimal notation.

Values ipv4-address a.b.c.d

ipv6-address - x:x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x - [0..FFFF]H d - [0..255]D

username *user-name* — The name of the user.

console — Disconnects the console session.

telnet — Disconnects the Telnet session.

ftp — Disconnects the FTP session.

ssh — Disconnects the SSH session.

display-config

Syntax display-config [detail | index]

Context admin

Description This command displays the system's running configuration.

By default, only non-default settings are displayed.

Specifying the detail option displays all default and non-default configuration parameters.

Parameters detail — Displays default and non-default configuration parameters.

index — Displays only persistent-indices.

reboot

Syntax reboot [active | standby | upgrade] [now]

Context admin

Description This command reboots the router including redundant CPMs and all IOMs or upgrades the boot

ROMs.

If no options are specified, the user is prompted to confirm the reboot operation. For example:

ALA-1>admin# reboot Are you sure you want to reboot (y/n)?

If the **now** option is specified, boot confirmation messages appear.

Parameters active — Keyword to reboot the active CPM.

Default active

standby — Keyword to reboot the standby CPM.

Default active

upgrade — Enables card firmware to be upgraded during chassis reboot. The 7750 SR OS and the boot.ldr support functionality to perform automatic firmware upgrades on CPMs and IOM cards. The automatic upgrade must be enabled in the 7750 SR OS Command Line Interface (CLI) when rebooting the system.

When the **upgrade** keyword is specified, a chassis flag is set for the BOOT Loader (boot.ldr) and on the subsequent boot of the 7750 SR OS on the chassis, any firmware images on CPMs or IOMs requiring upgrading will be upgraded automatically.

If an 7750 SR is rebooted with the **admin reboot** command (without the **upgrade** keyword), the firmware images are left intact.

Any CPMs that are installed in the chassis will be upgraded automatically. For example, if a card is inserted with down revision firmware as a result of a card hot swap with the latest OS version running, the firmware on the card will be automatically upgraded before the card is brought online.

If the card firmware is upgraded automatically, a chassis cardUpgraded (event 2032) log event is generated. The corresponding SNMP trap for this log event is tmnxEqCardFirmwareUpgraded.

During any firmware upgrade, automatic or manual, it is imperative that during the upgrade procedure:

- Power must NOT be switched off or interrupted.
- The system must NOT be reset.
- · No cards are inserted or removed.

Any of the above conditions may render cards inoperable requiring a return of the card for resolution.

The time required to upgrade the firmware on the cards in the chassis depends on the number of cards to be upgraded. On system reboot, the firmware upgrades can take from approximately 3 minutes for a minimally loaded 7750 SR-Series to 8 minutes for a fully loaded 7750 SR-12 chassis after which the configuration file will be loaded. The progress of the firmware upgrades can be monitored at the console. Inserting a single card requiring a firmware upgrade in a running system generally takes less than 2 minutes before the card becomes operationally up.

now — Forces a reboot of the router immediately without an interactive confirmation.

save

Syntax save [file-url] [detail] [index]

Context admin

Description This command saves the running configuration to a configuration file. For example:

A:ALA-1>admin# save ftp://test:test@192.168.x.xx/./100.cfg Saving configurationCompleted.

By default, the running configuration is saved to the primary configuration file.

Parameters *file-url* — The file URL location to save the configuration file.

Default The primary configuration file location.

Values file url: local-url | remote-url: 255 chars max

local-url: [cflash-id/][file-path], 200 chars max, including the cflash-id

directory length, 99 chars max each

remote-url: [{ftp://} login:pswd@remote-locn/][file-path]

remote-locn [hostname | ipv4-address | [ipv6- address]]

ipv4-address a.b.c.d

ipv6-address - x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x - [0..FFFF]H d - [0..255]D

interface - 32 chars max, for link local addresses

255 chars max, directory length 99 chars max each

cflash-id: cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

detail — Saves both default and non-default configuration parameters.

Default Saves non-default configuration parameters.

index — Forces a save of the persistent index file regardless of the persistent status in the BOF file.
The index option can also be used to avoid an additional boot required while changing your system to use the persistence indices.

enable-tech

Syntax [no] enable-tech

Context admin

Description This command enables the shell and kernel commands.

NOTE: This command should only be used with authorized direction from the Alcatel-Lucent

Technical Assistance Center (TAC).

radius-discovery

Syntax radius-discovery

Context admin

Description This command performs RADIUS discovery operations.

force-discover

Syntax force-discover [svc-id service-id]

Context admin>radius-discovery

Description When enabled, the server is immediately contacted to attempt discovery.

Parameters svc-id service-id — Specifies an existing service ID.

Values 1 — 2147483648 | *svc-name*, up to 64 char max

tech-support

Syntax tech-support file-url

Context admin

Description This command creates a system core dump.

NOTE: This command should only be used with authorized direction from the Alcatel-Lucent Technical Assistance Center (TAC).

file-url — The file URL location to save the binary file.

Values file url: local-url | remote-url: 255 chars max

local-url: [cflash-id/][file-path], 200 chars max, including the cflash-id

directory length, 99 chars max each

remote-url: [{ftp://} login:pswd@remote-locn/][file-path]

remote-locn [hostname | ipv4-address | [ipv6- address]]

ipv4-address a.b.c.d

ipv6-address - x:x:x:x:x:x:x[-interface]

x:x:x:x:x:d.d.d.d[-interface]

x - [0..FFFF]H d - [0..255]D

interface - 32 chars max, for link local addresses

255 chars max, directory length 99 chars max each

cflash-id: cf1:, cf1-A:,cf1-B:,cf2:,cf2-A:,cf2-B:,cf3:,cf3-A:,cf3-B:

Persistence Commands

persistence

Syntax [no] persistence

Context config>system

Description This command enables the context to configure persistence parameters on the system.

The persistence feature enables state on information learned through DHCP snooping across reboots to be retained. This information includes data such as the IP address and MAC binding information, lease-length information, and ingress sap information (required for VPLS snooping to identify the

ingress interface).

If persistence is enabled when there are no DHCP relay or snooping commands enabled, it will

simply create an empty file.

Default no persistence

dhcp-server

Syntax dhcp-server

Context config>system>persistence

Description This command configures DHCP server persistence parameters.

subscriber-mgmt

Syntax subscriber-mgmt

Context config>system>persistence

Description This command configures subscriber management persistence parameters.

location

Syntax location [cf1: | cf2: | cf3:]

no location

Context config>system>persistence>sub-mgmt

config>system>persistence>dhcp-server

Description This command instructs the system where to write the file. The name of the file is: dhcp-

persistence.db. On boot the system scans the file systems looking for dhcp-persistence.db, if it finds it

it starts to load it.

In the subscriber management context, the location specifies the flash device on a CPM card where

the data for handling subscriber management persistency is stored.

The **no** form of this command returns the system to the default. If there is a change in file location while persistence is running, a new file will be written on the new flash, and then the old file will be

removed.

Default no location

Redundancy Commands

redundancy

Syntax redundancy

Context admin

config

Description This command enters the context to allow the user to perform redundancy operations.

force-switchover

Syntax force-switchover [now]

Context admin>redundancy

Description This command forces a switchover to the standby CPM card. The primary CPM reloads its software

image and becomes the secondary CPM.

Parameters now — Forces the switchover to the redundant CPM card immediately.

bgp-multi-homing

Syntax bgp-multi-homing

Context config>redundancy

Description This command configures BGP multi-homing paramaters.

boot-timer

Syntax boot-timer seconds

no boot-timer

Context config>redundancy>bgp-multi-homing

Description This command configures the time the service manger waits after a node reboot before running the

DF election algorithm. The boot-timer value should be configured to allow for the BGP sessions to

come up and for the NLRI information to be refreshed/exchanged.

The **no** form of the command reverts the default.

Default no boot-timer

Parameters seconds — Specifies the BGP multi-homing boot-timer in seconds.

Values 1 — 100

site-activation-timer

Syntax site-activation-timer seconds

no site-activation-timer

Context config>redundancy>bgp-multi-homing

Description This command defines the amount of time the service manager will keep the local sites in standby

status, waiting for BGP updates from remote PEs before running the DF election algorithm to decide whether the site should be unblocked. The timer is started when one of the following events occurs if

the site is operationally up:

• Manual site activation using the **no shutdown** command at site-id level or at member object(s)

level (SAP(s) or PW(s))

· Site activation after a failure

Default no site-activation-timer

Parameters seconds — Specifies the standby status in seconds.

Values 1 — 100

Default 2

synchronize

Syntax synchronize {boot-env | config}

Context config>redundancy

Description This command performs a synrchonization of the standby CPM's images and/or config files to the

active CPM. Either the **boot-env** or **config** parameter must be specified.

In the **config>redundancy** context, this command performs an automatically triggered standby CPM synchronization. When the standby CPM takes over operation following a failure or reset of the active CPM, it is important to ensure that the active and standby CPMs have identical operational

parameters. This includes the saved configuration, CPM and IOM images.

The active CPM ensures that the active configuration is maintained on the standby CPM. However, to ensure smooth operation under all circumstances, runtime images and system initialization configurations must also be automatically synchronized between the active and standby CPM.

If synchronization fails, alarms and log messages that indicate the type of error that caused the failure of the synchronization operation are generated. When the error condition ceases to exist, the alarm is cleared.

Only files stored on the router are synchronized. If a configuration file or image is stored in a location other than on a local compact flash, the file is not synchronized (for example, storing a configuration file on an FTP server).

Default enabled

Parameters boot-env — Synchronizes all files required for the boot process (loader, BOF, images, and config).

config — Synchronize only the primary, secondary, and tertiary configuration files.

Default config

synchronize

Syntax synchronize {boot-env | config}

Context admin>redundancy

Description This command performs a synrchonization of the standby CPM's images and/or config files to the active CPM. Either the **boot-env** or **config** parameter must be specified.

In the **admin>redundancy** context, this command performs a manually triggered standby CPM synchronization. When the standby CPM takes over operation following a failure or reset of the active CPM, it is important to ensure that the active and standby CPM have identical operational parameters. This includes the saved configuration, CPM and IOM images.

The active CPM ensures that the active configuration is maintained on the standby CPM. However, to ensure smooth operation under all circumstances, runtime images and system initialization configurations must also be automatically synchronized between the active and standby CPM.

If synchronization fails, alarms and log messages that indicate the type of error that caused the failure of the synchronization operation are generated. When the error condition ceases to exist, the alarm is cleared.

Only files stored on the router are synchronized. If a configuration file or image is stored in a location other than on a local compact flash, the file is not synchronized (for example, storing a configuration file on an FTP server).

Default none

Parameters boot-env — Synchronizes all files required for the boot process (loader, BOF, images, and

configuration files.

config — Synchronize only the primary, secondary, and tertiary configuration files.

multi-chassis

Syntax multi-chassis

Context config>redundancy

Description This command enables the context to configure multi-chassis parameters.

peer-name

Syntax peer-name name

no peer-name

Context config>redundancy>multi-chassis>peer

Description This command specifies a peer name.

Parameters name — The string may be up to 32 characters long. Any printable, seven-bit ASCII characters can be

used within the string. If the string contains special characters (#, \$, spaces, etc.), the entire string

must be enclosed within double quotes.

source-address

Syntax source-address ip-address

no source-address

Context config>redundancy>multi-chassis>peer

Description This command specifies the source address used to communicate with the multi-chassis peer.

Parameters *ip-address* — Specifies the source address used to communicate with the multi-chassis peer.

sync

Syntax [no] sync

Context config>redundancy>multi-chassis>peer

Description This command enables the context to configure synchronization parameters.

igmp

Syntax [no] igmp

Context config>redundancy>multi-chassis>peer>sync

Description This command specifies whether IGMP protocol information should be synchronized with the multi-

chassis peer.

Default no igmp

igmp-snooping

Syntax [no] igmp-snooping

Context config>redundancy>multi-chassis>peer>sync

Description This command specifies whether IGMP snooping information should be synchronized with the multi-

chassis peer.

Default no igmp-snooping

local-dhcp-server

Syntax [no] local-dhcp-server

Context config>redundancy>multi-chassis>peer>sync

Description This command synchronizes DHCP server information.

mld-snooping

Syntax [no] mld-snooping

Context config>redundancy>multi-chassis>peer>sync

Description This command synchronizes MLD Snooping information.

port

Syntax port [port-id | lag-id] [sync-tag sync-tag]

no port [port-id | lag-id]

Context config>redundancy>multi-chassis>peer>sync

Description This command specifies the port to be synchronized with the multi-chassis peer and a

synchronization tag to be used while synchronizing this port with the multi-chassis peer.

Parameters *port-id* — Specifies the port to be synchronized with the multi-chassis peer.

lag-id — Specifies the LAG ID to be synchronized with the multi-chassis peer.

sync-tag sync-tag — Specifies a synchronization tag to be used while synchronizing this port with

the multi-chassis peer.

range

Syntax range encap-range sync-tag sync-tag

no range encap-range

Context config>redundancy>multi-chassis>peer>sync>port

Description This command configures a range of encapsulation values.

Parameters encap-range — Specifies a range of encapsulation values on a port to be synchronized with a multi-

chassis peer.

Values Dot1Q start-vlan-end-vlan

QinQ Q1.start-vlan-Q1.end-vlan

sync-tag sync-tag — Specifies a synchronization tag up to 32 characters in length to be used while

synchronizing this encapsulation value range with the multi-chassis peer.

srrp

Syntax [no] srrp

Context config>redundancy>multi-chassis>peer>sync

Description This command specifies whether subscriber routed redundancy protocol (SRRP) information should

be synchronized with the multi-chassis peer.

Default no srrp

sub-mgmt

Syntax [no] sub-mgmt

Context config>redundancy>multi-chassis>peer>sync

Description This command specifies whether subscriber management information should be synchronized with

the multi-chassis peer.

Default no sub-mgmt

Peer Commands

peer

Syntax [no] peer ip-address

Context config>redundancy>multi-chassis

Description This command configures a multi-chassis redundancy peer.

Parameters *ip-address* — Specifies a peer IP address. Multicast address are not allowed.

authentication-key

Syntax authentication-key [authentication-key | hash-key] [hash | hash2]

no authentication-key

Context config>redundancy>multi-chassis>peer

Description This command configures the authentication key used between this node and the multi-chassis peer.

The authentication key can be any combination of letters or numbers.

Parameters authentication-key — Specifies the authentication key. Allowed values are any string up to 20 characters long composed of printable, 7-bit ASCII characters. If the string contains special

characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

hash-key — The hash key. The key can be any combination of ASCII characters up to 33 (hash1-key) or 55 (hash2-key) characters in length (encrypted). If spaces are used in the string, enclose the

entire string in quotation marks ("").

hash — Specifies the key is entered in an encrypted form. If the hash or hash2 parameter is not used, the key is assumed to be in a non-encrypted, clear text form. For security, all keys are stored in encrypted form in the configuration file with the hash or hash2 parameter specified.

hash2 — Specifies the key is entered in a more complex encrypted form that involves more variables then the key value alone, this means that hash2 encrypted variable cannot be copied and pasted. If the hash or hash2 parameter is not used, the key is assumed to be in a non-encrypted, clear text form. For security, all keys are stored in encrypted form in the configuration file with

the hash or hash2 parameter specified.

MC Endpoint Commands

mc-endpoint

Syntax [no] mc-endpoint

Context config>redundancy>multi-chassis>peer

Description This command specifies that the endpoint is multi-chassis. This value should be the same on both

MC-EP peers for the pseudowires that must be part of the same group.

The no form of this command removes the endpoint from the MC-EP. Single chassis behavior

applies.

bfd-enable

Syntax [no] bfd-enable

Context config>redundancy>multi-chassis>peer>mc-ep

config>router>rsvp config>router>bgp config>router>bgp>group

config>router>bgp>group>neighbor

config>redundancy>multi-chassis>peer>mc-ep

Description This command enables the use of bi-directional forwarding (BFD) to control the state of the

associated protocol interface. By enabling BFD on a given protocol interface, the state of the protocol interface is tied to the state of the BFD session between the local node and the remote node. The

parameters used for the BFD are set via the BFD command under the IP interface.

The **no** form of this command disables BFD.

Default no bfd-enable

boot-timer

Syntax boot-timer interval

no boot-timer

Context config>redundancy>multi-chassis>peer>mc-ep

Description This command configures the boot timer interval. This command applies only when the node reboots.

It specifies the time the MC-EP protocol keeps trying to establish a connection before assuming a failure of the remote peer. This is different from the keep-alives mechanism which is used just after the peer-peer communication was established. After this time interval passed all the mc-endpoints configured under services will revert to single chassis behavior, activating the best local PW.

Redundancy Commands

The **no** form of this command sets the interval to default.

Default 300

Parameters *interval* — Specifies the boot timer interval.

Values 1 — 600

hold-on-neighbor-failure

Syntax hold-on-neighbor-failure multiplier

no hold-on-neighbor-failure

Context config>redundancy>multi-chassis>peer>mc-ep

Description This command specifies the number of keep-alive intervals that the local node will wait for packets

from the MC-EP peer before assuming failure. After this time interval passed the all the mc-endpoints configured under services will revert to single chassis behavior, activating the best local pseudowire.

The **no** form of this command sets the multiplier to default value

Default 3

Parameters *multiplier* — Specifies the hold time applied on neighbor failure.

Values 2 — 25

keep-alive-interval

Syntax keep-alive-interval interval

no keep-alive-interval

Context config>redundancy>multi-chassis>peer>mc-ep

Description This command sets the interval at which keep-alive messages are exchanged between two systems

participating in MC-EP when bfd is not enabled or is down. These fast keep-alive messages are used

to determine remote-node failure and the interval is set in deci-seconds.

The **no** form of this command sets the interval to default value

Default 5(0.5s)

Parameters *interval* — The time interval expressed in deci-seconds.

Values 5 — 500 (tenths of a second)

passive-mode

Syntax [no] passive-mode

Context config>redundancy>multi-chassis>peer>mc-ep

Description This command configures the passive mode behavior for the MC-EP protocol. When in passive mode

the MC-EP pair will be dormant until two of the pseudowires in a MC-EP will be signaled as active by the remote PEs, being assumed that the remote pair is configured with regular MC-EP. As soon as more than one pseudowire is active, dormant MC-EP pair will activate. It will use the regular exchange to select the best pseudowire between the active ones and it will block the Rx and Tx

directions of the other pseudowires.

The **no** form of this command will disable the passive mode behavior.

Default no passive-mode

system-priority

Syntax system-priority value

no system-priority

Context config>redundancy>multi-chassis>peer>mc-ep

Description This command allows the operator to set the system priority. The peer configured with the lowest

value is chosen to be the master. If system-priority are equal then the one with the highest system-id

(chassis MAC address) is chosen as the master.

The **no** form of this command sets the system priority to default

Default no system-priority

Parameters *value* — Specifies the priority assigned to the local MC-EP peer.

Values 1 — 255

MC-LAG Commands

mc-lag

Syntax [no] mc-lag

Context config>redundancy>multi-chassis>peer>mc-lag

Description This command enables the context to configure multi-chassis LAG operations and related

parameters.

The no form of this command administratively disables multi-chassis LAG. MC-LAG can only be

issued only when mc-lag is shutdown.

hold-on-neighbor-failure

Syntax hold-on-neighbor-failure multiplier

no hold-on-neighbor-failure

Context config>redundancy>multi-chassis>peer>mc-lag

Description This command specifies the interval that the standby node will wait for packets from the active node

before assuming a redundant-neighbor node failure. This delay in switch-over operation is required to accommodate different factors influencing node failure detection rate, such as IGP convergence, or

HA switch-over times and to prevent the standby node to take action prematurely.

The **no** form of this command sets this parameter to default value.

Default 3

Parameters multiplier — The time interval that the standby node will wait for packets from the active node before

assuming a redundant-neighbor node failure.

Values 2 — 25

keep-alive-interval

Syntax keep-alive-interval interval

no keep-alive-interval

Context config>redundancy>multi-chassis>peer>mc-lag

Description This command sets the interval at which keep-alive messages are exchanged between two systems

participating in MC-LAG. These keep-alive messages are used to determine remote-node failure and

the interval is set in deci-seconds.

The **no** form of this command sets the interval to default value

Default 1s (10 hundreds of milliseconds means interval value of 10)

Parameters

interval — The time interval expressed in deci-seconds

Values 5 — 500

lag

Syntax lag lag-id lacp-key admin-key system-id system-id [remote-lag lag-id] system-priority

system-priority no lag lag-id

Context config>redundancy>multi-chassis>peer>mc-lag

Description This command defines a LAG which is forming a redundant-pair for MC-LAG with a LAG configured on the given peer. The same LAG group can be defined only in the scope of 1 peer.

The same **lacp-key**, **system-id**, and **system-priority** must be configured on both nodes of the redundant pair in order to MC-LAG to become operational. In order MC-LAG to become operational, all parameters (**lacp-key**, **system-id**, **system-priority**) must be configured the same on both nodes of the same redundant pair.

The partner system (the system connected to all links forming MC-LAG) will consider all ports using the same **lacp-key**, **system-id**, **system-priority** as the part of the same LAG. In order to achieve this in MC operation, both redundant-pair nodes have to be configured with the same values. In case of the mismatch, MC-LAG is kept operationally down.

Default

none

Parameters

lag-id — The LAG identifier, expressed as a decimal integer. Specifying the lag-id allows the mismatch between lag-id on redundant-pair. If no lag-id is specified it is assumed that neighbor system uses the same lag-id as a part of the given MC-LAG. If no matching MC-LAG group can be found between neighbor systems, the individual LAGs will operate as usual (no MC-LAG operation is established.).

Values 1 — 200

lacp-key *admin-key* — Specifies a 16 bit key that needs to be configured in the same manner on both sides of the MC-LAG in order for the MC-LAG to come up.

Values 1 — 65535

system-id system-id — Specifies a 6 byte value expressed in the same notation as MAC address

Values xx:xx:xx:xx:xx - xx [00..FF]

remote-lag *lag-id* — Specifies the LAG ID on the remote system.

Values 1 — 200

system-priority system-priority — Specifies the system priority to be used in the context of the MC-LAG. The partner system will consider all ports using the same lacp-key, system-id, and system-priority as part of the same LAG.

Values 1 — 65535

Multi-Chassis Ring Commands

mc-ring

Syntax mc-ring

Context config>redundancy>mc>peer

config>redundancy>multi-chassis>peer>sync

Description This command enables the context to configure the multi-chassis ring parameters.

ring

Syntax ring sync-tag

no ring sync-tag

Context config>redundancy>mc>peer>mcr

Description This command configures a multi-chassis ring.

Parameters sync-tag — Specifies a synchronization tag to be used while synchronizing this port with the multi-

chassis peer.

in-band-control-path

Syntax in-band-control-path

Context config>redundancy>mc>peer>mcr>ring

Description This command enables the context to configure multi-chassis ring inband control path parameters.

dst-ip

Syntax dst-ip ip-address

no dst-ip

Context config>redundancy>mc>peer>mcr>ring>in-band-control-path

Description This command specifies the destination IP address used in the inband control connection. If the

address is not configured, the ring cannot become operational.

Parameters *ip-address* — Specifies the destination IP address.

interface

Syntax interface ip-int-name

no interface

Context config>redundancy>mc>peer>mcr>ring>in-band-control-path

Description This command specifies the name of the IP interface used for the inband control connection. If the

name is not configured, the ring cannot become operational.

service-id

Syntax service-id service-id

no service-id

Context config>redundancy>mc>peer>mcr>ring>ibc

Description This command specifies the service ID if the interface used for the inband control connection belongs

to a VPRN service. If not specified, the service-id is zero and the interface must belong to the Base

router.

The **no** form of the command removes the service-id from the IBC configuration.

Parameters *service-id* — Specifies the service ID if the interface.

path-b

Syntax [no] path-b

Context config>redundancy>mc>peer>mcr>ring

Description This command specifies the set of upper-VLAN IDs associated with the SAPs that belong to path B

with respect to load-sharing. All other SAPs belong to path A.

Default If not specified, the default is an empty set.

range

Syntax [no] range vlan-range

Context config>redundancy>mc>peer>mcr>ring>path-b

config>redundancy>mc>peer>mcr>ring>path-excl

Description This command configures a MCR b-path VLAN range.

Parameters *vla-range* — Specifies the VLAN range.

Values 1 to 4094 — 1 to 4094

path-excl

Syntax [no] path-excl

Context config>redundancy>mc>peer>mcr>ring

Description This command specifies the set of upper-VLAN IDs associated with the SAPs that are to be excluded

from control by the multi-chassis ring.

Default If not specified, the default is an empty set.

ring-node

Syntax ring-node ring-node-name [create]

no ring-node ring-node-name

Context config>redundancy>mc>peer>mcr>ring

Description This command specifies the unique name of a multi-chassis ring access node.

Parameters ring-node-name — Specifies the unique name of a multi-chassis ring access node.

create — Keyword used to create the ring node instance. The create keyword requirement can be

enabled/disabled in the environment>create context.

connectivity-verify

Syntax connectivity-verify

Context config>redundancy>mc>peer>mcr>ring>ring-node

Description This command enables the context to configure node connectivity check parameters.

dst-ip

Syntax dst-ip ip-address

no dst-ip

Context config>redundancy>mc>peer>mcr>ring>ring-node>connectivity-verify

Description This command configures the node cc destination IP address.

Default no dst-ip

Parameters ip-address — Specifies the destination IP address used in the inband control connection.

interval

Syntax interval interval

no interval

Context config>redundancy>mc>peer>mcr>ring>ring-node>connectivity-verify

Description This command specifies the polling interval of the ring-node connectivity verification of this ring

node.

Default 5

Parameters *interval* — Specifies the polling interval, in minutes.

Values 1 — 6000

service-id

Syntax service-id service-id

no service-id

Context config>redundancy>mc>peer>mcr>ring>ring-node>connectivity-verify

Description This command specifies the service ID of the SAP used for the ring-node connectivity verification of

this ring node.

Default no service-id

Parameters *service-id* — Specifies the service ID of the SAP.

Values 1 — 2147483647

src-ip

Syntax src-ip ip-address

no src-ip

Context config>redundancy>mc>peer>mcr>ring>ring-node>connectivity-verify

This command specifies the source IP address used in the ring-node connectivity verification of this

ring node.

Default no src-ip

Parameters *ip-address* — Specifies the address of the multi-chassis peer.

src-mac

Syntax src-mac ieee-address

no src-mac

Context config>redundancy>mc>peer>mcr>node>cv

Description This command specifies the source MAC address used for the Ring-Node Connectivity Verification

of this ring node.

A value of all zeroes (000000000000 H (0:0:0:0:0:0)) specifies that the MAC address of the system

management processor (CPM) is used.

Default no src-mac

Parameters *ieee-address* — Specifies the source MAC address.

vlan

Syntax vlan [0..4094]

no vlan

Context config>redundancy>mc>peer>mcr>node>cv

Description This command specifies the VLAN tag of the SAP used for the ring-node connectivity verification of

this ring node. It is only meaningful if the value of service ID is not zero. A zero value means that no

VLAN tag is configured.

Default no vlan

Parameters [0..4094] — Specifies the set of VLAN IDs associated with the SAPs that are to be controlled by the

slave peer.

LLDP System Commands

lldp

Syntax IIdp

Context config>system

Description This command enables the context to configure system-wide Link Layer Discovery Protocol

parameters.

message-fast-tx

Syntax message-fast-tx time

no message-fast-tx

Context config>system>lldp

Description This command configures the duration of the fast transmission period.

Parameters *time* — Specifies the fast transmission period in seconds.

Values 1 — 3600

Default 1

message-fast-tx-init

Syntax message-fast-tx-init count

no message-fast-tx-init

Context config>system>lldp

Description This command configures the number of LLDPDUs to send during the fast transmission period.

Parameters *count* — Specifies the number of LLDPDUs to send during the fast transmission period.

Values 1-8

Default 4

notification-interval

Syntax notification-interval time

no notification-interval

Context config>system>lldp

Description This command configures the minimum time between change notifications.

Parameters time — Specifies the minimum time, in seconds, between change notifications.

Values 5 — 3600

Default 5

reinit-delay

Syntax reinit-delay time

no reinit-delay

Context config>system>lldp

Description This command configures the time before re-initializing LLDP on a port.

Parameters time — Specifies the time, in seconds, before re-initializing LLDP on a port.

Values 1 — 10

Default 2

tx-credit-max

Syntax tx-credit-max count

no tx-credit-max

Context config>system>lldp

Description This command configures the maximum consecutive LLDPDUs transmitted.

Parameters count — Specifies the maximum consecutive LLDPDUs transmitted.

Values 1 — 100

Default 5

tx-hold-multiplier

Syntax tx-hold-multiplier multiplier

no tx-hold-multiplier

Context config>system>lldp

Description This command configures the multiplier of the tx-interval.

Parameters *multiplier* — Specifies the multiplier of the tx-interval.

Values 2 — 10

Default 4

tx-interval

Syntax tx-interval interval

no tx-interval

Context config>system>lldp

Description This command configures the LLDP transmit interval time.

Parameters *interval* — Specifies the LLDP transmit interval time.

Values 1 — 100

Default 5

LLDP Ethernet Port Commands

Refer to the 7750 SR OS Interface Guide for command descriptions and CLI usage.

lldp

Syntax IIdp

Context config>port>ethernet

Description This command enables the context to configure Link Layer Discovery Protocol (LLDP) parameters

on the specified port.

dest-mac

Syntax dest-mac {bridge-mac}

Context config>port>ethernet>lldp

Description This command configures destination MAC address parameters.

Parameters bridge-mac — Specifies destination bridge MAC type to use by LLDP.

Values nearest-bridge — Specifies to use the nearest bridge.

nearest-non-tpmr — Specifies to use the nearest non-Two-Port MAC Relay

(TPMR).

nearest-customer — Specifies to use the nearest customer.

admin-status

Syntax admin-status {rx | tx | tx-rx | disabled}

Context config>port>ethernet>lldp>dstmac

Description This command specifies the administratively desired status of the local LLDP agent.

Parameters rx — Specifies the LLDP agent will receive, but will not transmit LLDP frames on this port.

tx — Specifies that the LLDP agent will transmit LLDP frames on this port and will not store any information about the remote systems connected.

tx-rx — Specifies that the LLDP agent will transmit and receive LLDP frames on this port.

disabled — Specifies that the LLDP agent will not transmit or receive LLDP frames on this port. If there is remote systems information which is received on this port and stored in other tables, before the port's admin status becomes disabled, then the information will naturally age out.

notification

Syntax [no] notification

Context config>port>ethernet>lldp>dstmac

Description This command enables LLDP notifications.

The **no** form of the command disables LLDP notifications.

tx-mgmt-address

Syntax tx-mgmt-address [system]

no tx-mgmt-address

Context config>port>ethernet>lldp>dstmac

Description This command specifies which management address to transmit.

The no form of the command resets value to the default.

Default no tx-mgmt-address

Parameters system — Specifies to use the system IP address. Note that the system address will only be

transmitted once it has been configured if this parameter is specified

tx-tlvs

Syntax tx-tlvs [port-desc] [sys-name] [sys-desc] [sys-cap]

no tx-tlvs

Context config>port>ethernet>lldp>dstmac

Description This command specifies which LLDP TLVs to transmit.

The **no** form of the command resets the value to the default.

Default no tx-tlvs

Parameters port-desc — Indicates that the LLDP agent should transmit port description TLVs.

sys-name — Indicates that the LLDP agent should transmit system name TLVs.

sys-desc — Indicates that the LLDP agent should transmit system description TLVs.

sys-cap — Indicates that the LLDP agent should transmit system capabilities TLVs.

Show Commands

connections

Syntax connections [address ip-address [interface interface-name]] [port port-number] [detail]

Context show>system

Description This command displays UDP and TCP connection information.

If no command line options are specified, a summary of the TCP and UDP connections displays.

Parameters *ip-address* — Displays only the connection information for the specified IP address.

ipv4-address: a.b.c.d (host bits must be 0)

ipv6-address: x:x:x:x:x:x:x:x[-interface]

x:x:x:x:x:x:d.d.d.d[-interface] x: [0 — FFFF]H d: [0 — 255]D

interface: 32 characters maximum, mandatory for link local

addresses

port-number — Displays only the connection information for the specified port number.

Values 0 - 65535

detail — Appends TCP statistics to the display output.

Output Standa

Standard Connection Output — The following table describes the system connections output fields.

Label	Description
Proto	Displays the socket protocol, either TCP or UDP.
RecvQ	Displays the number of input packets received by the protocol.
TxmtQ	Displays the number of output packets sent by the application.
Local Address	Displays the local address of the socket. The socket port is separated by a period.
Remote Address	Displays the remote address of the socket. The socket port is separated by a period.
State	Listen — The protocol state is in the listen mode.
	Established — The protocol state is established.

A:ALA-12# show system connections

Connections:				
Proto	RecvQ	TxmtQ Local Address	Remote Address	State
TCP	0	0 0.0.0.21	0.0.0.0.0	LISTEN
TCP	0	0 0.0.0.23	0.0.0.0.0	LISTEN
TCP	0	0 0.0.0.179	0.0.0.0.0	LISTEN
TCP	0	0 10.0.0.xxx.51138	10.0.0.104.179	SYN SENT
TCP	0	0 10.0.0.xxx.51139	10.0.0.91.179	SYN SENT
TCP	0	0 10.10.10.xxx.646	0.0.0.0.0	LISTEN
TCP	0	0 10.10.10.xxx.646	10.10.10.104.49406	ESTABLISHED
TCP	0	0 11.1.0.1.51140	11.1.0.2.179	SYN SENT
TCP	0	993 192.168.x.xxx.23	192.168.x.xx.xxxx	ESTABLISHED
UDP	0	0 0.0.0.123	0.0.0.0.0	
UDP	0	0 0.0.0.646	0.0.0.0.0	
UDP	0	0 0.0.0.17185	0.0.0.0.0	
UDP	0	0 10.10.10.xxx.646	0.0.0.0.0	
UDP	0	0 127.0.0.1.50130	127.0.0.1.17185	
	0 Connectio		127.0.0.1.17185	

A:ALA-12#

Sample Detailed Output

A:ALA-12# show system connections detail

```
: 659635
packets sent
data packets
                                                                   : 338982 (7435146 bytes)
data packet retransmitted ack-only packets
                                                                   : 73 (1368 bytes)
                                                                   : 320548 (140960 delayed)
URG only packet
                                                                    : 0
window probe packet
window update packet
control packets
                                                                     : 32
packets received
                                                                     : 658893
                                                                     : 338738 for (7435123 bytes)
acks
                                                                    : 23
duplicate acks
ack for unsent data : 0
packets received in-sequence : 334705 (5568368 bytes)
completely duplicate packet : 2 (36 bytes)
packet with some dup. data : 0 (0 bytes)
out-of-order packets : 20 (0 bytes)
packet of data after window : 0 (0 bytes)
window probe : 0
ack for unsent data
                                                                    : 0
window update packet
window update packet

packets received after close

controlled for had checksum

controlled for had checksum

controlled for had checksum

controlled for had checksum
discarded for bad header offset field : 0 discarded because packet too short : 0
```

```
connection request : 4
connection accept : 24
connections established (including accepts) : 27
connections closed : 26 (including 2 drops)
embryonic connections dropped : 0
segments updated rtt : 338742 (of 338747 attempts)
retransmit timeouts : 75
connections dropped by rexmit timeout : 0
persist timeouts : 0
keepalive timeouts : 26
keepalive probes sent : 0
connections dropped by keepalive : 1
pcb cache lookups failed : 0
```

A:ALA-12#

cpu

Syntax cpu [sample-period seconds]

Context show>system

Description This command displays CPU utilization per task over a sample period.

Parameters sample-period seconds — The number of seconds over which to sample CPU task utilization.

Default 1

Values 1-5

Output System CPU Output — The following table describes the system CPU output fields.

Table 33: Show System CPU Output Fields

Label	Description
CPU Utilization	The total amount of CPU time.
Name	The process or protocol name.
CPU Time (uSec)	The CPU time each process or protocol has used in the specified time.
CPU Usage	The sum of CPU usage of all the processes and protocols.

Sample Output

System	3465	0.34%
Icc	1349	0.13%
RTM/Policies	0	0.00%
OSPF	61	~0.00%
MPLS/RSVP	2113	0.21%
LDP	19	~0.00%
IS-IS	0	0.00%
RIP	21	~0.00%
VRRP	0	0.00%
BGP	0	0.00%
Services	155	0.01%
IOM	24337	2.43%
SIM	4892	0.49%
CFLOWD	34	~0.00%
Idle	961064	96.34%

A:ALA-1#

cron

Syntax cron

Context show>cron

Description This command enters the show CRON context.

action

Syntax action [action-name] [owner action-owner] run-history run-state

Context show>cron#

Description This command displays cron action parameters.

Parameters action action-name — Specifies the action name.

Values maximum 32 characters

owner *action-owner* — Specifies the owner name.

Default TiMOS CLI

run-history run-state — Specifies the state of the test to be run.

Values executing, initializing, terminated

Output The following table describes the show cron action output fields.

Label Description

Action

Displays the name of the action.

Label	Description (Continued)
Action owner	The name of the action owner.
Administrative status	Enabled - Administrative status is enabled
	Disabled - Administrative status is disabled
Script	The name of the script
Script owner	The name of the script owner.
Script source location	Displays the location of scheduled script.
Max running allowed	Displays the maximum number of allowed sessions.
Max completed run histories	Displays the maximum number of sessions previously run.
Max lifetime allowed	Displays the maximum amount of time the script may run.
Completed run histories	Displays the number of completed sessions.
Executing run histories	Displays the number of sessions in the process of executing.
Initializing run histories	Displays the number of sessions ready to run/queued but not executed.
Max time run his- tory saved	Displays the maximum amount of time to keep the results from a script run.
Last change	Displays the system time a change was made to the configuration.
*A:Redundancy# show c	ron action run-history terminated
CRON Action Run Histo	ry
Action "test" Owner "TiMOS CLI"	
Script Run #17	
Start time : 2006/ Elapsed time : 0d 00 State : termi Result time : 2006/ Error time : never	11/06 20:30:09

```
Run exit
        : Success
______
Script Run #18
                            End time : 2006/11/06 20:40:40
Lifetime : 0d 00:00:00
Start time : 2006/11/06 20:35:24 End time
Elapsed time : 0d 00:05:16
                     Lifetime
Run exit code : noError
         : terminated
Result time : 2006/11/06 20:40:40 Keep history : 0d 00:55:13
Error time : never
Results file : ftp://*:*@192.168.15.18/home/testlab bgp/cron/ 20061106-203523.
Run exit : Success
*A:Redundancy#
*A:Redundancy# show cron action run-history executing
______
CRON Action Run History
______
Action "test"
Owner "TiMOS CLI"
Script Run #20
State : executing
                          Run exit code : noError
Result time : never
                            Keep history : 0d 01:00:00
Error time : never
Results file : ftp://*:*@192.168.15.18/home/testlab bgp/cron/ 20061106-204559.
          out
*A:Redundancy#
*A:Redundancy# show cron action run-history initializing
______
CRON Action Run History
______
Action "test"
Owner "TiMOS CLI"
Script Run #21
Start time : never
                           End time
                           Lifetime : 0d 01:00:00
Elapsed time : 0d 00:00:00
                         Run exit code : noError
      : initializing
Result time : never
                            Keep history : 0d 01:00:00
Error time
        : never
Results file : none
Script Run #22
                        End time : never
Lifetime : 0d 01:00:00
Start time : never
Elapsed time : 0d 00:00:00
State : initializing
                          Run exit code : noError
Result time : never
                           Keep history : 0d 01:00:00
Error time : never
```

Results file : none

Script Run #23

Start time : never End time : never
Elapsed time : 0d 00:00:00 Lifetime : 0d 01:00:00
State : initializing Run exit code : noError
Result time : never Keep history : 0d 01:00:00
Error time : never

Results file : none

schedule

schedule [schedule-name] [owner schedule-owner] **Syntax**

Context show>cron#

Description This command displays cron schedule parameters.

Parameters schedule-name — Displays information for the specified scheduler name.

owner schedule-owner — Displays information for the specified scheduler owner.

Output The following table describes the show cron schedule output fields.

A:sim1>show>cron schedule test

Label	Description
Schedule name	Displays the schedule name.
Schedule owner	Displays the owner name of the action.
Description	Displays the schedule's description.
Administrative status	Enabled — The administrative status is enabled.
	Disabled - Administratively disabled.
Operational sta- tus	Enabled — The operational status is enabled.
	Disabled - Operationally disabled.
Action	Displays the action name
Action owner	Displays the name of action owner.
Script	Displays the name of the script.
Script owner	Displays the name of the script.
Script owner	Displays the name of the of script owner.

^{*}A:Redundancy#

Label	Description (Continued)
Script source location	Displays the location of scheduled script.
Script results location	Displays the location where the script results have been sent.
Schedule type	Periodic - Displays a schedule which ran at a given interval.
	Calendar — Displays a schedule which ran based on a calendar.
	Oneshot — Displays a schedule which ran one time only.
Interval	Displays the interval between runs of an event.
Next scheduled run	Displays the time for the next scheduled run.
Weekday	Displays the configured weekday.
Month	Displays the configured month.
Day of Month	Displays the configured day of month.
Hour	Displays the configured hour.
Minute	Displays the configured minute.
Number of sched- uled runs	Displays the number of scheduled sessions.
Last scheduled run	Displays the last scheduled session.
Number of sched- uled failures	Displays the number of scheduled sessions that failed to execute.
Last scheduled failure	Displays the last scheduled session that failed to execute.
Last failure time	Displays the system time of the last failure.
CRON Schedule Informati	======================================
Schedule owner Description Administrative status Operational status Action Action owner Script Script Owner Script source location Script results location	/cron/test1.cfg : ftp://****:*****@192.168.15.1/home/testlab_bgp /cron/res
Schedule type	: periodic

Interval : 0d 00:01:00 (60 seconds)

Next scheduled run : 0d 00:00:42

Weekday : tuesday Month
Day of month
Hour
Minute Month : none : none Hour : none
Minute : none
Number of schedule runs : 10
Last schedule run : 2008/01/01 17:20:52

Number of schedule failures : 0 Last schedule failure : no error
Last failure time : never

A:sim1>show>cron

script

script [script-name] [owner script-owner] **Syntax**

Context show>cron#

Description This command displays cron script parameters.

Parameters schedule-name — Displays information for the specified script.

owner schedule-owner — Displays information for the specified script owner.

Output The following table describes the show cron script output fields.

Label	Description
Script	Displays the name of the script.
Script owner	Displays the owner name of script.
Administrative status	Enabled - Administrative status is enabled.
	Disabled - Administratively abled.
Operational sta- tus	Enabled — Operational status is enabled.
	Disabled - Operationally disabled.
Script source location	Displays the location of scheduled script.
Last script error	Displays the system time of the last error.
Last change	Displays the system time of the last change.

A:sim1>show>cron# script

CRON Script Information

: test Script Script
Owner name
Owner name
: TiMOS CLI
Description
: asd
Administrative status
Operational status
Script source location
: ftp://*****:*****@192.168.15.1/home/testlab_bgp
/cron/test1.cfg

/cron/testi.clg

Last script error : none : 2006/11/07 17:10:03 ______

A:sim1>show>cron#

information

Syntax information

Context show>system

Description This command displays general system information including basic system, SNMP server, last boot and DNS client information.

Output **System Information Output** — The following table describes the system information output fields.

Label	Description
System Name	The configured system name.
System Contact	A text string that describes the system contact information.
System Location	A text string that describes the system location.
System Coordi- nates	A text string that describes the system coordinates.
System Up Time	The time since the last boot.
SNMP Port	The port number used by this node to receive SNMP request messages and to send replies.
SNMP Engine ID	The SNMP engineID to uniquely identify the SNMPv3 node.
SNMP Max Message Size	The maximum SNMP packet size generated by this node.
SNMP Admin State	Enabled — SNMP is administratively enabled and running. Disabled — SNMP is administratively shutdown and not running.

Label	Description (Continued)
SNMP Oper State	Enabled — SNMP is operationally enabled. Disabled — SNMP is operationally disabled.
SNMP Index Boot Status	Persistent — System indexes are saved between reboots. Not Persistent — System indexes are not saved between reboots.
Telnet/SSH/FTP Admin	Displays the administrative state of the Telnet, SSH, and FTP sessions.
Telnet/SSH/FTP Oper	Displays the operational state of the Telnet, SSH, and FTP sessions.
BOF Source	The location of the BOF.
Image Source	Primary — Indicates that the directory location for runtime image file was loaded from the primary source.
	Secondary — Indicates that the directory location for runtime image file was loaded from the secondary source. Tertiary — Indicates that the directory location for runtime image file was loaded from the tertiary source.
Config Source	Primary — Indicates that the directory location for configuration file was loaded from the primary source. Secondary — Indicates that the directory location for configuration file was loaded from the secondary source. Tertiary — Indicates that the directory location for configuration file was loaded from the tertiary source.
DNS Resolve Preference	ipv4-only - Dns-names are queried for A-records only. ipv6-first - Dns-server will be queried for AAAA-records first and a successful reply is not received, the dns-server is queried for A-records.
Last Booted Config File	The URL and filename of the last loaded configuration file.
Last Boot Cfg Ver- sion	The date and time of the last boot.
Last Boot Config Header	Displays header information such as image version, date built, date generated.
Last Boot Index Version	The version of the persistence index file read when this CPM card was last rebooted.
Last Boot Index Header	The header of the persistence index file read when this CPM card was last rebooted.
Last Saved Config	The location and filename of the last saved configuration file.
Time Last Saved	The date and time of the last time configuration file was saved.

Label	Description (Continued)
Changes Since Last Save	Yes — There are unsaved configuration file changes. No — There are no unsaved configuration file changes.
Time Last Modified	The date and time of the last modification.
Max Cfg/BOF Backup Rev	The maximum number of backup revisions maintained for a configuration file. This value also applies to the number of revisions maintained for the BOF file.
Cfg-OK Script	$\tt URL-The\ location\ and\ name\ of\ the\ CLI\ script\ file\ executed\ following\ successful\ completion\ of\ the\ boot-up\ configuration\ file\ execution.$
Cfg-OK Script Sta- tus	Successful/Failed. The results from the execution of the CLI script file specified in the Cfg-OK Script location. Not used — No CLI script file was executed.
Cfg-Fail Script	 URL - The location and name of the CLI script file executed following a failed boot-up configuration file execution. Not used - No CLI script file was executed.
Cfg-Fail Script Status	Successful/Failed — The results from the execution of the CLI script file specified in the Cfg-Fail Script location. Not used — No CLI script file was executed.
Management IP Addr	The management IP address and mask.
DNS Server	The IP address of the DNS server.
DNS Domain	The DNS domain name of the node.
BOF Static Routes	To — The static route destination.
	Next Hop $-$ The next hop IP address used to reach the destination. Metric $-$ Displays the priority of this static route versus other static routes. None $-$ No static routes are configured.

```
: 0 days, 03:42:01.29 (hr:min:sec)
System Up Time
SNMP Port
                    : 161
SNMP Port : 161
SNMP Engine ID : 0000197f00008c6cff000000
SNMP Max Message Size : 1500
SNMP Admin State : Enabled SNMP Oper State : Enabled
SNMP Index Boot Status : Not Persistent
SNMP Sync State : OK
Tel/Tel6/SSH/FTP Admin : Enabled/Disabled/Enabled/Enabled
Tel/Tel6/SSH/FTP Oper : Up/Down/Up/Up
Image Source : primary
Config Source : primary
BOF Source
                    : ftp://test:test@xxx.xxx.xx.xx/./images
Last Booted Config File: ftp://*:*@xxx.xxx.xxx.xxx/./images/dut-f.cfg
Last Boot Cfg Version : N/A
Last Boot Index Version: N/A
Last Saved Config : N/A
Time Last Saved
Changes Since Last Save: No
{\tt Max~Cfg/BOF~Backup~Rev} : 5
Cfg-OK Script : ftp://*:*@[3000::8acb:466d]/./images/env.cfg
Cfg-OK Script Status : failed
Cfg-Fail Script : N/A
Cfg-Fail Script Status : not used
Management IP Addr : xxx.xxx.xx.xxx/23
Primary DNS Server : xxx.xxx.xxx
Secondary DNS Server : xxx.xxx.xxx
Tertiary DNS Server : N/A
DNS Domain
                    : sh.bel.alcatel.be
DNS Resolve Preference : ipv4-only
BOF Static Routes :
ATM LOCATION ID : 0:
ATM OAM Retry Up : 2
ATM OAM Retry Down : 4
ATM OAM Loopback Period: 10
______
A:Dut-F#
```

load-balancing-alg

Syntax load-balancing-alg [detail]

Context show>system

Description This command displays system load balancing settings.

Parameters detail — Displays port settings.

*A:ALA-49>show>system# load-balancing-alg

System-wide Load Balancing Algorithms

L4 - Load Balance : exclude-L4

LSR - Load Balance : lbl-only

*A:ALA-49>show>system#

memory-pools

Syntax memory-pools

Context show>system

Description This command displays system memory status.

Output Memory Pools Output — The following table describes memory pool output fields.

Table 34: Show Memory Pool Output Fields

Label	Description
Name	The name of the system or process.
Max Allowed	Integer — The maximum allocated memory size.
	No Limit - No size limit.
Current Size	The current size of the memory pool.
Max So Far	The largest amount of memory pool used.
In Use	The current amount of the memory pool currently in use.
Current Total Size	The sum of the Current Size column.
Total In Use	The sum of the In Use column.
Available Memory	The amount of available memory.

Sample Output

A:ALA-1# show system memory-pools

 Memory Pools
 Max Allowed
 Current Size
 Max So Far
 In Use

 System
 No limit
 24,117,248
 24,117,248
 16,974,832

 Icc
 8,388,608
 1,048,576
 1,048,576
 85,200

RTM/Policies	No limit	5,242,912	5,242,912	3,944,104
OSPF	No limit	3,145,728	3,145,728	2,617,384
MPLS/RSVP	No limit	9,769,480	9,769,480	8,173,760
LDP	No limit	0	0	0
IS-IS	No limit	0	0	0
RIP	No limit	0	0	0
VRRP	No limit	1,048,576	1,048,576	96
BGP	No limit	2,097,152	2,097,152	1,624,800
Services	No limit	2,097,152	2,097,152	1,589,824
IOM	No limit	205,226,800	205,226,800	202,962,744
SIM	No limit	1,048,576	1,048,576	392
CFLOWD	No limit	0	1,048,576	0
IGMP	No limit	0	0	0
PIM	No limit	0	0	0
ATM	No limit	2,872,648	2,872,648	2,790,104
MMPI	No limit	0	0	0
MFIB	No limit	0	0	0
PIP	No limit	79,943,024	79,943,024	78,895,248
MBUF	67,108,864	5,837,328	5,837,328	4,834,280

Current Total Size : 343,495,200 bytes
Total In Use : 324,492,768 bytes
Available Memory : 640,178,652 bytes

A:ALA-1#

ntp

Syntax ntp

Context show>system

Description This command displays NTP protocol configuration and state.

Show NTP Output — The following table describes NTP output fields. Output

Label	Description
Enabled	yes - NTP is enabled.
	no - NTP is disabled.
Admin Status	yes - Administrative state is enabled.
	no - Administrative state is disabled.
NTP Server	Displays NTP server state of this node.
Stratum	Displays stratum level of this node.
Oper Status	yes — The operational state is enabled.
	no — The operational state is disabled.
Auth Check	Displays the authentication requirement

Label	Description (Continued)
System Ref. ID	IP address of this node or a 4-character ASCII code showing the state.
Auth Error	Displays the number of authentication errors.
Auth Errors Ignored	Displays the number of authentication errors ignored.
Auth key ID Errors	Displays the number of key identification errors .
Auth Key Type Errors	Displays the number of authentication key type errors.
Reject	The peer is rejected and will not be used for synchronization. Rejection reasons could be the peer is unreachable, the peer is synchronized to this local server so synchronizing with it would create a sync loop, or the synchronization distance is too large. This is the normal startup state.
Invalid	The peer is not maintaining an accurate clock. This peer will not be used for synchronization.
Excess	The peer's synchronization distance is greater than ten other peers. This peer will not be used for synchronization.
Outlyer	The peer is discarded as an outlyer. This peer will not be used for synchronization.
Candidate	The peer is accepted as a possible source of synchronization.
Selected	The peer is an acceptable source of synchronization, but its synchronization distance is greater than six other peers.
Chosen	The peer is chosen as the source of synchronization.
ChosenPPS	The peer is chosen as the source of synchronization, but the actual synchronization is occurring from a pulse-per-second (PPS) signal.
Remote	The IP address of the remote NTP server or peer with which this local host is exchanging NTP packets.
Reference ID	When stratum is between 0 and 15 this field shows the IP address of the remote NTP server or peer with which the remote is exchanging NTP packets. For reference clocks, this field shows the identification assigned to the clock, such as, ".GPS." For an NTP server or peer, if the client has not yet synchronized to a server/peer, the status cannot be determined and displays the following codes:

-		-		
	2	h	Δ	ı

Description (Continued)

Peer Codes:

ACST — The association belongs to any cast server.

AUTH — Server authentication failed. Please wait while the association is restarted.

AUTO — Autokey sequence failed. Please wait while the association is restarted.

BCST — The association belongs to a broadcast server.

CRPT — Cryptographic authentication or identification failed. The details should be in the system log file or the cryptostats statistics file, if configured. No further messages will be sent to the server.

DENY - Access denied by remote server. No further messages will be sent to the server.

 ${\tt DROP}-{\tt Lost}$ peer in symmetric mode. Please wait while the association is restarted.

RSTR — Access denied due to local policy. No further messages will be sent to the server.

INIT — The association has not yet synchronized for the first time.

MCST — The association belongs to a manycast server.

NKEY - No key found. Either the key was never installed or is not trusted

RATE - Rate exceeded. The server has temporarily denied access because the client exceeded the rate threshold.

 ${\tt RMOT}$ — The association from a remote host running ntpdc has had unauthorized attempted access.

STEP — A step change in system time has occurred, but the association has not yet resynchronized.

System Codes

INIT – The system clock has not yet synchronized for the first time.

STEP - A step change in system time has occurred, but the system clock has not yet resynchronized.

Stratum level of this node.

Auth yes — Authentication is enabled.

no - Authentication is disabled.

Polling interval in seconds.

R Yes — The NTP peer or server has been reached at least once in the

last 8 polls.

No - The NTP peer or server has not been reached at least once in

the last 8 polls.

Offset The time between the local and remote UTC time, in milliseconds.

A:pc-40>conf	ig>system>time	>ntp# show sy:	stem nt	.p				
NTP Status								
Enabled Admin Status Server enabl System Ref I	ed : No	68.15.221	Stratu Oper S Server Auth C	tatus keyId	.=====	:	3 up none Yes	
	ig>system>time							
NTP Status								
Enabled Admin Status Server enabl System Ref I	ed : No d : 192.1	68.15.221	Stratu Oper S Server Auth C	status keyId		:	3 up none Yes	
NTP Active A			======		:=====			
State R	emote 	Reference ID	St 	Туре	Auth	Pol	Ll R	Offset
=	92.168.15.221 92.168.15.221			srvr mclnt	none none	64 64	У	0.901 1.101
A:pc-40>conf NTP Status Enabled Admin Status Server enabl System Ref I Auth Errors Auth Key Id	: Yes : up ed : No d : 192.1	:=======	Stratu Oper S Server Auth C	tatus keyId	gnored	: : :		
NTP Configur	ed Broadcast/M	Multicast Inte	rfaces					
vRouter	Interface	Add:	====== ress 		Тур	==== = 	Auth	Poll
=	i3/1/1 management t2 management	224	t-ones .0.1.1		bcli	st nt	yes no no no	off off n/a n/a
A:pc-40>conf	ig>system>time	>ntp# :>ntp# show sy:				====		
	. Yas		====== Stratu				 3	
Admin Status	: Yes : up			im Status			up	

Server enal	oled : No		Serve	r keyId		: no	ne	
System Ref	Id : 192.1	68.15.221	Auth	Check		: Ye	s	
Auth Error	s : 0		Auth	Errors I	gnored	: 0		
Auth Key I	d Errors : 0		Auth	Кеу Туре	Error	s : 0		
========							===:	
NTP Config	ured Broadcast/M	ulticast Int	erfaces					
				======			===:	
vRouter	Interface	Ac	ldress		Тур	e A	uth	Poll
Base	i3/1/1	Нс	st-ones		bca	 st v	es	off
	management		4.0.1.1		mca	-		off
Base	t.2	22	. 7 . 0 . 1 . 1			nt n		n/a
	~-	2.0	4.0.1.1		mcl			n/a
	management 		.4.0.1.1		11101	nt n 		11/a
NTP Active Associations								
State	Remote	Reference I	D St	Туре	Auth	Poll	R	Offset
_	192.168.15.221 192.168.15.221			srvr mclnt	none none	64 64	У	0.901 1.101

A:pc-40>config>system>time>ntp#

sntp

Syntax sntp

Context show>system

Description This command displays SNTP protocol configuration and state.

Output Show SNTP Output — The following table describes SNTP output fields.

Table 35: Show System SNTP Output Fields

Label	Description
SNTP Server	The SNTP server address for SNTP unicast client mode.
Version	The SNTP version number, expressed as an integer.
Preference	Normal — When more than one time server is configured, one server can be configured to have preference over another.
	Preferred - Indicates that this server has preference over another.
Interval	The frequency, in seconds, that the server is queried.

Sample Output



SNTP Server	Version	Preference	Interval
10.10.20.253	3	Preferred	64
A:ALA-1#			

thresholds

Syntax thresholds

Context show>system

Description This command display system monitoring thresholds.

Output Thresholds Output — following table describes system threshold output fields.

Label	Description
Variable	Displays the variable OID.
Alarm Id	Displays the numerical identifier for the alarm.
Last Value	Displays the last threshold value.
Rising Event Id	Displays the identifier of the RMON rising event.
Threshold	Displays the identifier of the RMON rising threshold.
Falling Event Id	Displays the identifier of the RMON falling event.
Threshold	Displays the identifier of the RMON falling threshold.
Sample Interval	Displays the polling interval, in seconds, over which the data is sampled and compared with the rising and falling thresholds.
Sample Type	Displays the method of sampling the selected variable and calculating the value to be compared against the thresholds.
Startup Alarm	Displays the alarm that may be sent when this alarm is first created.
Owner	Displays the owner of this alarm.
Description	Displays the event cause.
Event Id	Displays the identifier of the threshold event.
Last Sent	Displays the date and time the alarm was sent.

Label	Description (Continued)
Action Type	log — An entry is made in the RMON-MIB log table for each event occurrence. This does not create a TiMOS logger entry. The RMON-MIB log table entries can be viewed using the show>system>thresh-olds CLI command. trap — A TiMOS logger event is generated. The TiMOS logger utility then distributes the notification of this event to its configured log destinations which may be CONSOLE, telnet session, memory log, cflash file, syslog, or SNMP trap destinations logs. both — Both a entry in the RMON-MIB logTable and a TiMOS logger event are generated. none — No action is taken
Owner	Displays the owner of the event.

```
A:ALA-48# show system thresholds
_____
Threshold Alarms
_____
Variable: tmnxCpmFlashUsed.1.11.1
Alarm Id : 1 Last Value : 835
Rising Event Id : 1 Threshold : 5000
Falling Event Id : 2 Threshold : 2500
Sample Interval : 2147483* SampleType : absolute
Startup Alarm : either Owner
                               : TiMOS CLI
Variable: tmnxCpmFlashUsed.1.11.1
Alarm Id : 2 Last Value : 835
Rising Event Id : 3 Threshold : 10000
Falling Event Id : 4 Threshold : 5000
Sample Interval : 2147483* SampleType : absolute
Startup Alarm : rising Owner : TiMOS CLI
Variable: sgiMemoryUsed.0
Alarm Id : 3 Last Value : 42841056
Rising Event Id : 5 Threshold : 4000
Falling Event Id : 6 Threshold : 2000
Sample Interval : 2147836 SampleType : absolute
Startup Alarm : either Owner : TiMOS CLI
______
* indicates that the corresponding row element may have been truncated.
Threshold Events
Description: TiMOS CLI - cflash capacity alarm rising event
Description: TiMOS CLI - cflash capacity alarm falling event
Description: TiMOS CLI - cflash capacity warning rising event
```

```
Description: TiMOS CLI - cflash capacity warning falling event
Description: TiMOS CLI - memory usage alarm rising event
Description: TiMOS CLI - memory usage alarm falling event
_____
Threshold Events Log
Description : TiMOS CLI - cflash capacity alarm falling eve
           nt : value=835, <=2500 : alarm-index 1, event
            -index 2 alarm-variable OID tmnxCpmFlashUsed.
           1.11.1
Event Id : 2 Time Sent : 10/31/2006 08:48:00

Description : TiMOS CLI - memory usage alarm rising event :
           value=42841056, >=4000 : alarm-index 3, even
            t-index 5 alarm-variable OID sgiMemoryUsed.0
Event Id : 5 Time Sent : 10/31/2006 08:48:00
______
A:ALA-48#
```

time

Syntax time

Context show>system

Description This command displays the system time and zone configuration parameters.

Output System Time Output — The following table describes system time output fields.

Table 36: Show System Time Output Fields

Label	Description
Date & Time	The system date and time using the current time zone.
DST Active	Yes - Daylight Savings Time is currently in effect.
	No - Daylight Savings Time is not currently in effect.
Zone	The zone names for the current zone, the non-DST zone, and the DST zone if configured.
Zone type	Non-standard — The zone is user-defined.
	Standard — The zone is system defined.
Offset from UTC	The number of hours and minutes added to universal time for the zone, including the DST offset for a DST zone

Table 36: Show System Time Output Fields (Continued)

Label **Description**

The number of hours (always 0) and minutes (0—60) added to the time Offset from Non-

at the beginning of Daylight Saving Time and subtracted at the end

Daylight Saving Time.

Starts The date and time Daylight Saving Time begins.

The date and time Daylight Saving Time ends. Ends

Sample Output

DST

A:ALA-1# show system time

_______ ______

Current Date & Time : 2006/05/05 23:03:13 DST Active Offset from UTC : -7:00 Current Zone : PDT

Non-DST Zone : PST Offset from UTC

Zone type : standard

Offset from Non-DST : 0:60

DST Zone : PDT Offse Starts : first sunday in april 02:00 Ends : last sunday : last sunday in october 02:00

A:ALA-1#

A:ALA-1# show system time (with no DST zone configured)

Date & Time

Current Date & Time : 2006/05/12 11:12:05 DST Active Current Zone : APA Offset from UTC : -8:00

Non-DST Zone : APA Offset from UTC : -8:00

: non-standard

No DST zone configured

A:ALA-1#

time

Syntax time

Context show **Description** This command displays the current day, date, time and time zone.

The time is displayed either in the local time zone or in UTC depending on the setting of the root level **time-display** command for the console session.

Output Sample Output

A:ALA-49# show time Tue Oct 31 12:17:15 GMT 2006

tod-suite

Syntax tod-suite [detail]

tod-suite associations tod-suite failed-associations

Context show>cron

Description This command displays information on the configured time-of-day suite.

Output CRON TOD Suite Output — The following table describes TOD suite output fields:

Table 37: Show System tod-suite Output Fields

Label	Description
Associations	Shows which SAPs this tod-suite is associated with.
failed-associa- tions	Shows the SAPs or Multiservice sites where the TOD Suite could not be applied successfully.
Detail	Shows the details of this tod-suite.

Sample Output

A:kerckhot_4# show cron tod-suite suite_sixteen detail

Cron tod-suite details ______ Name : suite_sixteen Type / Id Time-range Prio State ______ Ingress Qos Policy 5 Inact 1160 day 6 Activ 1190 night Ingress Scheduler Policy SchedPolCust1_Day SchedPolCust1_Night Egress Qos Policy day 5 Inact night 6 Activ 1160 day 5 Inact Egress Scheduler Policy 1190 night 6 Activ SchedPolCust1Egress Day 5 Inact day

```
A:kerckhot 4#
The following example shows output for TOD suite associations.
A:kerckhot 4# show cron tod-suite suite sixteen associations
______
Cron tod-suite associations for suite suite sixteen
______
Service associations
                              Type : VPLS
Service Id : 1
SAP 1/1/1:1
SAP 1/1/1:2
SAP 1/1/1:3
SAP 1/1/1:4
SAP 1/1/1:5
SAP 1/1/1:6
SAP 1/1/1:20
Number of SAP's : 7
Customer Multi-Service Site associations
Multi Service Site: mss_1_1
Number of MSS's: 1
______
A:kerckhot 4#
The following example shows output for TOD suite failed-associations.
A:kerckhot 4# show cron tod-suite suite sixteen failed-associations
Cron tod-suite associations failed
tod-suite suite sixteen : failed association for SAP
Service Id : 1
                              Type : VPLS
 SAP 1/1/1:2
 SAP 1/1/1:3
 SAP 1/1/1:4
 SAP 1/1/1:5
 SAP 1/1/1:6
 SAP 1/1/1:20
{\tt tod}\text{-suite} suite sixteen : failed association for Customer MSS
Number of tod-suites failed/total: 1/1
______
Zooming in on one of the failed SAPs, the assignments of QoS and scheduler policies are shown as
A:kerckhot 4# show service id 1 sap 1/1/1:2
______
Service Access Points(SAP)
```

A:kerckhot 4#

If a time-range is specified for a filter entry, use the **show filter** command to view results:

```
A:kerckhot 4# show filter ip 10
IP Filter
______
                         Applied : No
Filter Id : 10
Scope : Template
                                     Def. Action : Drop
         : 2
Entries
Filter Match Criteria : IP
Entry : 1010
time-range : day
                                      Cur. Status : Inactive
Log Id : n/a
Src. IP
         : 0.0.0.0/0
                                     Src. Port
                                                : None
Dest. IP : 10.10.100.1/24
                                                : None
                                     Dest. Port
                                                : Undefined
Protocol
         : Undefined
                                     Dscp
ICMP Code
ICMP Type : Undefined
                                                 : Undefined
          : Off
                                      Option-present : Off
Fragment
Sampling
          : Off
                                     Int. Sampling : On
IP-Option : 0/0
                                     Multiple Option: Off
         : Off
                                                : Off
TCP-syn
                                     TCP-ack
Match action : Forward
Next Hop : 138.203.228.28
Ing. Matches : 0
                                     Egr. Matches : 0
Entry : 1020
                                      Cur. Status : Active
time-range : night
Log Id : n/a Src. IP : 0.0.
                                     Dest. Port : None

Desc. Port : None
         : 0.0.0.0/0
: 10.10.1.1/16
Dest. IP
Protocol
         : Undefined
                                                 : Undefined
                                     ICMP Code : Undefined
ICMP Type : Undefined
Fragment : Off
                                      Option-present : Off
Sampling
         : Off
                                      Int. Sampling : On
IP-Option : 0/0
                                      Multiple Option: Off
         : Off
                                      TCP-ack : Off
TCP-svn
Match action : Forward
Next Hop : 172.22.184.101
Ing. Matches : 0
                                     Egr. Matches : 0
______
A:kerckhot 4#
```

If a filter is referred to in a TOD Suite assignment, use the show filter associations command to view the output:

redundancy

Syntax redundancy

Context show

Description This command enables the context to show redundancy information.

multi-chassis

Syntax multi-chassis

Context show>redundancy

Description This command enables the context to show multi-chassis redundancy information.

all

Syntax all [detail]

Context show>redundancy>multi-chassis

Description This command displays brief multi-chassis redundancy information.

Parameters detail — Shows detailed multi-chassis redundancy information.

Output Show Redundancy Multi-Chassis All Output — The following table describes Redundancy

Multi-Chassis All fields:

Table 38: Show Multi-Chassis Redundancy Output Fields

Label	Description
Peer IP Address	Displays the multi-chassis redundancy peer.
Description	The text string describing the peer.
Authentication	If configured, displays the authentication key used between this node and the MC peer.
Source IP Address	Displays the source address used to communicate with the MC peer.
Admin State	Displays the administrative state of the peer.

Sample Output

B:Dut-B# show redundancy multi-chassis all

Multi-chassis Peer Table

Peer

```
Peer IP Address : 10.10.10.2
Description
Authentication
                : Mc-Lag peer 10.10.10.2
: Disabled
Source IP Address : 0.0.0.0
                 : Enabled
Admin State
______
B: Dut.-B#
B:Dut-B# show lag detail
LAG Details
______
Description: Description For LAG Number 1
______
Lag-id : 1
Adm : up
                               Mode
                   Opr
                               Port Threshold : 0
Thres. Exceeded Cnt : 9
Thres. Last Cleared : 05/20/2006 00:12:35 Threshold Action : down
: 1342177281
                                                : distribute
LACP : enabled Mode : active
LACP Transmit Intvl : fast LACP xmit stdby : enabled
Selection Criteria : highest-count Slave-to-partner : disabled
Number of sub-groups: 1 Forced : -
Prtr System Id : 20:f4:ff:00:00:00 Prtr System Priority : 32768
Prtr Oper Key
              : 32768
MC Peer Lag-id : 1
MC System Id : 00:00:00:33:33:33 MC System Priority : 32888
MC Admin Key : 32666 MC Peer Lag-id : 1
             : 32666 MC Active/Standby : active
MC Lacp ID in use : true
                               MC extended timeout : false
MC Selection Logic : peer decided
MC Config Mismatch : no mismatch
Port-id Adm Act/Stdby Opr Primary Sub-group Forced Prio
______
3/2/1 up active up yes 1 - 3/2/2 up active up 1 - 3/2/3 up active up 1 - 3/2/4 up active up 1 - - 3/2/4 up active up 1 - -
      up active up
up active up
______
Port-id Role Exp Def Dist Col Syn Aggr Timeout Activity
          actor No No Yes Yes Yes Yes
         partner No
                     No
                         Yes
                                    Yes Yes
3/2/1
                               Yes
                                             Yes
                 No No Yes Yes Yes Yes Yes
3/2/2
          actor
         partner No No Yes Yes Yes Yes Yes actor No No Yes Yes Yes Yes Yes
3/2/2
3/2/3
         partner No No Yes Yes Yes Yes
3/2/3
```

					Yes			Yes	Yes
3/2/4	partner =======	No ======	No ======	Yes =====	Yes =====	Yes =====	Yes ======	Yes ======	Yes ======
B:DutB#									

mc-endpoint

Syntax mc-endpoint statistics

mc-endpoint peer [ip-address] statistics mc-endpoint endpoint [mcep-id] statistics

mc-endpoint peer [ip-address]

Context show>redundancy>multi-chassis

Description This command displays multi-chassis endpoint information.

Parameters statistics — Displays the global statistics for the MC endpoint.

peer ip-address — Specifies the IP address of multi-chassis end-point peer.

endpoint *mcep-id* — Specifies the nulti-chassis endpoint.

Values 1 — 4294967295

Sample Output

*A:Dut-B# show redundancy multi-chassis mc-endpoint statistics

Packets Rx
Packets Rx Keepalive
Packets Rx Config
Packets Rx Peer Config
Packets Rx Peer Config
Packets Rx State
Packets Dropped Keep-Alive Task
Packets Dropped Too Short
Packets Dropped Verify Failed
Packets Dropped Tlv Invalid Size
Packets Dropped Out Of Seq
Packets Dropped Unknown Tlv
Packets Dropped Tlv Invalid MC-Endpoint Id
Packets Dropped MD5
Packets Dropped MD5
Packets Dropped MC Endpoint No Peer
Packets Tx
Packets Tx Keepalive
Packets Tx Keepalive
Packets Tx Peer Config
Packets Tx Peer Config

Packets Tx Peer Config : 17872
Packets Tx State : 4
Packets Tx Failed : 0

*A:Dut-B#

^{*}A:Dut-B# show redundancy multi-chassis mc-endpoint peer 3.1.1.3 statistics

```
Multi-Chassis MC-Endpoint Statistics
______
Peer Addr
                    : 3.1.1.3
                    : 597
Packets Rx
Packets Rx Keepalive
Packets Rx Config
Packets Rx Config : 3
Packets Rx Peer Config : 1
Packets Rx State : 7
Packets Dropped State Disabled : 0
Packets Dropped Packets Too Short: 0
Packets Dropped Tlv Invalid Size : 0
Packets Dropped Tlv Invalid LagId: 0
Packets Dropped Out of Seq : 0
Packets Dropped Unknown Tlv
Packets Dropped MD5
Packets Tx
                    : 636
Packets Tx Keepalive
                    : 600
Packets Tx Peer Config
                    : 30
Packets Tx Failed
                    : 0
Packets Dropped No Peer
                    : 0
______
*A:D11+-B#
*A:Dut-B# show redundancy multi-chassis mc-endpoint endpoint 1 statistics
______
Multi-Chassis Endpoint Statistics
______
MC-Endpoint Id 1
______
Packets Rx Config
                    : 3
Packets Rx State
Packets Tx Config
Packets Tx State
                    : 0
Packets Tx Failed
_______
Number of Entries 1
______
```

mc-lag

Syntax mc-lag [lag lag-id]

Context show>redundancy>multi-chassis

Description This command displays multi-chassis LAG information.

Parameters lag lag-id — Shows information for the specified LAG identifier.

Values 1 — 200

peer

Syntax peer ip-address [lag lag-id]

Context show>redundancy>multi-chassis>mc-lag

Description This command enables the context to display mc-lag peer-related redundancy information.

Parameters *ip-address* — Shows peer information about the specified IP address.

lag lag-id — Shows information for the specified LAG identifier.

Values 1 — 200

Output

Show Redundancy Multi-chassis MC-Lag Peer Output — The following table describes show redundancy multi-chassis mc-lag peer output fields:

Table 39: Show Redundancy Multi-chassis MC-Lag Peer Output Fields

Label	Description
Last Changed	Displays date and time of the last mc-lag peer.
Admin State	Displays the administrative state of the mc-lag peer.
Oper State	Displays the operation state of the mc-lag peer.
KeepAlive	Displays the length of time to keep alive the mg-lag peer.
Hold On Ngbr Fail- ure	Specifies how many "keepalive" intervals the standby SR will wait for packets from the active node before assuming a redundant-neighbor node failure.

```
A:subscr mgt# show redundancy multi-chassis mc-lag peer 10.10.10.30
______
Multi-Chassis MC-Lag Peer 10.10.10.30
Last Changed : 01/23/2007 18:20:13
Admin State : Up Oper State : Up
KeepAlive : 10 deci-seconds Hold On Ngbr Failure : 3
Lag Id Lacp Key Remote Lag Id System Id Sys Prio Last Changed
______
         1
                 00:00:00:00:00:02 2
                  00:00:00:00:00:01 1
                                    01/23/2007 18:20:13
         2
                                   01/24/2007 08:53:48
Number of LAGs : 2
______
A:subscr mgt#
A:subscr mgt# show redundancy multi-chassis mc-lag peer 10.10.10.30 lag 1
______
```

statistics

Syntax statistics mc-lag [peer ip-address [lag lag-id]]

Context show>redundancy>multi-chassis>mc-lag

Description This command displays multi-chassis statistics.

Parameters mc-lag — Displays multi-chassis LAG statistics.

peer *ip-address* — Shows the specified address of the multi-chassis peer.

lag lag-id — Shows information for the specified LAG identifier.

Values 1 — 200

Output

Show Redundancy Multi-chassis MC-Lag Peer Statistics Output — The following table describes show redundancy multi-chassis mc-lag peer output fields:

Label	Description
Packets Rx	Indicates the number of MC-Lag packets received from the peer.
Packets Rx Keepalive	Indicates the number of MC-Lag keepalive packets received from the peer.
Packets Rx Config	Indicates the number of received MC-Lag configured packets from the peer.
Packets Rx Peer Config	Indicates the number of received MC-Lag packets configured by the peer.
Packets Rx State	Indicates the number of MC-Lag "lag" state packets received from the peer.
Packets Dropped State Disabled	Indicates the number of packets that were dropped because the peer was administratively disabled.
Packets Dropped Packets Too Short	Indicates the number of packets that were dropped because the packet was too short.
Packets Dropped Tlv Invalid Size	Indicates the number of packets that were dropped because the packet size was invalid.

Label	Description
Packets Dropped Tlv Invalid LagId	Indicates the number of packets that were dropped because the packet referred to an invalid or non multi-chassis lag.
Packets Dropped Out of Seq	Indicates the number of packets that were dropped because the packet size was out of sequence.
Packets Dropped Unknown Tlv	Indicates the number of packets that were dropped because the packet contained an unknown TLV.
Packets Dropped MD5	Indicates the number of packets that were dropped because the packet failed MD5 authentication.
Packets Tx	Indicates the number of packets transmitted from this system to the peer.
Packets Tx Keepalive	Indicates the number of keepalive packets transmitted from this system to the peer.
Packets Tx Peer Config	Indicates the number of configured packets transmitted from this system to the peer.
Packets Tx Failed	Indicates the number of packets that failed to be transmitted from this system to the peer.

```
A:subscr mgt# show redundancy multi-chassis mc-lag statistics
Multi-Chassis Statistics
______
Packets Rx Keepalive : 52535
Packets Rx Keepalive : 52518
Packets Rx Config : 2
Packets Rx Peer Config : 4
Packets Rx State : 6
Packets Rx State : 6
Packets Dropped KeepaliveTask : 0
Packets Dropped Packet Too Short : 0
Packets Dropped Verify Failed : 0
Packets Dropped Tlv Invalid Size : 0
Packets Dropped Out of Seq : 0
Packets Dropped Unknown Tlv : 0
Packets Dropped Tlv Invalid LagId : 0
Packets Dropped MD5 : 0
Packets Dropped Unknown Peer : 0
Packets Tx : 52583
Packets Tx : 52583

Packets Tx Keepalive : 52519

Packets Tx Config : 2

Packets Tx Peer Config : 54

Packets Tx State : 8
Packets Tx State
                                    : 8
                                    : 0
______
A:subscr mgt#
B:Dut-B# show redundancy multi-chassis mc-lag peer 10.10.10.2 statistics
```

mc-ring

Syntax mc-ring peer ip-address statistics

mc-ring peer ip-address [ring sync-tag [detail|statistics]]

mc-ring peer ip-address ring sync-tag ring-node [ring-node-name [detail|statistics]]

mc-ring global-statistics

Context show>redundancy>multi-chassis

Description This command displays multi-chassis ring information.

Parameters *ip-address* — Specifies the address of the multi-chassis peer to display.

ring *sync-tag* — Specifies a synchronization tag to be displayed that was used while synchronizing this port with the multi-chassis peer.

node *ring-node-name* — Specifies a ring-node name.

global-statistics — Displays global statistics for the multi-chassis ring.

detail — Displays detailed peer information for the multi-chassis ring.

Output Show mc-ring peer ip-address ring Output — The following table describes mc-ring peer ip-address ring output fields.

Label	Description
Sync Tag	Displays the synchronization tag that was used while synchronizing this port with the multi-chassis peer.
Oper State	noPeer - The peer has no corresponding ring configured.
	connected — The inband control connection with the peer is operational.

Label Description

broken - The inband control connection with the peer has timed out.

conflict — The inband control connection with the peer has timed out but the physical connection is still OK; the failure of the inband signaling connection is caused by a misconfiguration. For example, a conflict between the configuration of this system and its peer, or a misconfiguration on one of the ring access node systems.

testingRing — The inband control connection with the peer is being set up. Waiting for result.

waitingForPeer — Verifying if this ring is configured on the peer.

configErr — The ring is administratively up, but a configuration error prevents it from operating properly.

halfBroken — The inband control connection indicates that the ring is broken in one direction (towards the peer).

localBroken — The inband control connection with the peer is known to be broken due to local failure or local administrive action.

shutdown - The ring is shutdown.

Failure Rea-

Displays the reason of the failure of the operational state of a MC ring.

son

No. of MC Ring entries Displays the number of MC ring entries.

Sample Output

*A:ALA-48>show>redundancy>multi-chassis# mc-ring peer 10.0.0.2 ring ring11 detail

Multi-Chassis MC-Ring Detailed Information

Peer : 10.0.0.2

Sync Tag : ring11
Port ID : 1/1/3
Admin State : inService
Oper State : connected

Admin Change : 01/07/2008 21:40:07 Oper Change : 01/07/2008 21:40:24

Failure Reason : None

In Band Control Path

Service ID : 10
Interface Name : to_an1
Oper State : connected
Dest IP : 10.10.0.2
Src IP : 10.10.0.1

```
VLAN Map B Path Provisioned
______
range 13-13
range 17-17
VLAN Map Excluded Path Provisioned
VLAN Map B Path Operational
range 17-17
VLAN Map Excluded Path Operational
range 18-18
*A:ALA-48>show>redundancy>multi-chassis#
*A:ALA-48>show>redundancy>multi-chassis# mc-ring peer 192.251.10.104
______
MC Ring entries
Sync Tag
                    Oper State
                            Failure Reason
No. of MC Ring entries: 0
______
*A:ALA-48>show>redundancy>multi-chassis#
*A:ALA-48>show>redundancy>multi-chassis# mc-ring peer 10.0.0.2
MC Ring entries
______
Sync Tag
                    Oper State
                             Failure Reason
ring11
                    connected
                              None
                    shutdown
______
No. of MC Ring entries: 4
______
*A:ALA-48>show>redundancy>multi-chassis#
*A:ALA-48>show>redundancy>multi-chassis# mc-ring peer 10.0.0.2 ring ring11 ring-node
an1 detail
Multi-Chassis MC-Ring Node Detailed Information
______
        : 10.0.0.2
Sync Tag : ring11
Node Name
         : an1
Oper State Loc : connected
Oper State Rem : notTested
In Use : True
Admin Change : 01/07/2008 21:40:07
Oper Change : 01/07/2008 21:40:25
```

Failure Reason : None

Ring Node Connectivity Verification

Admin State : inService Service ID : 11 VLAN Tag : 11

VLAN Tag : 11 : 10.11.3.1 Src IP : None : 1 minutes : None Src MAC

*A:ALA-48>show>redundancy>multi-chassis# mc-ring peer 10.0.0.2 ring ring11 ring-node

MC Ring Node entries

Name Loc Oper St. Failure Reason In Use Rem Oper St.

______ an1 connected

notTested notTested

No. of MC Ring Node entries: 2 ______

Show Redundancy Multi-Chassis Ring Peer Statistics Output — The following table describes multi-chassis ring peer output fields

Message	Displays the message type.
Received	Indicates the number of valid MC-Ring signalling messages received from the peer.
Transmitted	Indicates the number of valid MC-Ring signalling messages transmitted from the peer.
MCS ID Request	Displays the number of valid MCS ID requests were received from the peer.
MCS ID Response	Displays the number of valid MCS ID responses were received from the peer.
Ring Exists Request	Displays the number of valid 'ring exists' requests were received from the peer.
Ring Exists Response	Displays the number of valid ring exists' responses were received from the peer.

^{*}A:ALA-48>show>redundancy>multi-chassis#

^{*}A:ALA-48>show>redundancy>multi-chassis#

Label	Description

Keepalive

Displays the number of valid MC-Ring control packets of type 'keepalive' were received from the peer.

*A:ALA-48>show>redundancy>multi-chassis# mc-ring peer 192.251.10.104 statistics

MC Ring statistics for peer 192.251.10.104

_======================================		
Message	Received	Transmitted
MCS ID Request	0	0
MCS ID Response	0	0
Ring Exists Request	0	0
Ring Exists Response	0	0
Keepalive	0	0
Total	0	0

^{*}A:ALA-48>show>redundancy>multi-chassis#

Show mc-ring ring-node Command Output

Label	Description
Oper State	Displays the state of the connection verification (both local and remote).
	$\verb"notProvisioned" - Connection verification" is not provisioned.$
	configErr — Connection verification is provisioned but a configuration error prevents it from operating properly.
	notTested — Connection verification is administratively disabled or is not possible in the current situation.
	testing — Connection Verification is active, but no results are yet available.
	connected - The ring node is reachable.
	disconnected - Connection verification has timed out.
In Use	Displays "True" if the ring node is referenced on an e-pipe or as an inter-dest-id on a static host or dynamic lease.

Show mc-ring global-statistics Command Output

Label	Description
Rx	Displays the number of MC-ring signalling packets were received by this system.
Rx Too Short	Displays the number of MC-ring signalling packets were received by this system that were too short.
Rx Wrong Authen- tication	Displays the number of MC-ring signalling packets were received by this system with invalid authentication.
Rx Invalid TLV	Displays the number of MC-ring signalling packets were received by this system with invalid TLV.
Rx Incomplete	Displays the number of MC-ring signalling packets were received by this system that were incomplete.
Rx Unknown Type	Displays the number of MC-ring signalling packets were received by this system that were of unknown type.
Rx Unknown Peer	Displays the number of MC-ring signalling packets were received by this system that were related to an unknown peer.
Rx Unknown Ring	Displays the number of MC-ring signalling packets were received by this system that were related to an unknown ring.

Label	Description
Rx Unknown Ring Node	Displays the number of MC-ring signalling packets were received by this system that were related to an unknown ring node.
Tx	Displays the number of MC-ring signalling packets were transmitted by this system.
Tx No Buffer	Displays the number of MC-ring signalling packets could not be transmitted by this system due to a lack of packet buffers.
Tx Transmission Failed	Displays the number of MC-ring signalling packets could not be transmitted by this system due to a transmission failure.
Tx Unknown Des- tination	Displays the number of MC-ring 'unknown destination' signalling packets were transmitted by this system.
Missed Configu- ration Events	Displays the number of missed configuration events on this system.
Missed BFD Events	Displays the number of missed BFD events on this system.
Global MC Ring statist	ics
Rx Rx Too Short Rx Wrong Authentication Rx Invalid TLV Rx Incomplete Rx Unknown Type Rx Unknown Ring Rx Unknown Ring Rx Unknown Ring Node Tx Tx No Buffer Tx Transmission Failed Tx Unknown Destination Missed Configuration E	: 0 : 0 : 0 : 0 : 0 : 0 : 0 : 0 : 0 : 0
*A:ALA-48>show>redunda	

sync

Syntax sync [port port-id | lag-id]

Context show>redundancy>multi-chassis

 $\textbf{Description} \qquad \text{This command displays synchronization information}.$

Parameters

port port-id — Shows the specified port ID of the multi-chassis peer.

lag lag-id — Shows information for the specified LAG identifier.

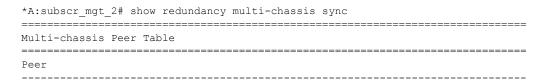
Values 1 — 200

Output

Show Redundancy Multi-chassis Sync Output — The following table describes show redundancy multi-chassis sync output fields:

Table 40: Show Redundancy Multi-chassis Sync Output Fields

Label	Description
Peer IP Address	Displays the multi-chassis redundancy peer.
Description	The text string describing the peer.
Authentication	If configured, displays the authentication key used between this node and the multi-chassis peer.
Source IP Address	Displays the source address used to communicate with the multi-chassis peer.
Admin State	Displays the administrative state of the peer.
Client Applica- tions	Displays the list of client applications synchronized between SRs.
Sync Admin State	Displays the administrative state of the synchronization.
Sync Oper State	Displays the operation state of the synchronization.
DB Sync State	Displays the database state of the synchronization.
Num Entries	Displays the number of entries on local router.
Lcl Deleted Entries	Displays the number of deleted entries made at the local router.
Alarm Entries	Displays the alarm entries on the local router.
Rem Num Entries	Displays the number of entries on the remote router.
Rem Lcl Deleted Entries	Displays the number of locally deleting entries made by the remote router.
Rem Alarm Entries	Displays alarm entries on the remote router.



Peer IP Address : 10.10.10.20
Description : Mc-Lag peer 10.10.10.20
Authentication : Disabled
Source IP Address : 0.0.0.0
Admin State : Enabled

Sync-status

Client Applications : SUBMGMT
Sync Admin State : Up
Sync Oper State : Up
DB Sync State : inSync
Num Entries : 1 Lcl Deleted Entries : 0 Alarm Entries : 0 Rem Num Entries Rem Lcl Deleted Entries : 0

Rem Alarm Entries : 0 ______

A:subscr mgt 2#

peer

peer ip-address Syntax

show>redundancy>multi-chassis>sync Context

Description This command enables the context to display peer-related redundancy information.

Parameters *ip-address* — Shows peer information about the specified IP address.

Output Show Redundancy Multi-chassis Sync Peer Output — The following table describes show redundancy multi-chassis sync output fields:

Table 41: Show Redundancy Multi-chassis Sync Peer Output Fields

Label	Description
Peer IP Address	Displays the multi-chassis redundancy peer.
Description	The text string describing the peer.
Authentication	If configured, displays the authentication key used between this node and the multi-chassis peer.
Source IP Address	Displays the source address used to communicate with the multi-chassis peer.
Admin State	Displays the administrative state of the peer.
Client Applica- tions	Displays the list of client applications synchronized between SRs.
Sync Admin State	Displays the administrative state of the synchronization.
Sync Oper State	Displays the operation state of the synchronization.

Table 41: Show Redundancy Multi-chassis Sync Peer Output Fields (Continued)

Label	Description
DB Sync State	Displays the database state of the synchronization.
Num Entries	Displays the number of entries on local router.
Lcl Deleted Entries	Displays the number of deleted entries made at the local router.
Alarm Entries	Displays the alarm entries on the local router.
Rem Num Entries	Displays the number of entries on the remote router.
Rem Lcl Deleted Entries	Displays the number of locally deleting entries made by the remote router.
Rem Alarm Entries	Displays alarm entries on the remote router.

```
*A:subscr mgt 2# show redundancy multi-chassis sync peer 10.10.10.20
______
Multi-chassis Peer Table
______
Peer IP Address : 10.10.10.20
Description : Mc-Lag peer 10.10.10.20
Authentication : Disabled
                : Disabled
Source IP Address : 0.0.0.0
Admin State
                 : Enabled
Svnc-status
_____
Client Applications : SUBMGMT
Sync Admin State : Up
Sync Oper State : Up
DB Sync State : inSync
Num Entries : 1
Num Entries : 1
Lcl Deleted Entries : 0
Alarm Entries : 0
Rem Num Entries : 1
Rem Lcl Deleted Entries: 0
Rem Alarm Entries : 0
______
MCS Application Stats
______
                : igmp
Rem Num Entries : 0
Rem Lcl Deleted Entries : 0
Rem Alarm Entries : 0
```

Application Num Entries Lcl Deleted Entries Alarm Entries	: 0 : 0
Rem Num Entries Rem Lcl Deleted Entries Rem Alarm Entries	: 0 : 0
Application Num Entries Lcl Deleted Entries Alarm Entries	: 1 : 0 : 0
Rem Num Entries Rem Lcl Deleted Entries Rem Alarm Entries	: 1 : 0
Application Num Entries Lcl Deleted Entries Alarm Entries	: srrp : 0 : 0
Rem Num Entries Rem Lcl Deleted Entries Rem Alarm Entries	: 0 : 0
*A:subscr mgt 2#	

detail

Syntax detail

Context show>redundancy>multi-chassis>peer

Description This command displays detailed peer information.

Output Show Redundancy Multi-chassis Sync Peer Detail Output — The following table describes show redundancy multi-chassis sync detail output fields:

Table 42: Show Redundancy Multi-chassis Sync Peer Detail Output Fields

Label	Description
Peer IP Address	Displays the multi-chassis redundancy peer.
Description	The text string describing the peer.
Authentication	If configured, displays the authentication key used between this node and the multi-chassis peer.

Table 42: Show Redundancy Multi-chassis Sync Peer Detail Output Fields

Label	Description
Source IP Address	Displays the source address used to communicate with the multi-chassis peer.
Admin State	Displays the administrative state of the peer.
Client Applica- tions	Displays the list of client applications synchronized between routers.
Sync Admin State	Displays the administrative state of the synchronization.
Sync Oper State	Displays the operation state of the synchronization.
DB Sync State	Displays the database state of the synchronization.
Num Entries	Displays the number of entries on local router.
Lcl Deleted Entries	Displays the number of deleted entries made at the local router.
Alarm Entries	Displays the alarm entries on the local router.
Rem Num Entries	Displays the number of entries on the remote router.
Rem Lcl Deleted Entries	Displays the number of locally deleting entries made by the remote router.
Rem Alarm Entries	Displays alarm entries on the remote router.

*A:subscr_mgt_2# show redundancy multi-chassis sync peer 10.10.10.20 detail		
Multi-chassis Peer Table		
Peer		
Peer IP Address Description Authentication Source IP Address Admin State	: Mc-Lag peer 10.10.10.20 : Disabled : 0.0.0.0	
Client Applications Sync Admin State Sync Oper State DB Sync State Num Entries Lcl Deleted Entries	: Up : Up : inSync : 1 : 0	

```
Rem Lcl Deleted Entries: 0
Rem Alarm Entries
______
MCS Application Stats
_______
Application : igmp
Num Entries : 0
Lcl Deleted Entries : 0
Alarm Entries : 0
                  -----
Rem Num Entries : 0
Rem Lcl Deleted Entries: 0
Rem Alarm Entries : 0
Application : igmpSnooping
Num Entries : 0
Lcl Deleted Entries : 0
Alarm Entries : 0
Rem Num Entries
Rem Lcl Deleted Entries : 0
Rem Alarm Entries : 0
Application : subMgmt
Num Entries · 1
Num Entries : 1
Lcl Deleted Entries : 0
Alarm Entries : 0
______
Rem Num Entries
Rem Lcl Deleted Entries: 0
Rem Alarm Entries : 0
______
Application
              : srrp
Num Entries
Lcl Deleted Entries : 0
Alarm Entries
               : 0
______
Rem Num Entries
Rem Lcl Deleted Entries : 0
Rem Alarm Entries
              : 0
______
Ports synced on peer 10.10.10.20
Port/Encap
                  Tag
                  test123
______
*A:subscr mgt 2#
```

synchronization

Syntax synchronization

Context show>redundancy

Description This command displays redundancy synchronization times.

```
A:ALA-48>show>redundancy# synchronization
```

Synchronization Information

Standby Status : disabled

Last Standby Failure : N/A

Standby Up Time : N/A

Failover Time : N/A

Failover Reason : N/A

Boot/Config Sync Mode : None

Boot/Config Sync Status : No synchronization

Last Config File Sync Time : Never Last Boot Env Sync Time : Never

A:ALA-48>show>redundancy#

time-range

Syntax time-range name associations [detail]

Context show>cron

Description This command displays information on the configured time ranges.

Output **Time Range Output** — The following table displays system time range output fields:

Table 43: Show System Time-range Output Fields

Label	Description
Associations	Shows the time-range as it is associated with the TOD suites and ACL entries as well as the SAPs using them.
Detail	Shows the details of this time-range.

Sample Output

The following example shows time-range detail output.

```
A:ala# show cron time-range time-range2 detail
______
Cron time-range
______
Name : time-range1
Periodic : Start * * * * End * * * *
Absolute : Start * * * * End * * * *
```

The following example shows output for time-range associations with previously created IP and MAC filters.

A:ala# show cron time-range day associations

Cron time-range associations

Name : day State : Inactive

IP Filter associations

IP filter Id : 10, entry 1010

MAC Filter associations

None

Tod-suite associations

Tod-suite : suite_sixteen, for Ingress Qos Policy "1160"

Tod-suite : suite_sixteen, for Ingress Scheduler Policy "SchedPolCust1_Day"

Tod-suite : suite_sixteen, for Egress Qos Policy "1160"

Tod-suite : suite_sixteen, for Egress Scheduler Policy "SchedPolCust1_Day"

Tod-suite : suite_sixteen, for Egress Scheduler Policy "SchedPolCust1Egress_Day"

uptime

Syntax uptime

Context show

Description This command displays the time since the system started.

Output Uptime Output — The following table describes uptime output fields.

Table 44: System Timing Output Fields

	Label	Description
S	ystem Up Time	Displays the length of time the system has been up in days, hr:min:sec format.

Sample Output

A:ALA-1# show uptime

System Up Time : 11 days, 18:32:02.22 (hr:min:sec)
A:ALA-1#

switch-fabric

Syntax switch-fabric

Context show>system

Description This command displays switch fabric information.

Output

Switch fabric output — The following table describes switch-fabric output fields for 12-slot and 7-slot chassis models:

Table 45: Show System Switch-Fabric Output Fields

Label	Description
Slot/MDA	Displays the fabric slot within a chassis in the system. The CPM cards and IOM cards cannot be physically inserted into the switch fabric card slots.
Min. Forwarding Capacity	Displays the minimum forwarding capacity of the slot and MDA as a percentage.
Max. Forwarding Capacity	Displays the maximum forwarding capacity of the slot and MDA as a percentage.

|--|

Slot/Mda	=	Capacity Max. Forwarding Capacity
 1/1	100%	100%
1/2	100%	100%
2/1	100%	100%
2/2	100%	100%
3/1	100%	100%
3/2	100%	100%
4/1	100%	100%
4/2	100%	100%
5/1	100%	100%
5/2	100%	100%
A	100%	100%
В	100%	100%

		- 2		
- 1. 1	_ , ,			

Switch Fabric					
Slot/Mda			Capacity	Max.	Forwarding Capacity
1/1	100%				100%
1/2	100%				100%
2/1	100%				100%
2/2	100%				100%
3/1	100%				100%
3/2	100%				100%
4/1	100%				100%
4/2	100%				100%
5/1	100%				100%

5/2	100%	100%	
6/1	100%	100%	
6/2	100%	100%	
7/1	100%	100%	
7/2	100%	100%	
8/1	100%	100%	
8/2	100%	100%	
A	100%	100%	
В	100%	100%	

A:ALA-12

sync-if-timing

Syntax sync-if-timing

Context show>system

Description This command displays synchronous interface timing operational information.

Output System Timing Output — The following table describes system interface timing output fields.

Label	Description
System Status CPM A	Indicates the present status of the synchronous timing equipment subsystem (SETS). not-present master-freerun master-holdover master-locked slave acquiring
Reference Input Mode	Revertive — Indicates that for a re-validated or a newly validated reference source which has a higher priority than the currently selected reference has reverted to the new reference source.
	Non-revertive — The clock cannot revert to a higher priority clock if the current clock goes offline.
Reference Selected	Indicates which reference has been selected. This can be ref1, ref2, BITS A, BITS B or Mate CPM. When the reference is from the Mate CPM, the display also indicates the reference being used by the Mate CPM.
Current Frequency Offset	(value) — The frequency offset of the currently selected timing reference in parts per million.
Reference Order	${\tt ref1}$, ${\tt ref2}$ bits — Indicates that the priority order of the timing references.

Label	Description (Continued)
Reference Mate CPM	Data within this block represents the status of the timing reference provided by the Mate CPM. This will be the BITS input from the standby CPM.
Admin Status	down - The ref1 or ref2 configuration is administratively shutdown
	up - The ref1 or ref2 configuration is administratively enabled.
	diag — Indicates the reference has been forced using the force-reference command.
In Use	Selected — Indicates whether the first/second timing reference being used by the synchronous timing subsystem. If it is in use, the frequency offset is indicated.
	Not Selected — The first/second timing reference is not being used by the synchronous timing subsystem.
Qualified for Use	Indicates whether the reference has been qualified to be used as a source of timing for the node.
Not Qualified Due To	Indicates the reason why the reference has not been qualified: - disabled - LOS - OOPIR - OOF
Selected for Use	Indicates whether the method is presently selected.
Not Selected Due To	Indicates the reason why the method is not selected.: - disabled - not qualified - previous failure - LOF - AIS-L - validating
Interface Type	The interface type configured for the BITS port.
Framing	The framing configured for the BITS port.
Line Coding	The line coding configured for the BITS port.
0	

```
Current Frequency Offset (ppm) : +0
Reference Order
                                  : bits ref1 ref2
Reference Mate CPM
    Qualified For Use : Yes
Selected For Use : No
      lected For Use : No
Not Selected Due To : on standby
Reference Input 1
   Admin Status : up
Qualified For Use : Yes
Selected For Use : Yes
   Admin Status
                                  : 2/1/1
   Source Port
Reference Input 2
   Admin Status : down
Qualified For Use : No
Not Qualified Due To :
Selected For Use : No
Not Selected Due To :
Source Port : None
   Admin Status
                                         disabled
                                         disabled
                                  : None
Reference BITS A
   Admin Status : down
Qualified For Use : No
Not Qualified Due To : disabled
Selected For Use : No
   Admin Status
   Not Qualified Duc 1

Selected For Use : No
Not Selected Due To : disabled : DS1
                                 : ESF
   Framing
   Line Coding
                                  : B8ZS
______
*A:SR7#
A:SR7# show system sync-if-timing standby
______
System Interface Timing Operational Info
______
System Status CPM B
                                  : Master Locked
   Reference Input Mode : Non-revertive
Reference Selected : Mate CPM (ref1)
    Current Frequency Offset (ppm) : +0
Reference Order
                                   : bits ref1 ref2
Reference Mate CPM
                               : Yes
   Qualified For Use
   Selected For Use
                                  : Yes
Reference Input 1
   Admin Status : up
Qualified For Use : Yes
Selected For Use : No
Not Selected Due To : on standby
Source Port : 2/1/1
   Admin Status
   Source Port
Reference Input 2
```

Admin Status : down
Qualified For Use : No
Not Qualified Due To : disabled
Selected For Use : No
Not Selected Due To : disabled
Source Port : None

Reference BITS B

Qualified For Use : No
Not Qualified Due To : disabled
Selected For Use : No
Not Selected Due To : disabled
Interface Type : DS1
Framing

Framing : ESF Line Coding : B8ZS

chassis

chassis [environment] [power-supply] **Syntax**

Context show

Description This command displays general chassis status information.

Parameters environment — Displays chassis environmental status information.

> **Default** Display all chassis information.

power-supply — Displays chassis power supply status information.

Default Display all chassis information.

Output **Chassis Output** — The following table describes chassis output fields.

Label	Description
Name	The system name for the router.
Туре	The router series model number.
Location	The system location for the device.
Coordinates	A user-configurable string that indicates the Global Positioning System (GPS) coordinates for the location of the chassis. For example: N 45 58 23, W 34 56 12 N37 37' 00 latitude, W122 22' 00 longitude N36*39.246' W121*40.121'
CLLI Code	The Common Language Location Identifier (CLLI) that uniquely identifies the geographic location of places and certain functional categories of equipment unique to the telecommunications industry.

^{*}A:SR7#

Label	Description (Continued)
Number of slots	The number of slots in this chassis that are available for plug-in cards. The total number includes the IOM slots and the CPM slots.
Number of ports	The total number of ports currently installed in this chassis. This count does not include the Ethernet ports on the CPMs that are used for management access.
Critical LED state	The current state of the Critical LED in this chassis.
Major LED state	The current state of the Major LED in this chassis.
Minor LED state	The current state of the Minor LED in this chassis.
Base MAC address	The base chassis Ethernet MAC address.
Part number	The SF/CPM part number.
CLEI code	The code used to identify the router.
Serial number	The SF/CPM part number. Not user modifiable.
Manufacture date	The chassis manufacture date. Not user modifiable.
Manufacturing string	Factory-inputted manufacturing text string. Not user modifiable.
Time of last boot	The date and time the most recent boot occurred.
Current alarm state	Displays the alarm conditions for the specific board.
Number of fan trays	The total number of fan trays installed in this chassis.
Number of fans	The total number of fans installed in this chassis.
Operational sta- tus	Current status of the fan tray.
Fan speed	Half speed - The fans are operating at half speed.
	Full speed $-$ The fans are operating at full speed.
Number of power supplies	The number of power supplies installed in the chassis.
Power supply number	The ID for each power supply installed in the chassis.
AC power	Within range $-$ AC voltage is within range.
	Out of range - AC voltage is out of range.

Label	Description (Continued)
DC power	Within range — DC voltage is within range.
	Out of range - DC voltage is out of range.
Over temp	Within range — The current temperature is within the acceptable range.
	Out of range — The current temperature is above the acceptable range.
Status	Up/Present - The specified power supply is up.
	Down - The specified power supply is down.

```
B:Dut-D# show chassis
______
Chassis Information
_____
    Name : Dut-D
Type : 7750 SR-7
Location :
    Coordinates
   CLLI code :

Number of slots : 7

Number of ports : 19

Critical LED state : Off

Major LED state : Off

Minor LED state : Off

Base MAC address : 00:03:fa:14:cf:a7

Admin chassis mode : a

Oper chassis mode : a
    CLLI code
Hardware Data
   rdware Data
Part number : 3HE00186AAAA01
CLEI code :
Serial number : NS042450133
Manufacture date : 06172004
Manufacturing string :
Manufacturing deviations :
Time of last boot : 2006/06/16 09:37:51
Current alarm state : alarm cleared
Environment Information
                                        : 2
    Number of fan trays
     Number of fans
                                           : 4
     Fan tray number
     Status
                                            : up
                                            : half speed
     Speed
    Fan tray number : 2
     Status
                                           : up
     Speed
                                           : half speed
```

```
Power Supply Information
  Number of power supplies : 2
  Power supply number : 1
  Defaulted power supply type : none
                : not equipped
   Status
  Power supply number : 2
  Defaulted power supply type : dc
                         : up
B:Dut-D#
ALA-4# show chassis environment
Chassis Information
______
Environment Information
  Number of fan trays : 1
Number of fans : 2
  Fan tray number
                         : 1
  Status
                        : up
  Speed
                         : half speed
```

synchronization

Syntax synchronization

Context show>redundancy>synchronization

Description This command displays redundancy synchronization times.

Output Synchronization Output — The following table describes redundancy synchronization output fields.

Table 46: Show Synchronization Output Fields

Label	Description
Standby Status	Displays the status of the standby CPM.
Last Standby Failure	Displays the timestamp of the last standby failure.
Standby Up Time	Displays the length of time the standby CPM has been up.
Failover Time	Displays the timestamp when the last redundancy failover occurred causing a switchover from active to standby CPM. If there is no redundant CPM card in this system or no failover has occurred since the system last booted, the value will be 0.

Table 46: Show Synchronization Output Fields (Continued)

Label	Description
Failover Reason	Displays a text string giving an explanation of the cause of the last redundancy failover. If no failover has occurred, an empty string displays.
Boot/Config Sync Mode	Displays the type of synchronization operation to perform between the primary and secondary CPMs after a change has been made to the configuration files or the boot environment information contained in the boot options file (BOF).
Boot/Config Sync Status	Displays the results of the last synchronization operation between the primary and secondary CPMs.
Last Config File Sync Time	Displays the timestamp of the last successful synchronization of the configuration files.
Last Boot Env Sync Time	Displays the timestamp of the last successful synchronization of the boot environment files.

A:ALA-1>show>redundancy# synchronization

Synchronization Information

Standby Status : disabled

Last Standby Failure : N/A

Standby Up Time : N/A

Failover Time : N/A

Failover Reason : N/A

Boot/Config Sync Mode : None

Boot/Config Sync Status : No synchronization

Last Config File Sync Time : Never Last Boot Env Sync Time : Never

A:ALA-1>show>redundancy#

Debug Commands

sync-if-timing

Syntax sync-if-timing

Context debug

Description The context to debug synchronous interface timing references.

force-reference

Syntax force-reference {ref1 | ref2 | bits }

no force-reference

Context debug>sync-if-timing

Description This command allows an operator to force the system synchronous timing output to use a specific ref-

erence.

NOTE: This command should be used for testing and debugging purposes only. Once the system timing reference input has been forced, it will not revert back to another reference at anytime. The state

of this command is not persistent between system boots.

When the **debug force-reference** command is executed, the current system synchronous timing output is immediately referenced from the specified reference input. If the specified input is not available (shutdown), or in a disqualified state, the timing output will enter the holdover state based on the pre-

vious input reference.

Parameters ref1 — The clock will use the first timing reference.

ref2 — The clock will use the second timing reference.

bits — The clock will use the external network interface on the active CPM to be the highest priority

input.

system

Syntax [no] system

Context debug

Description This command displays system debug information.

http-connections

Syntax http-connections [host-ip-address/mask]

http-connections

Context debug>system

Description This command displays HTTP connections debug information.

Parameters host-ip-address/mask — Displays information for the specified host IP address and mask.

ntp

Syntax [no] router router-name interface ip-int-name

Context debug>system

Description This command enables and configures debugging for NTP.

The **no** form of the command disables debugging for NTP.

Parameters router-name — Base, management

Default Base

ip-int-name — maximum 32 characters; must begin with a letter. If the string contains special characters (#, \$, spaces, etc.), the entire string must be enclosed within double quotes.

persistence

Syntax [no] persistence

Context debug>system

Description This command displays persistence debug information.

Tools Commands

redundancy

Syntax redundancy

Context tools>dump

Description This command enables the context to dump redundancy parameters.

multi-chassis

Syntax multi-chassis

Context tools>dump>redundancy

Description This command enables the context to dump multi-chassis parameters.

mc-endpoint

Syntax mc-endpoint peer ip-address

Context tools>dump>redundancy>multi-chassis

Description This command dumps multi-chassis endpoint information.

Parameters peer *ip-address* — Specifies the peer's IP address.

Sample Output

```
*A:Dut-B# tools dump redundancy multi-chassis mc-endpoint peer 3.1.1.3

MC Endpoint Peer Info

peer addr
peer name
peer name
peer name refs
surce addr conf
source addr
pum of mcep
num of non-mcep
own sess num
state
tlv own mc admin state
tlv peer mc admin state
tlv peer mc admin state
tlv peer mc admin state
verachable

own sys priority

own sys id
peer sys priority

1 3.1.1.3

2 1.1.2

1 2

2 1.1.2

1 2

2 1.1.2

1 3

2 1.1.3

2 1.1.3

2 1.1.3

2 1.1.3

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2 1.1.1.3

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2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2

2 1.1.1.2
```

```
master : 00:03:fa:c6:31:f8
master : No

conf boot timer : 300
boot timer active : No
conf ka intv : 10
conf hold on num of fail : 3
tlv own ka intv : 10
tlv peer ka intv : 10
ka timeout tmr active : Yes
ka timeout tmr time left : 4
peer ka intv : 10
mc peer timed out : No

initial peer conf rx : Yes
peer-mc disabled : No
initial peer conf sync : Yes
peer conf sync : Yes
own passive mode : Disable
peer passive mode : No

retransmit pending : No
retransmit intvl : 5
last tx time : 1437130
last rx time : 1437156

own bfd
peer bfd
bfd vrtr if : 2
bfd handle : 1
bfd state : 3
bfd code : 0
```

*A:Dut-B#

mc-ring

Syntax mc-ring

mc-ring peer ip-address [ring sync-tag]

Context tools>dump>redundancy>multi-chassis

Description This command dumpsmulti-chassis ring information.

peer *ip-address* — Specifies the peer's IP address.

ring sync-tag — Specifies the ring's sync-tag created in the config>redundancy>mc>peer>mcr> ring context.

sync-database

Syntax sync-database [peer ip-address] [port port-id | lag-id] [sync-tag sync-tag] [application

application] [detail] [type type]

Context tools>dump>redundancy>multi-chassis

Description This command dumps MCS database information.

peer ip-address — Specifies the peer's IP address.

port port-id | lag-id — Indicates the port or LAG ID to be synchronized with the multi-chassis peer.

Values slot/mda/port or lag-lag-id

sync-tag sync-tag — Specifies a synchronization tag to be used while synchronizing this port with the multi-chassis peer.

application application — Specifies a particular multi-chassis peer synchronization protocol application.

Values dhcp-server: local dhcp server

> igmp: Internet group management protocol

igmp-snooping: igmp-snooping multi-chassis ring mc-ring:

mld-snooping: multicast listener discovery-snooping simple router redundancy protocol srrp:

sub-host-trk: subscriber host tracking sub-mgmt: subscriber management

type type — Indicates the locally deleted or alarmed deleted entries in the MCS database per multichassis peer.

Values alarm-deleted, local-deleted

detail — Displays detailed information.

srrp-sync-data

Syntax srrp-sync-database [instance instance-id] [peer ip-address]

Context tools>dump>redundancy>multi-chassis

Description This command dumps SRRP database information.

peer *ip-address* — Specifies the peer's IP address.

instance instance-id — Dumps information for the specified Subscriber Router Redundancy Protocol

instance configured on this system.

Values 1 — 4294967295

Clear Commands

application-assurance

Syntax application-assurance

Context clear

Description This command clears application assurance commands.

group

Syntax group isa-aa-group-id statistics

group isa-aa-group-id status

Context clear>app-assure

Description This command clears application assurance group data.

Parameters isa-aa-group-id — Specifies the ISA-AA group index.

Values 1

status — Specifies that application assurance system statistics are cleared.

statistics — Specifies that application assurance statistics are cleared.

cron

Syntax cron action completed [action-name] [owner action-owner]

Context clear

Description This command clears completed CRON action run history entries.

Parameters *action-name* — Specifies the action name.

Values maximum 32 characters

owner *action-owner* — Specifies the owner name.

Default TiMOS CLI

redundancy

Syntax redundancy

Context clear

Description This command enables the context to clear redundancy parameters.

multi-chassis

Syntax multi-chassis

Context clear>redundancy

Description This command enables the context to clear multi-chassis parameters.

mc-endpoint

Syntax mc-endpoint endpoint [mcep-id] statistics

mc-endpoint statistics

mc-endpoint peer [ip-address] statistics

Context clear>redundancy>multi-chassis

Description This command clears multi-chassis endpoint statistics.

endpoint *mcep-id* — Clears information for the specified multi-chassis endpoint ID.

Values 1 — 4294967295

peer *ip-address* — Clears information for the specified peer IP address.

statistics — Clears statistics for this multi-chassis endpoint.

mc-lag

Syntax mc-lag [peer ip-address [lag lag-id]]

Context clear>redundancy>multi-chassis

Description This command clears multi-chassis Link Aggregation Group (LAG) information.

Parameters peer *ip-address* — Clears the specified address of the multi-chassis peer.

lag lag-id — Clears the specified LAG on this system.

Values 1 — 100

mc-ring

Syntax mc-ring

Context clear>redundancy>multi-chassis

Description This command clears multi-chassis ring data.

debounce

Syntax debounce peer ip-address ring sync-tag

Context clear>redundancy>multi-chassis

Description This command clears multi-chassis ring operational state debounce history.

Parameters *ip-address* — Clears debounce historyf or the specified IP address.

ring sync-tag — Clears debounce history for the specified sync tag.

ring-nodes

Syntax ring-nodes peer ip-address ring sync-tag

Context clear>redundancy>multi-chassis>mcr

Description This command clears multi-chassis ring unreferenced ring nodes.

Parameters *ip-address* — Clears ring statistics for the specified IP address.

ring sync-tag — Clears ring statistics for the specified sync tag.

statistics

Syntax statistics

Context clear>redundancy>multi-chassis>mcr

Description This command clears multi-chassis ring

global

Syntax global

Context clear>redundancy>multi-chassis>mcr>statistics

Description This command clears multi-chassis ring global statistics.

peer

Syntax peer ip-address

Context clear>redundancy>multi-chassis>mcr>statistics

Description This command clears multi-chassis ring peer statistics.

Parameters *ip-address* — Clears ring peer statistics for the specified IP address.

ring

Syntax ring peer ip-address ring sync-tag

Context clear>redundancy>multi-chassis>mcr>statistics

Description This command clears multi-chassis ring statistics.

Parameters *ip-address* — Clears ring statistics for the specified IP address.

ring sync-tag — Clears ring statistics for the specified sync tag.

ring-node

Syntax ring-node peer ip-address ring sync-tag node ring-node-name

Context clear>redundancy>multi-chassis>mcr>statistics

Description This command clears multi-chassis ring statistics.

Parameters peer *ip-address* — Clears ring-node peer statistics for the specified IP address.

ring sync-tag — Clears ring-node peer statistics for the specified sync-tag.

node ring-node-name — Clears ring-node peer statistics for the specified ring node name.

sync-database

Syntax sync-database peer ip-address all application application

sync-database peer ip-address { port port-id | lag-id | sync-tag sync-tag } application

application

sync-database peer ip-address port port-id | lag-id sync-tag sync-tag application

application

Context clear>redundancy>multi-chassis

Description This command clears multi-chassis sync database information.

Parameters peer *ip-address* — Clears the specified address of the multi-chassis peer.

port port-id — Clears the specified port ID of the multi-chassis peer.

port lag-id — Clears the specified Link Aggregation Group (LAG) on this system.

all — Clears all ports and/or sync tags.

sync-tag *sync-tag* — Clears the synchronization tag used while synchronizing this port with the multi-chassis peer.

application — Clears the specified application information that was synchronized with the multichassis peer.

Values all: All supported applications

dhcp-server: local dhcp server

igmp: internet group management protocol

igmp-snooping: igmp-snooping mc-ring: multi-chassis ring

mld-snooping: multicast listener discovery-snooping srrp: simple router redundancy protocol

sub-host-trk subscriber host tracking sub-mgmt: subscriber management

screen

Syntax screen

Context clear

Description This command allows an operator to clear the Telnet or console screen.

system

Syntax system sync-if-timing {ref1 | ref2 | bits}

Context clear

Description This command allows an operator to individually clear (re-enable) a previously failed reference. As

long as the reference is one of the valid options, this command is always executed. An inherent behavior enables the revertive mode which causes a re-evaluation of all available references.

trace

Syntax trace log

Context clear

Description This command allows an operator to clear the trace log.

Standards and Protocol Support

Standards Compliance

IEEE 802.1ab-REV/D3 Station and Media Access Control Connectivity Discovery

IEEE 802.1d Bridging

IEEE 802.1p/Q VLAN Tagging

IEEE 802.1s Multiple Spanning Tree

IEEE 802.1w Rapid Spanning Tree Protocol

IEEE 802.1x Port Based Network Access Control

IEEE 802.1ad Provider Bridges

IEEE 802.1ah Provider Backbone Bridges

IEEE 802.1ag Service Layer OAM

IEEE 802.3ah Ethernet in the First Mile

IEEE 802.1ak Multiple MAC Registration Protocol

IEEE 802.3 10BaseT

IEEE 802.3ad Link Aggregation

IEEE 802.3ae 10Gbps Ethernet

IEEE 802.3ah Ethernet OAM

IEEE 802.3u 100BaseTX

IEEE 802.3x Flow Control

IEEE 802.3z 1000BaseSX/LX

ITU-T Y.1731 OAM functions and mechanisms for Ethernet based networks

ITU-T G.8031 Ethernet linear protection switching

Protocol Support

OSPF

RFC 1765 OSPF Database Overflow

RFC 2328 OSPF Version 2

RFC 2370 Opaque LSA Support

RFC 2740 OSPF for IPv6 (OSPFv3) draft-ietf-ospf-ospfv3-update-14.txt

RFC 3101 OSPF NSSA Option

RFC 3137 OSPF Stub Router Advertisement

RFC 3623 Graceful OSPF Restart — GR helper

RFC 3630 Traffic Engineering (TE) Extensions to OSPF Version 2

RFC 4203 for Shared Risk Link Group (SRLG) sub-TLV

BGP

RFC 1397 BGP Default Route Advertisement

RFC 1772 Application of BGP in the Internet

RFC 1965 Confederations for BGP

RFC 1997 BGP Communities Attribute

RFC 2385 Protection of BGP Sessions via MD5

RFC 2439 BGP Route Flap Dampening

RFC 2547bis BGP/MPLS VPNs

RFC 2918 Route Refresh Capability for BGP-4

RFC 3107 Carrying Label Information in BGP-4

RFC 3392 Capabilities Advertisement with BGP4

RFC 4271 BGP-4 (previously RFC 1771)

RFC 4360 BGP Extended Communities
Attribute

RFC 4364 BGP/MPLS IP Virtual Private Networks (VPNs) (previously RFC 2547bis BGP/MPLS VPNs)

RFC 4456 BGP Route Reflection: Alternative to Full-mesh IBGP (previously RFC 1966 & 2796)

RFC 4724 Graceful Restart Mechanism for BGP — GR helper

RFC 4760 Multi-protocol Extensions for BGP

RFC 4893 BGP Support for Four-octet AS Number Space

RFC 5065 Confederations for BGP (obsoletes 3065)

IS-IS

RFC 1142 OSI IS-IS Intra-domain Routing Protocol (ISO 10589)

RFC 1195 Use of OSI IS-IS for routing in TCP/IP & dual environments

RFC 2763 Dynamic Hostname Exchange for IS-IS

RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS

RFC 2973 IS-IS Mesh Groups

RFC 3373 Three-Way Handshake for Intermediate System to Intermediate System (IS-IS) Point-to-Point Adjacencies

RFC 3567 Intermediate System to Intermediate System (ISIS) Cryptographic Authentication

RFC 3719 Recommendations for Interoperable Networks using IS-IS

RFC 3784 Intermediate System to Intermediate System (IS-IS) Extensions for Traffic Engineering (TE)

RFC 3787 Recommendations for Interoperable IP Networks

RFC 3847 Restart Signaling for IS-IS — GR helper

RFC 4205 for Shared Risk Link Group (SRLG) TLV

draft-ietf-isis-igp-p2p-over-lan-05.txt

LDP

RFC 3036 LDP Specification

RFC 3037 LDP Applicability

RFC 3478 Graceful Restart Mechanism for LDP — GR helper

RFC 5283 LDP extension for Inter-Area LSP

draft-jork-ldp-igp-sync-03

IPSec

RFC 2401 Security Architecture for the Internet Protocol

RFC 2409 The Internet Key Exchange (IKE)

RFC 3706 IKE Dead Peer Detection

RFC 3947 Negotiation of NAT-Traversal in the IKE

RFC 3948 UDP Encapsulation of IPsec ESP Packets

Standards and Protocols

- draft-ietf-ipsec-isakmp-xauth-06.txt Extended Authentication within ISAKMP/Oakley (XAUTH)
- draft-ietf-ipsec-isakmp-modecfg-05.txt
 The ISAKMP Configuration
 Method

IPv6

- RFC 1981 Path MTU Discovery for IPv6 RFC 2375 IPv6 Multicast Address Assignments
- RFC 2460 Internet Protocol, Version 6 (IPv6) Specification
- RFC 2461 Neighbor Discovery for IPv6
- RFC 2462 IPv6 Stateless Address Auto configuration
- RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 Specification
- RFC 2464 Transmission of IPv6 Packets over Ethernet Networks
- RFC 2529 Transmission of IPv6 over IPv4 Domains without Explicit Tunnels
- RFC 2545 Use of BGP-4 Multiprotocol Extension for IPv6 Inter-Domain Routing
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2740 OSPF for IPv6
- RFC 3306 Unicast-Prefix-based IPv6 Multicast Addresses
- RFC 3315 Dynamic Host Configuration Protocol for IPv6
- RFC 3587 IPv6 Global Unicast Address Format
- RFC3590 Source Address Selection for the Multicast Listener Discovery (MLD) Protocol
- RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6
- RFC 4007 IPv6 Scoped Address Architecture
- RFC 4193 Unique Local IPv6 Unicast Addresses
- RFC 4291 IPv6 Addressing Architecture
- RFC 4552 Authentication/Confidentiality for OSPFv3
- RFC 4659 BGP-MPLS IP Virtual Private Network (VPN) Extension for IPv6 VPN
- RFC 5072 IP Version 6 over PPP

- RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
- draft-ietf-isis-ipv6-05
- draft-ietf-isis-wg-multi-topology-xx.txt

Multicast

- RFC 1112 Host Extensions for IP Multicasting (Snooping)
- RFC 2236 Internet Group Management Protocol, (Snooping)
- RFC 3376 Internet Group Management Protocol, Version 3 (Snooping)
- RFC 2362 Protocol Independent Multicast-Sparse Mode (PIMSM)
- RFC 3618 Multicast Source Discovery Protocol (MSDP)
- RFC 3446 Anycast Rendevous Point (RP) mechanism using Protocol Independent Multicast (PIM) and Multicast Source Discovery Protocol (MSDP)
- RFC 4601 Protocol Independent Multicast - Sparse Mode (PIM-SM): Protocol Specification (Revised)
- RFC 4604 Using IGMPv3 and MLDv2 for Source-Specific Multicast
- RFC 4607 Source-Specific Multicast for IP
- RFC 4608 Source-Specific Protocol Independent Multicast in 232/8
- RFC 4610 Anycast-RP Using Protocol Independent Multicast (PIM)
- draft-ietf-pim-sm-bsr-06.txt
- draft-rosen-vpn-mcast-08.txt
- draft-ietf-mboned-msdp-mib-01.txt
- draft-ietf-l3vpn-2547bis-mcast-07: Multicast in MPLS/BGP IP VPNs
- draft-ietf-l3vpn-2547bis-mcast-bgp-05: BGP Encodings and Procedures for Multicast in MPLS/BGP IP VPNs
- RFC 3956: Embedding the Rendezvous Point (RP) Address in an IPv6 Multicast Address

MPLS

- RFC 3031 MPLS Architecture
- RFC 3032 MPLS Label Stack
- Encoding (REV3443))
- RFC 4379 Detecting Multi-Protocol Label Switched (MPLS) Data Plane Failures
- RFC 4182 Removing a Restriction on the use of MPLS Explicit NULL

RFC 5332 MPLS Multicast Encapsulations

RIP

RFC 1058 RIP Version 1 RFC 2082 RIP-2 MD5 Authentication RFC 2453 RIP Version 2

RSVP-TE

- RFC 2430 A Provider Architecture DiffServ & TE
- RFC 2702 Requirements for Traffic Engineering over MPLS
- RFC2747 RSVP Cryptographic Authentication
- RFC3097 RSVP Cryptographic Authentication
- RFC 3209 Extensions to RSVP for Tunnels
- RFC 3564 Requirements for Diff-Servaware TE
- RFC 4090 Fast reroute Extensions to RSVP-TE for LSP Tunnels
- RFC 4124 Protocol Extensions for Support of Diffserv-aware MPLS Traffic Engineering
- RFC 4125 Maximum Allocation Bandwidth Constraints Model for Diffserv-aware MPLS Traffic Engineering
- RFC 4875 Extensions to Resource Reservation Protocol - Traffic Engineering (RSVP-TE) for Pointto-Multipoint TE Label Switched Paths (LSPs)
- draft-ietf-mpls-soft-preemption-14 MPLS Traffic Engineering Soft Preemption
- draft-ietf-ccamp-mpls-gracefulshutdown-06 Graceful Shutdown in GMPLS Traffic Engineering Networks
- draft-ietf-mpls-p2mp-lsp-ping-06 Graceful Shutdown in GMPLS Traffic Engineering Networks

DIFFERENTIATED SERVICES

- RFC 2474 Definition of the DS Field the IPv4 and IPv6 Headers (Rev)
- RFC 2597 Assured Forwarding PHB Group (rev3260)
- RFC 2598 An Expedited Forwarding PHB

RFC 3140 Per-Hop Behavior Identification Codes

TCP/IP

RFC 768 UDP

RFC 1350 The TFTP Protocol (Rev.

RFC 791 IP

RFC 792 ICMP

RFC 793 TCP

RFC 826 ARP

RFC 854 Telnet

RFC 951 BootP (rev)

RFC 1519 CIDR

RFC 1542 Clarifications and Extensions for the Bootstrap Protocol

RFC 1812 Requirements for IPv4 Routers

RFC 2347 TFTP option Extension

RFC 2328 TFTP Blocksize Option

RFC 2349 TFTP Timeout Interval and Transfer

Size option

RFC 2401 Security Architecture for Internet Protocol

draft-ietf-bfd-mib-00.txtBidirectional Forwarding Detection Management Information Base

draft-ietf-bfd-base-05.txt Bidirectional Forwarding Detection

draft-ietf-bfd-v4v6-1hop-06.txt BFD IPv4 and IPv6 (Single Hop)

draft-ietf-bfd-multihop-06.txt BFD for Multihop Paths

VRRP

RFC 2787 Definitions of Managed Objects for the Virtual Router Redundancy Protocol

RFC 3768 Virtual Router Redundancy Protocol

draft-ietf-vrrp-unified-spec-02: Virtual Router Redundancy Protocol Version 3 for IPv4 and IPv6

PPP

RFC 1332 PPP IPCP

RFC 1377 PPP OSINLCP

RFC 1638/2878PPP BCP

RFC 1661 PPP (rev RFC2151)

RFC 1662 PPP in HDLC-like Framing

RFC 1877 PPP Internet Protocol Control Protocol Extensions for Name Server Addresses RFC 1989 PPP Link Quality Monitoring RFC 1990 The PPP Multilink Protocol (MP)

RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)

RFC 2516 A Method for Transmitting PPP Over EthernetRFC 2615 PPP over SONET/SDH

RFC 2686 The Multi-Class Extension to Multi-Link PPP

Frame Relay

FRF.1.2 - PVC User-to-Network Interface (UNI) Implementation Agreement

FRF.5 - Frame Relay/ATM PVC Network Interworking Implementation

ANSI T1.617 Annex D, DSS1 — Signalling Specification For Frame Relay Bearer Service.

FRF2.2 -PVC Network-to- Network Interface (NNI) Implementation Agreement.

FRF.12 Frame Relay Fragmentation Implementation Agreement

FRF.16.1 Multilink Frame Relay UNI/ NNI Implementation Agreement

ITU-T Q.933 Annex A-Additional procedures for Permanent Virtual Connection (PVC) status management

ATM

RFC 1626 Default IP MTU for use over ATM AAL5

RFC 2514 Definitions of Textual Conventions and OBJECT_IDENTITIES for ATM Management

RFC 2515 Definition of Managed Objects for ATM Management RFC 2684 Multiprotocol Encapsulation over ATM Adaptation Layer 5

AF-TM-0121.000 Traffic Management Specification Version 4.1

ITU-T Recommendation I.610 - B-ISDN Operation and Maintenance Principles and Functions version 11/ 95

ITU-T Recommendation I.432.1 — BISDN user-network interface — Physical layer specification: General characteristics GR-1248-CORE - Generic Requirements for Operations of ATM Network Elements (NEs). Issue 3

GR-1113-CORE - Bellcore, Asynchronous Transfer Mode (ATM) and ATM Adaptation Layer (AAL) Protocols Generic Requirements, Issue 1

AF-ILMI-0065.000 Integrated Local Management Interface (ILMI) Version 4.0

AF-TM-0150.00 Addendum to Traffic Management v4.1 optional minimum desired cell rate indication for UBR

AF-PHY-0086.001, Inverse Multiplexing for ATM (IMA) Specification Version 1.1

DHCP

RFC 2131 Dynamic Host Configuration Protocol (REV)

RFC 3046 DHCP Relay Agent Information Option (Option 82)

RFC 1534 Interoperation between DHCP and BOOTP

VPLS

RFC 4762 Virtual Private LAN Services Using LDP

draft-ietf-l2vpn-vpls-mcast-reqts-04 draft-ietf-l2vpn-signaling-08

PSEUDO-WIRE

RFC 3985 Pseudo Wire Emulation Edgeto-Edge (PWE3)

RFC 4385 Pseudo Wire Emulation Edgeto-Edge (PWE3) Control Word for Use over an MPLS PSN

RFC 3916 Requirements for Pseudo-Wire Emulation Edge-to-Edge (PWE3)

RFC 4717 Encapsulation Methods for Transport ATM over MPLS Networks (draft-ietf-pwe3-atmencap-10.txt)

RFC 4816 PWE3 ATM Transparent Cell Transport Service (draft-ietf-pwe3cell-transport-04.txt)

RFC 4448 Encapsulation Methods for Transport of Ethernet over MPLS Networks (draft-ietf-pwe3-ethernetencap-11.txt)

Standards and Protocols

- RFC 4619 Encapsulation Methods for Transport of Frame Relay over MPLS Networks (draft-ietf-pwe3frame-relay-07.txt)
- RFC 4446 IANA Allocations for PWE3 RFC 4447 Pseudowire Setup and Maintenance Using LDP (draft-ietfpwe3-control-protocol-17.txt)
- RFC 5085, Pseudowire Virtual Circuit Connectivity Verification (VCCV):A Control Channel for Pseudowires
- draft-ietf-l2vpn-vpws-iw-oam-02.txt draft-ietf-pwe3-oam-msg-map-05-txt draft-ietf-l2vpn-arp-mediation-04.txt draft-ietf-pwe3-ms-pw-arch-05.txt draft-ietf-pwe3-segmented-pw-11.txt draft-hart-pwe3-segmented-pw-vccv-02.txt
- draft-muley-dutta-pwe3-redundancy-bit-02.txt
- draft-muley-pwe3-redundancy-02.txt MFA Forum 9.0.0 The Use of Virtual trunks for ATM/MPLS Control Plane Interworking
- MFA Forum 12.0.0 Multiservice Interworking - Ethernet over MPLS
- MFA forum 13.0.0 Fault Management for Multiservice Interworking v1.0
- MFA Forum 16.0.0 Multiservice Interworking - IP over MPLS

ANCP/L2CP

draft-ietf-ancp-framework-01.txt draft-ietf-ancp-protocol-00.txt

CIRCUIT EMULATION

- RFC 4553 Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP)
- RFC 5086 Structure-Aware Time Division Multiplexed (TDM) Circuit Emulation Service over Packet Switched Network (CESoPSN)
- MEF-8 Implementation Agreement for the Emulation of PDH Circuits over Metro Ethernet Networks, October 2004
- RFC 5287 Control Protocol Extensions for the Setup of Time-Division Multiplexing (TDM) Pseudowires in MPLS Networks

SONET/SDH

- ITU-G.841 Telecommunication Standardization Section of ITU, Types and Characteristics of
- SDH Networks Protection Architecture, issued in October 1998 and as augmented by Corrigendum1 issued in July 2002

RADIUS

RFC 2865 Remote Authentication Dial In User Service

RFC 2866 RADIUS Accounting

SSH

- draft-ietf-secsh-architecture.txtSSH Protocol Architecture
- draft-ietf-secsh-userauth.txt SSH Authentication Protocol
- draft-ietf-secsh-transport.txt SSH Transport Layer Protocol
- draft-ietf-secsh-connection.txt SSH Connection Protocol
- draft-ietf-secsh- newmodes.txt SSH Transport Layer Encryption Modes

TACACS+

draft-grant-tacacs-02.txt

Timing

- GR-253-CORE SONET Transport Systems: Common Generic Criteria. Issue 3, September 2000
- ITU-T G.781 Telecommunication Standardization Section of ITU, Synchronization layer functions, issued 09/2008
- ITU-T G.813 Telecommunication Standardization Section of ITU, Timing characteristics of SDH equipment slave clocks (SEC), issued 03/2003.
- GR-1244-CORE Clocks for the Synchronized Network: Common Generic Criteria, Issue 3,May 2005
- ITU-T G.8261 Telecommunication Standardization Section of ITU, Timing and synchronization aspects in packet networks, issued 04/2008.
- ITU-T G.8262 Telecommunication Standardization Section of ITU, Timing characteristics of synchronous Ethernet equipment slave clock (EEC), issued 08/2007.

ITU-T G.8264 Telecommunication Standardization Section of ITU, Distribution of timing information through packet networks, issued 10/ 2008.

NETWORK MANAGEMENT

- ITU-T X.721: Information technology-OSI-Structure of Management Information
- ITU-T X.734: Information technology-OSI-Systems Management: Event Report Management Function
- M.3100/3120 Equipment and Connection Models
- TMF 509/613 Network Connectivity Model
- RFC 1157 SNMPv1
- RFC 1215 A Convention for Defining Traps for use with the SNMP
- RFC 1657 BGP4-MIB
- RFC 1724 RIPv2-MIB
- RFC 1850 OSPF-MIB
- RFC 1907 SNMPv2-MIB
- RFC 2011 IP-MIB
- RFC 2012 TCP-MIB
- RFC 2013 UDP-MIB
- RFC 2096 IP-FORWARD-MIB
- RFC 2138 RADIUS
- RFC 2206 RSVP-MIB
- RFC 2452 IPv6 Management Information Base for the
- Transmission Control Protocol
- RFC 2454 IPv6 Management Information Base for the User Datagram Protocol
- RFC 2465 Management Information Base for IPv6: Textual Conventions and General Group
- RFC 2558 SONET-MIB
- RFC 2571 SNMP-FRAMEWORKMIB
- RFC 2572 SNMP-MPD-MIB
- RFC 2573 SNMP-TARGET-&-
- NOTIFICATION-MIB
- RFC 2574 SNMP-USER-BASED-SMMIB
- RFC 2575 SNMP-VIEW-BASEDACM-MIB
- RFC 2576 SNMP-COMMUNITY-MIB
- RFC 2665 EtherLike-MIB
- RFC 2819 RMON-MIB
- RFC 2863 IF-MIB
- RFC 2864 INVERTED-STACK-MIB

RFC 2987 VRRP-MIB

RFC 3014 NOTIFICATION-LOGMIB

RFC 3019 IP Version 6 Management Information Base for The Multicast Listener Discovery Protocol

RFC 3164 Syslog

RFC 3273 HCRMON-MIB

RFC 3411 An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks

RFC 3412 - Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)

RFC 3413 - Simple Network Management Protocol (SNMP) Applications

RFC 3414 - User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)

RFC 3418 - SNMP MIB

RFC 5101 - Specification of the IP Flow Information Export (IPFIX) Protocol for the Exchange of IP Traffic Flow Information draft-ietf-disman-alarm-mib-04.txt

draft-ietf-ospf-mib-update-04.txt draft-ietf-mpls-lsr-mib-06.txt

draft-ietf-mpls-te-mib-04.txt

draft-ietf-mpls-ldp-mib-07.txt

draft-ietf-isis-wg-mib-05.txt

IANA-IFType-MIB

IEEE8023-LAG-MIB

Proprietary MIBs

TIMETRA-APS-MIB.mib

TIMETRA-ATM-MIB.mib

TIMETRA-BGP-MIB.mib

TIMETRA-BSX-NG-MIB.mib

TIMETRA-CAPABILITY-7750-V4v0.mib

TIMETRA-CFLOWD-MIB.mib

TIMETRA-CHASSIS-MIB.mib

TIMETRA-CLEAR-MIB.mib

TIMETRA-FILTER-MIB.mib

TIMETRA-GLOBAL-MIB.mib

TIMETRA-IGMP-MIB.mib

TIMETRA-ISIS-MIB.mib

TIMETRA-LAG-MIB.mib

TIMETRA-LDP-MIB.mib

TIMETRA-LOG-MIB.mib

TIMETRA-MIRROR-MIB.mib

TIMETRA-MPLS-MIB.mib

TIMETRA-NG-BGP-MIB.mib

TIMETRA-OAM-TEST-MIB.mib

TIMETRA-OSPF-NG-MIB.mib

TIMETRA-OSPF-V3-MIB.mib

TIMETRA-PIM-NG-MIB.mib

TIMETRA-PORT-MIB.mib

TIMETRA-PPP-MIB.mib

TIMETRA-QOS-MIB.mib

TIMETRA-RIP-MIB.mib

TIMETRA-ROUTE-POLICY-MIB.mib

TIMETRA-RSVP-MIB.mib

TIMETRA-SECURITY-MIB.mib

TIMETRA-SERV-MIB.mib

TIMETRA-SUBSCRIBER-

MGMTMIB.mib

TIMETRA-SYSTEM-MIB.mib

TIMETRA-TC-MIB.mib

TIMETRA-VRRP-MIB.mib

TIMETRA-VRTR-MIB.mib

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