CHAPTER 12

System Troubleshooting

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Introduction

This chapter provides the information needed to monitor and troubleshoot System events and alarms. This chapter is divided into the following sections:

- System Events and Alarms – Provides a brief overview of each System event and alarm.
- Monitoring System Events – Provides the information needed to monitor and correct System events.
- Troubleshooting System Alarms – Provides the information needed to troubleshoot and correct System alarms.

System Events and Alarms

This section provides a brief overview of the System events and alarms for the Cisco BTS 10200 Softswitch in numerical order. Table 12-1 lists all of the System events and alarms by severity.

Note Click the System message number in Table 12-1 to display information about the event or alarm.

Table 12-1 System Events and Alarms by Severity

CRITICAL	MAJOR	MINOR	WARNING	INFO
SYSTEM (13)	SYSTEM (8)	SYSTEM (2)	SYSTEM (5)	SYSTEM (1)
	SYSTEM (12)	SYSTEM (3)	SYSTEM (9)	
		SYSTEM (4)		
		SYSTEM (6)		
		SYSTEM (7)		
		SYSTEM (10)		
		SYSTEM (11)		
		SYSTEM (14)		

SYSTEM (1)

For additional information, refer to the "Test Report - System (1)" section on page 12-11.

DESCRIPTION	Test Report
SEVERITY	Information (INFO)
THRESHOLD	100
THROTTLE	0
PRIMARY CAUSE	This is a test report for the new "SYSTEM" category.
PRIMARY ACTION	No action is required.

SYSTEM (2)

To troubleshoot and correct the cause of the alarm, refer to the "Inter-Process Communication Queue Read Failure - System (2)" section on page 12-14.

DESCRIPTION	Inter-Process Communication Queue Read Failure
SEVERITY	MINOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	Queue Name - STRING [20] Location Tag - STRING [30]
PRIMARY CAUSE	There is a problem with inter-process communication (IPC) communication.
PRIMARY ACTION	If problem persists, call Cisco Technical Assistance Center (TAC). (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (3)

To troubleshoot and correct the cause of the alarm, refer to the "Inter-Process Communication Message Allocate Failure - System (3)" section on page 12-14.

DESCRIPTION	Inter-Process Communication Message Allocate Failure
SEVERITY	MINOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	Requested Size - TWO_BYTES Error Code - FOUR_BYTES Location Tag - STRING [30]
PRIMARY CAUSE	There is a system error or there is not enough free memory left to allocate a message buffer.
PRIMARY ACTION	If problem persists, call Cisco TAC. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (4)

To troubleshoot and correct the cause of the alarm, refer to the "Inter-Process Communication Message Send Failure - System (4)" section on page 12-15.

DESCRIPTION	Inter-Process Communication Message Send Failure
SEVERITY	MINOR
THRESHOLD	50
THROTTLE	0
DATAWORDS	Error Code - FOUR_BYTES Destination Process - FOUR_BYTES Message Number - FOUR_BYTES Location Tag - STRING [30]
PRIMARY CAUSE	The process for which the message is intended is not running.
PRIMARY ACTION	Check to ensure all components/processes are running. Attempt to restart any component/process that is not.
SECONDARY CAUSE	An internal error has occurred.
SECONDARY ACTION	If problem persists, call Cisco TAC. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (5)

To monitor and correct the cause of the event, refer to the "Unexpected Inter-Process Communication Message Received - System (5)" section on page 12-12.

DESCRIPTION	Unexpected Inter-Process Communication Message Received
SEVERITY	WARNING
THRESHOLD	100
THROTTLE	0
DATAWORDS	Source Process Type - ONE_BYTE Source Thread Type - ONE_BYTE Message Number - TWO_BYTES Location Tag - STRING [30]
PRIMARY CAUSE	The process reporting the event is receiving messages it is not expecting.
PRIMARY ACTION	Call Cisco TAC. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (6)

To troubleshoot and correct the cause of the alarm, refer to the "Index List Insert Error - System (6)" section on page 12-15.

DESCRIPTION	Index List Insert Error
SEVERITY	MINOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	List Name - STRING [20] Index of Entry Being - FOUR_BYTES Location Tag - STRING [30]
PRIMARY CAUSE	An internal error has occurred.
PRIMARY ACTION	If problem persists, call Cisco TAC. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (7)

To troubleshoot and correct the cause of the alarm, refer to the "Index List Remove Error - System (7)" section on page 12-15.

DESCRIPTION	Index List Remove Error
SEVERITY	MINOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	List Name - STRING [20] Index of Entry Being - FOUR_BYTES Location Tag - STRING [30]
PRIMARY CAUSE	An internal error has occurred.
PRIMARY ACTION	If problem persists, call Cisco TAC. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (8)

To troubleshoot and correct the cause of the alarm, refer to the "Thread Creation Failure - System (8)" section on page 12-15.

DESCRIPTION	Thread Creation Failure
SEVERITY	MAJOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	Error Code - FOUR_BYTES Thread Name - STRING [20] Location Tag - STRING [30]
PRIMARY CAUSE	An internal error has occurred. A process was unable to create one of its threads.
PRIMARY ACTION	Attempt to restart the node on which the error occurred. If the same error occurs, call Cisco TAC. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (9)

To monitor and correct the cause of the event, refer to the "Timer Start Failure - System (9)" section on page 12-12.

DESCRIPTION	Timer Start Failure
SEVERITY	WARNING
THRESHOLD	100
THROTTLE	0
DATAWORDS	Timer Type - STRING [20] Location Tag - STRING [30]
PRIMARY CAUSE	Process was unable to start a platform timer.
PRIMARY ACTION	If problem persists, call Cisco TAC. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (10)

To troubleshoot and correct the cause of the alarm, refer to the "Index Update Registration Error - System (10)" section on page 12-15.

DESCRIPTION	Index Update Registration Error
SEVERITY	MINOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	Error Code - FOUR_BYTES Table Name - STRING [20] Location Tag - STRING [30]
PRIMARY CAUSE	Application unsuccessfully requested to be notified of table changes.
PRIMARY ACTION	Call Cisco TAC. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (11)

To troubleshoot and correct the cause of the alarm, refer to the "Index Table Add Entry Error - System (11)" section on page 12-16.

DESCRIPTION	Index Table Add Entry Error
SEVERITY	MINOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	Table Name - STRING [20] Index of Entry Being - FOUR_BYTES Error Code - FOUR_BYTES Location Tag - STRING [30]
PRIMARY CAUSE	An internal error has occurred.
PRIMARY ACTION	If problem persists, call Cisco TAC. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (12)

To troubleshoot and correct the cause of the alarm, refer to the "Software Error - System (12)" section on page 12-16.

DESCRIPTION	Software Error
SEVERITY	MAJOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	Context Description - STRING [80] FileName - STRING [20] Line Number of Code - TWO_BYTES Error Specific Information - STRING [80]
PRIMARY CAUSE	Logic path is not handled by algorithm in code.
PRIMARY ACTION	Save trace log around the time of occurrence and notify Cisco Systems, Inc. (Contact Cisco TAC.)

Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

SYSTEM (13)

To troubleshoot and correct the cause of the alarm, refer to the "Multiple Readers and Multiple Writers Maximum Q Depth Reached - System (13)" section on page 12-16.

DESCRIPTION	Multiple Readers and Multiple Writers Maximum Queue Depth Reached
SEVERITY	CRITICAL
THRESHOLD	100
THROTTLE	0
DATAWORDS	High Mark for Queue Depth - FOUR_BYTES Low Mark for Queue Depth - FOUR_BYTES
PRIMARY CAUSE	Messages flooding from a malfunctioning network element.
PRIMARY ACTION	Check messages to process.
SECONDARY CAUSE	Resource congestion or slow processing of messages from queue.
SECONDARY ACTION	Check the process and system resources. May need failover.

SYSTEM (14)

To troubleshoot and correct the cause of the alarm, refer to the "Multiple Readers and Multiple Writers Queue Reached Low Queue Depth - System (14)" section on page 12-16.

DESCRIPTION	Multiple Readers and Multiple Writers Queue Reached Low Queue Depth
SEVERITY	MINOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	Lower Queue Depth Limit - FOUR_BYTES Higher Queue Depth Limit - FOUR_BYTES
PRIMARY CAUSE	High rate of messages being received from the network.
PRIMARY ACTION	Check messages to the system.
SECONDARY CAUSE	System or processing thread congestion.
SECONDARY ACTION	Check process and system resources.

SYSTEM (15)

To troubleshoot and correct the cause of the alarm, refer to the "Multiple Readers and Multiple Writers Throttle Queue Depth Reached - System (15)" section on page 16.

DESCRIPTION	Multiple Readers and Multiple Writers Throttle Queue Depth Reached
SEVERITY	MAJOR
THRESHOLD	100
THROTTLE	0
DATAWORDS	Throttle Mark for Queue Depth - FOUR_BYTES Throttle Clear Mark for Queue De - FOUR_BYTES
PRIMARY CAUSE	Inbound network messages arriving at a rate much higher than processing capacity.
PRIMARY ACTION	Determine the cause of increase in inbound network traffic, and try to control the traffic externally.
SECONDARY CAUSE	Resource congestion resulting in a slow down in processing messages from queue.
SECONDARY ACTION	Check the platform CPU utilization, IPC queue depths and overall availability of system resources.

Monitoring System Events

This section provides the information needed to monitor and correct System events. Table 12-2 lists all System events in numerical order and provides cross reference to each subsection in this section.

Table 12-2 Cisco BTS 10200 Softswitch System Events

Event Type	Event Name	Event Severity
SYSTEM(1)	Test Report - System (1)	INFO
SYSTEM(2)	Inter-Process Communication Queue Read Failure - System (2)	MINOR
SYSTEM(3)	Inter-Process Communication Message Allocate Failure - System (3)	MINOR
SYSTEM(4)	Inter-Process Communication Message Send Failure - System (4)	MINOR
SYSTEM(5)	Unexpected Inter-Process Communication Message Received - System (5)	WARNING
SYSTEM(6)	Index List Insert Error - System (6)	MINOR
SYSTEM(7)	Index List Remove Error - System (7)	MINOR
SYSTEM(8)	Thread Creation Failure - System (8)	MAJOR
SYSTEM(9)	Timer Start Failure - System (9)	WARNING
SYSTEM(10)	Index Update Registration Error - System (10)	MINOR
SYSTEM(11)	Index Table Add-Entry Error - System (11)	MINOR
SYSTEM(12)	Software Error - System (12)	MAJOR
SYSTEM(13)	Multiple Readers and Multiple Writers Maximum Q Depth Reached - System (13)	CRITICAL
SYSTEM(14)	Multiple Readers and Multiple Writers Queue Reached Low Queue Depth - System (14)	MINOR
SYSTEM(15)	Multiple Readers and Multiple Writers Throttle Queue Depth Reached - System (15)	MAJOR

Test Report - System (1)

The Test Report event is for testing the system event category. The event is informational and no further action is required.

Inter-Process Communication Queue Read Failure - System (2)

The Inter-Process Communication Queue Read Failure alarm (minor) indicates that the IPC queue read has failed. To troubleshoot and correct the cause of the Inter-Process Communication Queue Read Failure alarm, refer to the "Inter-Process Communication Queue Read Failure - System (2)" section on page 12-14.

Inter-Process Communication Message Allocate Failure - System (3)

The Inter-Process Communication Message Allocate Failure alarm (minor) indicates that the IPC message allocation has failed. To troubleshoot and correct the cause of the Inter-Process Communication Message Allocate Failure alarm, refer to the "Inter-Process Communication Message Allocate Failure - System (3)" section on page 12-14.

Inter-Process Communication Message Send Failure - System (4)

The Inter-Process Communication Message Send Failure alarm (minor) indicates that the IPC message send has failed. To troubleshoot and correct the cause of the Inter-Process Communication Message Send Failure alarm, refer to the "Inter-Process Communication Message Send Failure - System (4)" section on page 12-15.

Unexpected Inter-Process Communication Message Received - System (5)

The Unexpected Inter-Process Communication Message Received event serves as a warning that an unexpected IPC message was received. The primary cause of the event is that the IPC process is receiving messages it is not expecting. To correct the primary cause of the event, contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Index List Insert Error - System (6)

The Index List Insert Error alarm (minor) indicates that an error has been inserted in the index list. To troubleshoot and correct the cause of the Index List Insert Error alarm, refer to the "Index List Insert Error - System (6)" section on page 12-15.

Index List Remove Error - System (7)

The Index List Remove Error alarm (minor) indicates that an index list remove error has occurred. To troubleshoot and correct the cause of the Index List Remove Error alarm, refer to the "Index List Remove Error - System (7)" section on page 12-15.

Thread Creation Failure - System (8)

The Thread Creation Failure alarm (major) indicates that a thread creation has failed. To troubleshoot and correct the cause of the Thread Creation Failure alarm, refer to the "Thread Creation Failure - System (8)" section on page 12-15.

Timer Start Failure - System (9)

The Timer Start Failure event serves as a warning that a timer start failure has occurred. The primary cause of the event is that the process was unable to start a platform timer. To correct the primary cause of the event, check and see if the problem persists. If the problem persists, call Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Index Update Registration Error - System (10)

The Index Update Registration Error alarm (minor) indicates that an index update registration error has occurred. To troubleshoot and correct the cause of the Index Update Registration Error alarm, refer to the "Index Update Registration Error - System (10)" section on page 12-15.

Index Table Add-Entry Error - System (11)

The Index Table Add-entry Error alarm (minor) indicates that an error occurred while adding an entry in the index table. To troubleshoot and correct the cause of the Index Table Add-entry Error alarm, refer to the "Index Table Add Entry Error - System (11)" section on page 12-16.

Software Error - System (12)

The Software Error alarm (major) indicates that a software error has occurred. To troubleshoot and correct the cause of the Software Error alarm, refer to the "Software Error - System (12)" section on page 12-16.

Multiple Readers and Multiple Writers Maximum Q Depth Reached - System (13)

The Multiple Readers and Multiple Writers Maximum Q Depth Reached alarm (critical) indicates that the multiple readers and multiple writers (MRMW) maximum queue depth has been reached. To troubleshoot and correct the cause of the Multiple Readers and Multiple Writers Maximum Q Depth Reached alarm, refer to the "Multiple Readers and Multiple Writers Maximum Q Depth Reached - System (13)" section on page 12-16.

Multiple Readers and Multiple Writers Queue Reached Low Queue Depth - System (14)

The Multiple Readers and Multiple Writers Queue Reached Low Queue Depth alarm (minor) indicates that the MRMW queue has reached the low queue depth threshold. To troubleshoot and correct the cause of the Multiple Readers and Multiple Writers Queue Reached Low Queue Depth alarm, refer to the "Multiple Readers and Multiple Writers Queue Reached Low Queue Depth - System (14)" section on page 12-16.

Multiple Readers and Multiple Writers Throttle Queue Depth Reached - System (15)

The Multiple Readers and Multiple Writers Throttle Queue Depth Reached alarm (major) indicates that the MRMW queue has reached the throttle depth. To troubleshoot and correct the cause of the Multiple Readers and Multiple Writers Throttle Queue Depth Reached alarm, refer to the "Multiple Readers and Multiple Writers Throttle Queue Depth Reached - System (15)" section on page 16.

Troubleshooting System Alarms

This section provides the information needed to monitor and correct System alarms. Table 12-3 lists all System alarms in numerical order and provides cross reference to each subsection in this section.

Table 12-3 Cisco BTS 10200 Softswitch System Alarms

Alarm Type	Alarm Name	Alarm Severity
SYSTEM(2)	Inter-Process Communication Queue Read Failure - System (2)	MINOR
SYSTEM(3)	Inter-Process Communication Message Allocate Failure - System (3)	MINOR
SYSTEM(4)	Inter-Process Communication Message Send Failure - System (4)	MINOR
SYSTEM(6)	Index List Insert Error - System (6)	MINOR
SYSTEM(7)	Index List Remove Error - System (7)	MINOR
SYSTEM(8)	Thread Creation Failure - System (8)	MAJOR
SYSTEM(10)	Index Update Registration Error - System (10)	MINOR
SYSTEM(11)	Index Table Add Entry Error - System (11)	MINOR
SYSTEM(12)	Software Error - System (12)	MAJOR
SYSTEM(13)	Multiple Readers and Multiple Writers Maximum Q Depth Reached - System (13)	CRITICAL
SYSTEM(14)	Multiple Readers and Multiple Writers Queue Reached Low Queue Depth - System (14)	MINOR
SYSTEM(15)	Multiple Readers and Multiple Writers Throttle Queue Depth Reached - System (15)	MAJOR

Inter-Process Communication Queue Read Failure - System (2)

The Inter-Process Communication Queue Read Failure alarm (minor) indicates that the IPC queue read has failed. The primary cause of the alarm is that there is a problem with IPC communication. To correct the primary cause of the alarm, contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Inter-Process Communication Message Allocate Failure - System (3)

The Inter-Process Communication Message Allocate Failure alarm (minor) indicates that the IPC message allocation has failed. The primary cause of the alarm is that there is a system error, or there is not enough free memory left to allocate a message buffer. To correct the primary cause of the alarm, contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Inter-Process Communication Message Send Failure - System (4)

The Inter-Process Communication Message Send Failure alarm (minor) indicates that the IPC message send has failed. The primary cause of the alarm is that the process for which the message is intended is not running. To correct the primary cause of the alarm, check to ensure that all components and processes are running. Attempt to restart any component or process that is not running. The secondary cause of the alarm is that an internal error has occurred. To correct the secondary cause of the alarm, contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Index List Insert Error - System (6)

The Index List Insert Error alarm (minor) indicates that an error has been inserted in the index list. The primary cause of the alarm is that an internal error has occurred. To correct the primary cause of the alarm, contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Index List Remove Error - System (7)

The Index List Remove Error alarm (minor) indicates that an index list remove error has occurred. The primary cause of the alarm is that an internal error has occurred. To correct the primary cause of the alarm, contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Thread Creation Failure - System (8)

The Thread Creation Failure alarm (major) indicates that a thread creation has failed. The primary cause of the alarm is that an internal error occurred. A process was unable to create one of its threads. To correct the primary cause of the alarm, attempt to restart the node on which the error occurred. If the same alarm occurs, contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Index Update Registration Error - System (10)

The Index Update Registration Error alarm (minor) indicates that an index update registration error has occurred. The primary cause of the alarm is that an application unsuccessfully requested to be notified of table changes. To correct the primary cause of the alarm, contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Index Table Add Entry Error - System (11)

The Index Table Add Entry Error alarm (minor) indicates that an error occurred while adding an entry in the index table. The primary cause of the alarm is that an internal error has occurred. To correct the primary cause of the alarm, contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Software Error - System (12)

The Software Error alarm (major) indicates that a software error has occurred. The primary cause of the alarm is that a logic path is not handled by algorithm in the code. To correct the primary cause of the alarm, save the trace log from around the time of occurrence and contact Cisco TAC. Refer to the "Obtaining Documentation and Submitting a Service Request" section on page liii for detailed instructions on contacting Cisco TAC and opening a service request.

Multiple Readers and Multiple Writers Maximum Q Depth Reached - System (13)

The Multiple Readers and Multiple Writers Maximum Q Depth Reached alarm (critical) indicates that the MRMW maximum queue depth has been reached. The primary cause of the alarm is message flooding from an erratic network element. To correct the primary cause of the alarm, check the messages to process, The secondary cause of the alarm is resource congestion or slow processing of messages from queue. To correct the secondary cause of the alarm, check the process and system resources. The system may need to be failed over.

Multiple Readers and Multiple Writers Queue Reached Low Queue Depth - System (14)

The Multiple Readers and Multiple Writers Queue Reached Low Queue Depth alarm (minor) indicates that the MRMW queue has reached the low queue depth threshold. The primary cause of the alarm is a high rate of messages from the network. To correct the primary cause of the alarm, check the messages to the system. The secondary cause of the alarm is system or processing thread congestion. To correct the secondary cause of the alarm, check process and system resources.

Multiple Readers and Multiple Writers Throttle Queue Depth Reached - System (15)

The Multiple Readers and Multiple Writers Throttle Queue Depth Reached alarm (major) indicates that the MRMW queue has reached the throttle depth. The primary cause of the alarm is that inbound network messages arriving at a rate much higher than processing capacity. To correct the primary cause of the alarm, determine the cause of increase in inbound network traffic, and try to control the traffic externally. The secondary cause of the alarm is that there is resource congestion resulting in a slow down in processing messages from queue. To correct the secondary cause of the alarm, check the platform CPU utilization, IPC queue depths and overall availability of system resources.