CHAPTER 3

Billing Troubleshooting

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Introduction

This chapter provides the information needed for monitoring and troubleshooting billing events and alarms. This chapter is divided into the following sections:

- Billing Events and Alarms—Provides a brief overview of each billing event and alarm
- Monitoring Billing Events—Provides the information needed for monitoring and correcting the billing events
- Troubleshooting Billing Alarms—Provides the information needed for troubleshooting and correcting the billing alarms

Note The following billing records are created when a call is rejected due to overload conditions:

• SS7 termination cause code 42
• Cable signaling stop event cause code “resource unavailable”

Calls rejected by the signaling adapter will not generate a billing record.

Billing Events and Alarms

This section provides a brief overview of the billing events and alarms for the Cisco BTS 10200 Softswitch; the events and alarms are arranged in numerical order. Table 3-1 lists all of the billing events and alarms by severity.

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

Note Click the Billing message number in Table 3-1 to display information about the event or alarm.

Table 3-1 Billing Events and Alarms by Severity

Critical	Major	Minor	Warning	Information	Not Used
Billing (4)	Billing (3)	Billing (2)	Billing (14)	Billing (1)	Billing (9)
Billing (7)	Billing (6)	Billing (40)	Billing (42)	Billing (5)	Billing (10)
Billing (13)	Billing (8)	Billing (41)		Billing (36)	Billing (11)
Billing (35)	Billing (15)	Billing (45)		Billing (57)	Billing (12)
Billing (49)	Billing (29)	Billing (46)		Billing (59)	Billing (16)
Billing (52)	Billing (30)	Billing (47)			Billing (17)
Billing (55)	Billing (31)	Billing (53)			Billing (18)
Billing (56)	Billing (32)				Billing (19)
	Billing (33)				Billing (20)
	Billing (37)				Billing (21)
	Billing (38)				Billing (22)
	Billing (44)				Billing (23)
	Billing (48)				Billing (24)
	Billing (54)				Billing (25)
	Billing (58)				Billing (26)
	Billing (60)				Billing (27)
					Billing (28)
					Billing (34)
					Billing (39)
					Billing (43)
					Billing (50)
					Billing (51)

Billing (1)

Table 3-2 lists the details of the Billing (1) informational event. For additional information, refer to the "Test Report—Billing (1)" section on page 3-27.

Table 3-2 Billing (1) Details

Description	Test Report
Severity	Information
Threshold	10000
Throttle	0

Billing (2)

Table 3-3 lists the details of the Billing (2) minor alarm. To troubleshoot and correct the cause of the alarm, refer to the "Billing Partition Disk Usage Minor Threshold Exceeded—Billing (2)" section on page 3-35.

Table 3-3 Billing (2) Details

Description	Billing Partition Disk Usage Minor Threshold Exceeded
Severity	Minor
Threshold	100
Throttle	0
Datawords	Disk Usage Percentage—TWO_BYTES
Primary Cause	Call detail records are accumulating on the disk associated with the billing database in the Element Management System (EMS). This is because data is being written into the database faster than it is being read out of the database. The minor threshold (default value = 70%) has been exceeded.
Primary Action	Monitor this alarm. The read process should catch up to the write process within a few minutes, and the alarm should not remain active.
Secondary Cause	Some fluctuation in disk usage is to be expected as the call volume rises and falls during the day. Threshold crossings might step upward (from minor to major to critical) when there is a rapid increase in the call volume, and then step downward (critical to major to minor) when the call volume slows.
Secondary Action	To monitor the alarm, use the **subscribe alarm-report** command. To obtain a summary, use the **report alarm-summary** command. Verify that type = billing is entered in the commands.

Billing (3)

Table 3-4 lists the details of the Billing (3) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Billing Partition Disk Usage Major Threshold Exceeded—Billing (3)" section on page 3-35.

Table 3-4 Billing (3) Details

Description	Billing Partition Disk Usage Major Threshold Exceeded
Severity	Major
Threshold	100
Throttle	0
Datawords	Disk Usage Percentage—TWO_BYTES
Primary Cause	Call detail records are accumulating on the disk associated with the billing database in the EMS. This is because data is being written into the database faster than it is being read out of the database. The major threshold (default value = 80%) has been exceeded.
Primary Action	Monitor this alarm. The read process should catch up to the write process within a few minutes, and the alarm should not remain active.
Secondary Cause	Some fluctuation in disk usage is to be expected as the call volume rises and falls during the day. Threshold crossings might step upward (from minor to major to critical) when there is a rapid increase in the call volume, and then step downward (critical to major to minor) when the call volume slows.
Secondary Action	To monitor the alarm, use the **subscribe alarm-report** command. To obtain a summary, use the **report alarm-summary** command. Verify that type = billing is entered in the commands.
Ternary Action	If the alarm does not clear (or step down to a reduced level) in a few minutes, contact Cisco Technical Assistance Center (TAC) for assistance.

Billing (4)

Table 3-5 list the details of the Billing (4) critical alarm. To troubleshoot and correct the cause of the alarm, refer to the "Billing Partition Disk Usage Critical Threshold Exceeded—Billing (4)" section on page 3-36.

Table 3-5 Billing (4) Details

Description	Billing Partition Disk Usage Critical Threshold Exceeded
Severity	Critical
Threshold	100
Throttle	0
Datawords	Disk Usage Percentage—TWO_BYTES
Primary Cause	Call detail records are accumulating on the disk associated with the billing database in the EMS. This is because data is being written into the database faster than it is being read out of the database. The major threshold (default value = 90%) has been exceeded.
Primary Action	Monitor this alarm. The read process should catch up to the write process within a few minutes, and the alarm should not remain active.
Secondary Cause	Some fluctuation in disk usage is to be expected as the call volume rises and falls during the day. Threshold crossings might step upward (from minor to major to critical) when there is a rapid increase in the call volume, and then step downward (critical to major to minor) when the call volume slows.
Secondary Action	To monitor the alarm, use the **subscribe alarm-report** command. To obtain a summary, use the **report alarm-summary** command. Verify that type = billing is entered in these commands.
Ternary Action	If the alarm does not clear (or step down to a reduced level) in a few minutes, contact Cisco TAC for assistance.

Billing (5)

Table 3-6 lists the details of the Billing (5) informational event. For additional information, refer to the "Billing Partition Disk Usage Within Normal Range—Billing (5)" section on page 3-28.

Table 3-6 Billing (5) Details

Description	Billing Partition Disk Usage Within Normal Range
Severity	Information
Threshold	100
Throttle	0
Datawords	Disk Usage Percentage—TWO_BYTES

Billing (6)

Table 3-7 list the details of the Billing (6) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "File Transfer Protocol/Secure File Transfer Protocol Transfer Failed—Billing (6)" section on page 3-36.

Table 3-7 Billing (6) Details

Description	File Transfer Protocol/Secure File Transfer Protocol Transfer Failed (FTP/SFTP Transfer Failed)
Severity	Major
Threshold	100
Throttle	0
Datawords	TransferType—STRING [5] FileName—STRING [40] RemoteAddress—STRING [40] Error—STRING [50]
Primary Cause	Unable to connect to the remote host.
Primary Action	Verify that the remote host is reachable. Run the **show billing-acct-addr** command and verify that the billing-server-addr is correct. Change the billing-server-addr, if necessary, using the change **billing-acct-addr** command.
Secondary Cause	Unable to log in to the remote host.
Secondary Action	Use **show billing-acct-addr** command to verify that the user-name is a valid user for the host specified in the billing-server-addr. If user-name is correct and the TransferType dataword shows File Transfer Protocol (FTP), reenter the password using the **change billing-acct-addr** command. If user-name is correct and the TransferType dataword shows Secure File Transfer Protocol (SFTP), verify that secure shell (SSH) keys have been preconfigured for the user name on both the Cisco BTS 10200 and the remote host.
Ternary Cause	A file transfer error has occurred.
Ternary Action	Check the Error dataword to see if it gives an indication of the kind of error that occurred. It could be a file-system error on the remote host, or a communication failure between the Cisco BTS 10200 and the remote host.
Subsequent Cause	The CDB_BILLING_SUPP flag is not set to Y in the call-agent-profile table.
Subsequent Action	Verify that the CDB_BILLING_SUPP flag is set to Y in the call-agent-profile table.

Billing (7)

Table 3-8 lists the details of the Billing (7) critical alarm. To troubleshoot and correct the cause of the alarm, refer to the "Transmission Control Protocol Connection Error—Billing (7)" section on page 3-37.

Table 3-8 Billing (7) Details

Description	Transmission Control Protocol Connection Error (TCP Connection Error)
Severity	Critical
Threshold	100
Throttle	0
Datawords	Hostname—STRING [100]
Primary Cause	A system call error has occurred.
Primary Action	Check the address in platform configuration.
Secondary Cause	The Cisco BTS 10200 is not connected to the right address.
Secondary Action	Contact Cisco TAC.

Billing (8)

Table 3-9 lists the details of the Billing (8) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Transmission Control Protocol Packet Receive Failure—Billing (8)" section on page 3-37.

Table 3-9 Billing (8) Details

Description	Transmission Control Protocol Packet Receive Failure (TCP Packet Receive Failure)
Severity	Major
Threshold	100
Throttle	0
Datawords	Host Name—STRING [25]
Primary Cause	Peer went down; socket closed.
Primary Action	Check the peer status and bring the peer back up.

Billing (9)

Billing (9) is not used.

Billing (10)

Billing (10) is not used.

Billing (11)

Billing (11) is not used.

Billing (12)

Billing (12) is not used.

Billing (13)

Table 3-10 lists the details of the Billing (13) critical alarm. To troubleshoot and correct the cause of the alarm, refer to the "Database Connection Error—Billing (13)" section on page 3-38.

Table 3-10 Billing (13) Details

Description	Database Connection Error
Severity	Critical
Threshold	100
Throttle	0
Primary Cause	Structured Query Language (SQL) server is down.
Primary Action	Restart server; if this does not correct the problem, contact Cisco TAC.

Billing (14)

Table 3-11 lists the details of the Billing (14) warning event. To monitor and correct the cause of the event, refer to the "File Open Error—Billing (14)" section on page 3-29.

Table 3-11 Billing (14) Details

Description	File Open Error
Severity	Warning
Threshold	100
Throttle	0
Datawords	Path Name—STRING [100]
Primary Cause	System error, may be out of file descriptors.
Primary Action	Contact Cisco TAC.

Billing (15)

Table 3-12 lists the details of the Billing (15) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "File Write Error—Billing (15)" section on page 3-38.

Table 3-12 Billing (15) Details

Description	File Write Error
Severity	Major
Threshold	100
Throttle	0
Datawords	Path Name—STRING [100]
Primary Cause	System error, may be out of file descriptors.
Primary Action	Contact Cisco TAC.

Billing (16)

Billing (16) is not used.

Billing (17)

Billing (17) is not used.

Billing (18)

Billing (18) is not used.

Billing (19)

Billing (19) is not used.

Billing (20)

Billing (20) is not used.

Billing (21)

Billing (21) is not used.

Billing (22)

Billing (22) is not used.

Billing (23)

Billing (23) is not used.

Billing (24)

Billing (24) is not used.

Billing (25)

Billing (25) is not used.

Billing (26)

Billing (26) is not used.

Billing (27)

Billing (27) is not used.

Billing (28)

Billing (28) is not used.

Billing (29)

Table 3-13 lists the details of the Billing (29) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Call Data Block Send Failed—Billing (29)" section on page 3-38.

Table 3-13 Billing (29) Details

Description	Call Data Block Send Failed (CDB Send Failed)
Severity	Major
Threshold	100
Throttle	0
Primary Cause	Transmission Control Protocol (TCP) send call failure.
Primary Action	Check the port number and address of the blg and bmg processes in the platform.cfg file.
Secondary Cause	Both the EMS servers are down.
Secondary Action	Check if both EMS servers are down. If they are, bring at least one up.

Billing (30)

Table 3-14 lists the details of the Billing (30) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Domain Name Mapping Failed—Billing (30)" section on page 3-38.

Table 3-14 Billing (30) Details

Description	Domain Name Mapping Failed
Severity	Major
Threshold	100
Throttle	0
Datawords	Address—STRING [50]
Primary Cause	Wrong domain name system (DNS) name mapping specified in the configuration files.
Primary Action	Check the opticall.cfg and platform.cfg for the right mapping.

Billing (31)

Table 3-15 lists the details of the Billing (31) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Port Not Specified—Billing (31)" section on page 3-38.

Table 3-15 Billing (31) Details

Description	Port not Specified
Severity	Major
Threshold	100
Throttle	0
Primary Cause	Port not specified in the platform.cfg file.
Primary Action	Check platform.cfg file and add the argument to blg -port 15260.

Billing (32)

Table 3-16 lists the details of the Billing (32) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Element Management System Address Not Specified—Billing (32)" section on page 3-39.

Table 3-16 Billing (32) Details

Description	Element Management System Address not Specified (EMS Address not Specified)
Severity	Major
Threshold	100
Throttle	0
Primary Cause	Either the primary or secondary EMS address has not been specified in the platform.cfg file.
Primary Action	Check the platform.cfg for the process Billing (BLG) and add the missing addresses to the file.

Billing (33)

Table 3-17 lists the details of the Billing (33) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid—Billing (33)" section on page 3-39.

Table 3-17 Billing (33) Details

Description	File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid (FTP/SFTP Parameters Invalid)
Severity	Major
Threshold	100
Throttle	0
Datawords	TransferType—STRING [5] BillingServerDir—STRING [100] BillingServerAddr—STRING [100] User Name—STRING [100]
Primary Cause	The billing-acct-addr table is not fully provisioned with the information needed to perform file transfers.
Primary Action	Check billing-acct-addr fields using the **show billing-acct-addr** command. For FTP file transfer, ensure that the billing-server-addr, billing-server-directory, user-name, and password (not displayed) are provisioned. Also ensure that sftp-supp is set to N. For SFTP file transfer, ensure that the billing-server-addr, billing-server-directory, and user-name are provisioned. Also ensure that sftp-supp is set to Y.

Billing (34)

Billing (34) is not used.

Billing (35)

Table 3-18 lists the details of the Billing (35) critical alarm. To troubleshoot and correct the cause of the alarm, refer to the "All Billing Links at Billing Server Down—Billing (35)" section on page 3-39.

Table 3-18 Billing (35) Details

Description	All Billing Links at Billing Server Down
Severity	Critical
Threshold	100
Throttle	0
Primary Cause	The cable connection might have been pulled out.
Primary Action	Restore the cable connection.
Secondary Cause	An **ifconfig down** command might have been executed on the interfaces.
Secondary Action	Execute an **ifconfig up** command on the interfaces.

Billing (36)

Table 3-19 lists the details of the Billing (36) informational event. For additional information, refer to the "Billing Link Restored—Billing (36)" section on page 3-30.

Table 3-19 Billing (36) Details

Description	Billing Link Restored
Severity	Information
Threshold	100
Throttle	0
Datawords	Interface Name—STRING [50]
Primary Cause	The cable connection has been restored.
Primary Action	None

Billing (37)

Table 3-20 lists the details of the Billing (37) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Billing Link Failure—Billing (37)" section on page 3-39.

Table 3-20 Billing (37) Details

Description	Billing Link Failure
Severity	Major
Threshold	100
Throttle	0
Datawords	Interface Name—STRING [5]
Primary Cause	The cable connection may have been pulled.
Primary Action	Restore the cable connection.
Secondary Cause	An **ifconfig down** command may have been performed on the interface.
Secondary Action	Perform an **ifconfig up** command on the interface.

Billing (38)

Table 3-21 lists the details of the Billing (38) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Event Message Log File Access Error—Billing (38)" section on page 3-39.

Table 3-21 Billing (38) Details

Description	Event Message Log File Access Error (EM Log File Access Error)
Severity	Major
Threshold	50
Throttle	0
Datawords	Type of Access Error—STRING [25] Reason for Error—STRING [40] Sequence Number OFF—FOUR_BYTES Index of Event Messa—FOUR_BYTES Location Tag—STRING [30]
Primary Cause	System error, may be out of file descriptors.
Primary Action	Contact Cisco TAC.
Secondary Cause	The disk may be faulty.
Secondary Action	Make the Bulk Data Management System (BDMS) switch over to its mate node.

Billing (39)

Billing (39) is not used.

Billing (40)

Table 3-22 lists the details of the Billing (40) minor alarm. To troubleshoot and correct the cause of the alarm, refer to the "Event Message Encode Failure—Billing (40)" section on page 3-40.

Table 3-22 Billing (40) Details

Description	Event Message Encode Failure (EM Encode Failure)
Severity	Minor
Threshold	100
Throttle	0
Datawords	Location Tag—STRING [30]
Primary Cause	There is a problem with the format of the data to be sent to the record keeping system (RKS).
Primary Action	If problem persists, contact Cisco TAC.

Billing (41)

Table 3-23 lists the details of the Billing (41) minor alarm. To troubleshoot and correct the cause of the alarm, refer to the "Message Content Error—Billing (41)" section on page 3-40.

Table 3-23 Billing (41) Details

Description	Message Content Error
Severity	Minor
Threshold	100
Throttle	0
Datawords	Message Type—FOUR_BYTES Field Name—STRING [20] Field Value (Text)—STRING [20] Field Value (Numeric)—FOUR_BYTES Location Tag—STRING [30]
Primary Cause	There is a mismatch between what the sender populated in the message and what the receiver expects.
Primary Action	Contact Cisco TAC.

Billing (42)

Table 3-24 list the details of the Billing (42) warning event. To monitor and correct the cause of the event, refer to the "Error Reading Provisioned Data—Using Default—Billing (42)" section on page 3-31.

Table 3-24 Billing (42) Details

Description	Error Reading Provisioned Data—Using Default
Severity	Warning
Threshold	100
Throttle	0
Datawords	Error Code—FOUR_BYTES Table Name—STRING [20] Field Name—STRING [20] Default Value (Decim—FOUR_BYTES Default Value (Text)—STRING [20] Location Tag—STRING [30]
Primary Cause	An application was unable to read the provisioned data, and had to resort to using default values.
Primary Action	Check to ensure that a complete load has been installed on the system. If the load is complete and problem persists, contact Cisco TAC.

Billing (43)

Billing (43) is not used.

Billing (44)

Table 3-25 lists the details of the Billing (44) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Record Keeping System Switch Occurred—Billing (44)" section on page 3-40.

Table 3-25 Billing (44) Details

Description	Record Keeping System Switch Occurred (RKS Switch Occurred)
Severity	Major
Threshold	100
Throttle	0
Datawords	Type of RKS Switch—STRING [20] Location Tag—STRING [30]
Primary Cause	Billing changed the destination RKS to which event messages are transmitted. The change could have been triggered by a communication problem with an RKS, or by an attempt to reestablish RKS communication.
Primary Action	No action is necessary.

Billing (45)

Table 3-26 lists the details of the Billing (45) minor alarm. To troubleshoot and correct the cause of the alarm, refer to the "Event Message Log File Opened—Billing (45)" section on page 3-40.

Table 3-26 Billing (45) Details

Description	Event Message Log File Opened
Severity	Minor
Threshold	50
Throttle	0
Datawords	Element Type—STRING [5] File Name—STRING [60] Location Tag—STRING [30]
Primary Cause	A log file has been created for the storage of event messages that cannot be transmitted to an RKS.
Primary Action	No action is necessary.

Billing (46)

Table 3-27 lists the details of the Billing (46) minor alarm. To troubleshoot and correct the cause of the alarm, refer to the "Event Message Log File Closed—Billing (46)" section on page 3-40.

Table 3-27 Billing (46) Details

Description	Event Message Log File Closed
Severity	Minor
Threshold	50
Throttle	0
Datawords	Element Type—STRING [5] File Name—STRING [60] Location Tag—STRING [30]
Primary Cause	An open event message log file has been closed.
Primary Action	No action is necessary.

Billing (47)

Table 3-28 lists the details of the Billing (47) minor alarm. To troubleshoot and correct the cause of the alarm, refer to the "Record Keeping System Unreachable for One Hour—Billing (47)" section on page 3-40.

Table 3-28 Billing (47) Details

Description	Record Keeping System Unreachable for One Hour (RKS Unreachable for 1 Hour)
Severity	Minor
Threshold	25
Throttle	0
Datawords	Location Tag—STRING [30]
Primary Cause	Billing has not been able to communicate with any RKS for the past hour.
Primary Action	Check status of the primary and secondary RKS servers; attempt to bring them into service. Verify that the radius-profile table and call-agent-profile table are provisioned such that communication with the RKS servers is possible.

Billing (48)

Table 3-29 lists the details of the Billing (48) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Record Keeping System Unreachable for Three Hours—Billing (48)" section on page 3-41.

Table 3-29 Billing (48) Details

Description	Record Keeping System Unreachable for Three Hours (RKS Unreachable for 3 Hours)
Severity	Major
Threshold	25
Throttle	0
Datawords	Location Tag—STRING [30]
Primary Cause	Billing has not been able to communicate with any RKS for the past three hours.
Primary Action	Check status of the primary and secondary RKS servers: attempt to bring them into service. Verify that the radius-profile table and call-agent-profile table are provisioned such that communication with the RKS servers is possible.

Billing (49)

Table 3-30 lists the details of the Billing (49) critical alarm. To troubleshoot and correct the cause of the alarm, refer to the "Record Keeping System Unreachable for Five Hours—Billing (49)" section on page 3-41.

Table 3-30 Billing (49) Details

Description	Record Keeping System Unreachable for 5 Hours (RKS Unreachable for 5 Hours)
Severity	Critical
Threshold	25
Throttle	0
Datawords	Location Tag—STRING [30]
Primary Cause	Billing has not been able to communicate with any RKS for the past five hours.
Primary Action	Check status of the primary and secondary RKS servers; attempt to bring them into service. Verify that the radius-profile table and call-agent-profile table are provisioned such that communication with the RKS servers is possible.

Billing (50)

Billing (50) is not used.

Billing (51)

Billing (51) is not used.

Billing (52)

Table 3-31 lists the details of the Billing (52) critical alarm. To troubleshoot and correct the cause of the alarm, refer to the "Bulk Data Management System Stopped Generating New Billing File—Billing (52)" section on page 3-41.

Table 3-31 Billing (52) Details

Description	Bulk Data Management System Stopped Generating New Billing File (BDMS Stopped Generating New Billing File)
Severity	Critical
Threshold	100
Throttle	0
Primary Cause	Call detail records are accumulating on the disk associated with the billing files in the EMS. This is because data is being written into the billing files faster than it is being forwarded to the Billing Mediation Server. The FTP to the Billing Mediation Server may not be working. The maximum disk partition for billing records has been exceeded or the maximum number of files has been exceeded.
Primary Action	Check Billing Mediation Server node name, user name, and password specified in BILLING_ACCT_ADDR table and log files. Correct any errors to let FTP start again. If billing_server_directory = "/dev/null" as in the lab, primary files under billing_directory will not be forwarded or deleted automatically. In this case, files have to be manually deleted or moved, and BDMS needs to be restarted before it will start generating new billing files.

Billing (53)

Table 3-32 lists the details of the Billing (53) minor alarm. To troubleshoot and correct the cause of the alarm, refer to the "Event Message Disk Space 50 Percent Full—Billing (53)" section on page 3-41.

Table 3-32 Billing (53) Details

Description	Event Message Disk Space 50 Percent Full
Severity	Minor
Threshold	100
Throttle	0
Datawords	Number of Megabytes Used for Eve—FOUR_BYTES Directory Containing Event Messa—STRING [30] Location Tag—STRING [30]
Primary Cause	The event message storage has reached 50% of the maximum storage allowed.
Primary Action	Move the event message files out of the specified directory. Store them in another location, or discard them.

Billing (54)

Table 3-33 lists the details of the Billing (54) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Event Message Disk Space 70 Percent Full—Billing (54)" section on page 3-41.

Table 3-33 Billing (54) Details

Description	Event Message Disk Space 70 Percent Full
Severity	Major
Threshold	100
Throttle	0
Datawords	Number of Megabytes Used for Eve—FOUR_BYTES Directory Containing Event Messa—STRING [30] Location Tag—STRING [30]
Primary Cause	The event message storage has reached 70% of the maximum storage allowed.
Primary Action	Move the event message files out of the specified directory. Store them in another location, or discard them.

Billing (55)

Table 3-34 lists the details of the Billing (55) critical alarm. To troubleshoot and correct the cause of the alarm, refer to the "Event Message Disk Space 100 Percent Full—Billing (55)" section on page 3-42.

Table 3-34 Billing (55) Details

Description	Event Message Disk Space 100 Percent Full
Severity	Critical
Threshold	100
Throttle	0
Datawords	Number of Megabytes Used for Eve—FOUR_BYTES Directory Containing Event Messa—STRING [30] Location Tag—STRING [30]
Primary Cause	The event message storage has been completely filled. No additional event messages will be written to disk until more space is made available.
Primary Action	Move the event message files out of the specified directory. Store them in another location, or discard them.

Billing (56)

Table 3-35 lists the details of the Billing (56) critical alarm. To troubleshoot and correct the cause of the alarm, refer to the "Billing Data Corruption Detected—Billing (56)" section on page 3-42.

Table 3-35 Billing (56) Details

Description	Billing Data Corruption Detected
Severity	Critical
Threshold	100
Throttle	0
Datawords	File/Table That May be Corrupt—STRING [32] Low End of the Range of Records—FOUR_BYTES High End of the Range of Records—FOUR_BYTES Error Code—FOUR_BYTES Location Tag—STRING [32]
Primary Cause	The billing data stored on the disk may have become corrupted due to a power outage, ungraceful shutdown, or disk failure.
Primary Action	The BDMS that detected the problem should have gone out of service; leave it in the out-of-service state and contact Cisco TAC for assistance.

Billing (57)

Table 3-36 lists the details of the Billing (57) informational event. For additional information, refer to the "Prepaid Subscriber Call Attempt Failed Because of Balance—Billing (57)" section on page 3-33.

Table 3-36 Billing (57) Details

Description	Prepaid Subscriber Call Attempt Failed Because of Balance
Severity	Information
Threshold	100
Throttle	0
Datawords	Instance Name—STRING [65] Calling Party—STRING [32] Called Party—STRING [32] Pop ID- STRING [32]
Primary Cause	The subscriber has consumed the balance on his or her account.
Primary Action	Ask the subscriber to deposit money in the account.
Secondary Cause	There may be a problem in the billing information at prepaid server.
Secondary Action	Verify the billing info at the prepaid server.

Billing (58)

Table 3-37 lists the details of the Billing (58) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Signaling Prepaid Server Inaccessible—Billing (58)" section on page 3-42.

Table 3-37 Billing (58) Details

Description	Signaling Prepaid Server Inaccessible
Severity	Major
Threshold	100
Throttle	0
Datawords	Instance Name—STRING [65] Pop ID—STRING [32] Radius Profile ID—STRING [32]
Primary Cause	All of the prepaid servers are down.
Primary Action	Check and correct the operating status of the prepaid servers.
Secondary Cause	The Internet Protocol (IP) network between the Cisco BTS 10200 plain old telephone service (POTS) Feature Server (FS) and the prepaid servers is down.
Secondary Action	Check and correct any problems in the IP network.

Billing (59)

Table 3-38 lists the details of the Billing (59) informational event. For additional information, refer to the "Billing File Name Type Change in Command Line Interface Is Inconsistent—Billing (59)" section on page 3-33.

Table 3-38 Billing (59) Details

Description	Billing File Name Type Change in the Command Line Interface is Inconsistent
Severity	Information
Threshold	100
Throttle	0
Primary Cause	A user updated the billing file name type in the CLI.
Primary Action	Execute a switchover or a platform restart so the change is propagated to the billing code.

Billing (60)

Table 3-39 lists the details of the Billing (60) major alarm. To troubleshoot and correct the cause of the alarm, refer to the "Bad File Detected During Startup—Billing (60)" section on page 3-42.

Table 3-39 Billing (60) Details

Description	Bad File Detected During Startup
Severity	Major
Threshold	100
Throttle	0
Datawords	Filename of the Bad File—STRING [128] Diagnosis—STRING [64] Changed to Filename—STRING [128]
Primary Cause	A bad billing file was generated due to a CPU failure, power outage, ungraceful shutdown, or disk failure.
Primary Action	The billing subsystem isolates the bad file, renames the bad billing file, and continues to complete the initialization. The bad file is placed out of the control of the billing subsystem, and the billing subsytem will not FTP the bad file to the BMS. The bad file should should be deleted, or the content of the file should be corrected and then the file should be uploaded to the BMS.

Monitoring Billing Events

This section provides the information needed to monitor and correct billing events. Table 3-40 lists all of the billing events in numerical order and provides cross-references to the subsections in this section..

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

Table 3-40 Cisco BTS 0200 Billing Events

Event Type	Event Name	Event Severity
Billing (1)	Test Report—Billing (1)	Information
Billing (2)	Billing Partition Disk Usage Minor Threshold Exceeded—Billing (2)	Minor
Billing (3)	Billing Partition Disk Usage Major Threshold Exceeded—Billing (3)	Major
Billing (4)	Billing Partition Disk Usage Critical Threshold Exceeded—Billing (4)	Critical
Billing (5)	Billing Partition Disk Usage Within Normal Range—Billing (5)	Information
Billing (6)	File Transfer Protocol/Secure File Transfer Protocol Transfer Failed—Billing (6)	Major
Billing (7)	Transmission Control Protocol Connection Error—Billing (7)	Critical
Billing (8)	Transmission Control Protocol Packet Receive Failure—Billing (8)	Major
Billing (13)	Database Connection Error—Billing (13)	Critical
Billing (14)	File Open Error—Billing (14)	Warning
Billing (15)	File Write Error—Billing (15)	Major
Billing (29)	Call Data Block Send Failed—Billing (29)	Major
Billing (30)	Domain Name Mapping Failed—Billing (30)	Major
Billing (31)	Port Not Specified—Billing (31)	Major
Billing (32)	Element Management System Address Not Specified—Billing (32)	Major
Billing (33)	File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid—Billing (33)	Major
Billing (35)	All Billing Links at Billing Server Down—Billing (35)	Critical
Billing (36)	Billing Link Restored—Billing (36)	Information
Billing (37)	Billing Link Failure—Billing (37)	Major
Billing (38)	Event Message Log File Access Error—Billing (38)	Major
Billing (40)	Event Message Encode Failure—Billing (40)	Minor
Billing (41)	Message Content Error—Billing (41)	Minor
Billing (42)	Error Reading Provisioned Data—Using Default—Billing (42)	Warning
Billing (44)	Record Keeping System Switch Occurred—Billing (44)	Major
Billing (45)	Event Message Log File Opened—Billing (45)	Minor

Table 3-40 Cisco BTS 0200 Billing Events (continued)

Event Type	Event Name	Event Severity
Billing (46)	Event Message Log File Closed—Billing (46)	Minor
Billing (47)	Record Keeping System Unreachable for One Hour—Billing (47)	Minor
Billing (48)	Record Keeping System Unreachable for Three Hours—Billing (48)	Major
Billing (49)	Record Keeping System Unreachable for Five Hours—Billing (49)	Critical
Billing (52)	Bulk Data Management System Stopped Generating New Billing File—Billing (52)	Critical
Billing (53)	Event Message Disk Space 50 Percent Full—Billing (53)	Minor
Billing (54)	Event Message Disk Space 70 Percent Full—Billing (54)	Major
Billing (55)	Event Message Disk Space 100 Percent Full—Billing (55)	Critical
Billing (56)	Billing Data Corruption Detected—Billing (56)	Critical
Billing (57)	Prepaid Subscriber Call Attempt Failed Because of Balance—Billing (57)	Information
Billing (58)	Signaling Prepaid Server Inaccessible—Billing (58)	Major
Billing (59)	Billing File Name Type Change in Command Line Interface Is Inconsistent—Billing (59)	Information
Billing (60)	Bad File Detected During Startup—Billing (60)	Major

Test Report—Billing (1)

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

Billing Partition Disk Usage Minor Threshold Exceeded—Billing (2)

The Billing Partition Disk Usage Minor Threshold Exceeded alarm (minor) indicates that a billing partition disk usage minor threshold crossing has occurred. To troubleshoot and correct the cause of the Billing Partition Disk Usage Minor Threshold Exceeded alarm, refer to the "Billing Partition Disk Usage Minor Threshold Exceeded—Billing (2)" section on page 3-35.

Billing Partition Disk Usage Major Threshold Exceeded—Billing (3)

The Billing Partition Disk Usage Major Threshold Exceeded alarm (major) indicates that a billing partition disk usage major threshold crossing has occurred. To troubleshoot and correct the cause of the Billing Partition Disk Usage Major Threshold Exceeded alarm, refer to the "Billing Partition Disk Usage Major Threshold Exceeded—Billing (3)" section on page 3-35.

Billing Partition Disk Usage Critical Threshold Exceeded—Billing (4)

The Billing Partition Disk Usage Critical Threshold Exceeded alarm (critical) indicates that a billing partition disk usage critical threshold crossing has occurred. To troubleshoot and correct the cause of the Billing Partition Disk Usage Critical Threshold Exceeded alarm, refer to the "Billing Partition Disk Usage Critical Threshold Exceeded—Billing (4)" section on page 3-36.

Billing Partition Disk Usage Within Normal Range—Billing (5)

The Billing Partition Disk Usage Within Normal Range event is informational and no further action is required.

File Transfer Protocol/Secure File Transfer Protocol Transfer Failed—Billing (6)

The File Transfer Protocol/Secure File Transfer Protocol Transfer Failed alarm (major) indicates that the billing information FTP/SFTP transfer has failed. To troubleshoot and correct the cause of the File Transfer Protocol/Secure File Transfer Protocol Transfer Failed alarm, refer to the "File Transfer Protocol/Secure File Transfer Protocol Transfer Failed—Billing (6)" section on page 3-36.

Note OpenSSH version 3.9p1 contains a bug that may cause billing file transfers over SFTP to fail.

Transmission Control Protocol Connection Error—Billing (7)

The Transmission Control Protocol Connection Error alarm (critical) indicates that an error has occurred on the TCP connection. To troubleshoot and correct the cause of the Transmission Control Protocol Connection Error alarm, refer to the "Transmission Control Protocol Connection Error—Billing (7)" section on page 3-37.

Transmission Control Protocol Packet Receive Failure—Billing (8)

The Transmission Control Protocol Packet Receive Failure alarm (major) indicates that a TCP packet receive failure has occurred. To troubleshoot and correct the cause of the Transmission Control Protocol Packet Receive Failure alarm, refer to the "Transmission Control Protocol Packet Receive Failure—Billing (8)" section on page 3-37.

Database Connection Error—Billing (13)

The Database Connection Error alarm (critical) indicates that a database connection error has occurred. To troubleshoot and correct the cause of the Database Connection Error alarm, refer to the "Database Connection Error—Billing (13)" section on page 3-38.

File Open Error—Billing (14)

The File Open Error event serves as a warning that a file open error has occurred. The primary cause of a file open error is a system malfunction. The system might be out of file descriptors. If a file open error has occurred, contact Cisco TAC to obtain technical assistance.

From the UNIX prompt, collect the following information prior to contacting Cisco TAC.

```
sysdef -i
df -k
```

File Write Error—Billing (15)

The File Write Error alarm (major) indicates that a file write error has occurred. To troubleshoot and correct the cause of the File Write Error alarm, refer to the "File Write Error—Billing (15)" section on page 3-38.

Call Data Block Send Failed—Billing (29)

The Call Data Block Send Failed alarm (major) indicates that a call data block (CDB) send has failed. To troubleshoot and correct the cause of the Call Data Block Send Failed alarm, refer to the "Call Data Block Send Failed—Billing (29)" section on page 3-38.

Domain Name Mapping Failed—Billing (30)

The Domain Name Mapping Failed alarm (major) indicates that a domain name mapping has failed. To troubleshoot and correct the cause of the Domain Name Mapping Failed alarm, refer to the "Domain Name Mapping Failed—Billing (30)" section on page 3-38.

Port Not Specified—Billing (31)

The Port Not Specified alarm (major) indicates that a port has not been specified or configured. To troubleshoot and correct the cause of the Port not Specified alarm, refer to the "Port Not Specified—Billing (31)" section on page 3-38.

Element Management System Address Not Specified—Billing (32)

The Element Management System Address Not Specified alarm (major) indicates that an EMS address has not been specified or configured. To troubleshoot and correct the cause of the Element Management System Address not Specified alarm, refer to the "Element Management System Address Not Specified—Billing (32)" section on page 3-39.

File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid—Billing (33)

The File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid alarm (major) indicates that the FTP/SFTP parameters configuration is not valid or has not been fully configured. To troubleshoot and correct the cause of the File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid alarm, refer to the "File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid—Billing (33)" section on page 3-39.

All Billing Links at Billing Server Down—Billing (35)

The All Billing Links at Billing Server Down alarm (critical) indicates that all of the billing links to the billing server are down. To troubleshoot and correct the cause of the All Billing Links at Billing Server Down alarm, refer to the "All Billing Links at Billing Server Down—Billing (35)" section on page 3-39.

Billing Link Restored—Billing (36)

The Billing Link Restored event is informational and no further action is required. The primary cause of the Billing Link Restored event is that the cable to the billing server or the link to the billing server has been restored.

Billing Link Failure—Billing (37)

The Billing Link Failure alarm (major) indicates that a link to the billing server has failed. To troubleshoot and correct the cause of the Billing Link Failure alarm, refer to the "Billing Link Failure—Billing (37)" section on page 3-39.

Event Message Log File Access Error—Billing (38)

The Event Message Log File Access Error alarm (major) indicates that an event message (EM) log file access error has occurred. To troubleshoot and correct the cause of the Event Message Log File Access Error alarm, refer to the "Event Message Log File Access Error—Billing (38)" section on page 3-39.

Event Message Encode Failure—Billing (40)

The Event Message Encode Failure alarm (minor) indicates that an EM encode failure has occurred. To troubleshoot and correct the cause of the Event Message Encode Failure alarm, refer to the "Event Message Encode Failure—Billing (40)" section on page 3-40.

Message Content Error—Billing (41)

The Message Content Error alarm (minor) indicates that a message content error has occurred. To troubleshoot and correct the cause of the Message Content Error alarm, refer to the "Message Content Error—Billing (41)" section on page 3-40.

Error Reading Provisioned Data—Using Default—Billing (42)

The Error Reading Provisioned Data—Using Default event functions as a warning that an error occurred during the reading of provisioning data and that the default provisioning data and default values will be used. The primary cause of the error is that the application was unable to read provisioned data and had to resort to using default values. Check to ensure a complete load has been installed on the Cisco BTS 10200 system. If the load is complete and the problem persists, contact Cisco TAC.

Record Keeping System Switch Occurred—Billing (44)

The Record Keeping System Switch Occurred alarm (major) indicates that an RKS switch has occurred. To troubleshoot and correct the cause of the Record Keeping System Switch Occurred alarm, refer to the "Record Keeping System Switch Occurred—Billing (44)" section on page 3-40.

Event Message Log File Opened—Billing (45)

The Event Message Log File Opened alarm (minor) indicates that an event message log file has been opened. To troubleshoot and correct the cause of the Event Message Log File Opened alarm, refer to the "Event Message Log File Opened—Billing (45)" section on page 3-40.

Event Message Log File Closed—Billing (46)

The Event Message Log File Closed alarm (minor) indicates that an event message log file has been closed. To troubleshoot and correct the cause of the Event Message Log File Closed alarm, refer to the "Event Message Log File Closed—Billing (46)" section on page 3-40.

Record Keeping System Unreachable for One Hour—Billing (47)

The Record Keeping System Unreachable for One Hour alarm (minor) indicates that the RKS servers have been unreachable for 1 hour. To troubleshoot and correct the cause of the Record Keeping System Unreachable for One Hour alarm, refer to the "Record Keeping System Unreachable for One Hour—Billing (47)" section on page 3-40.

Record Keeping System Unreachable for Three Hours—Billing (48)

The Record Keeping System Unreachable for Three Hours alarm (major) indicates that the RKS servers have been unreachable for 3 hours. To troubleshoot and correct the cause of the Record Keeping System Unreachable for Three Hours alarm, refer to the "Record Keeping System Unreachable for Three Hours—Billing (48)" section on page 3-41.

Record Keeping System Unreachable for Five Hours—Billing (49)

The Record Keeping System Unreachable for Five Hours alarm (critical) indicates that the RKS servers have been unreachable for 5 hours. To troubleshoot and correct the cause of the Record Keeping System Unreachable for Five Hours alarm, refer to the "Record Keeping System Unreachable for Five Hours—Billing (49)" section on page 3-41.

Bulk Data Management System Stopped Generating New Billing File—Billing (52)

The Bulk Data Management System Stopped Generating New Billing File alarm (critical) indicates that the BDMS has stopped generating new billing files. To troubleshoot and correct the cause of the Bulk Data Management System Stopped Generating New Billing File alarm, refer to the "Bulk Data Management System Stopped Generating New Billing File—Billing (52)" section on page 3-41.

Event Message Disk Space 50 Percent Full—Billing (53)

The Event Message Disk Space 50 Percent Full alarm (minor) indicates that the event message disk space is 50 percent full. To troubleshoot and correct the cause of the Event Message Disk Space 50 Percent Full alarm, refer to the "Event Message Disk Space 50 Percent Full—Billing (53)" section on page 3-41.

Event Message Disk Space 70 Percent Full—Billing (54)

The Event Message Disk Space 70 Percent Full alarm (major) indicates that the event message disk space is 70 percent full. To troubleshoot and correct the cause of the Event Message Disk Space 70 Percent Full alarm, refer to the "Event Message Disk Space 70 Percent Full—Billing (54)" section on page 3-41.

Event Message Disk Space 100 Percent Full—Billing (55)

The Event Message Disk Space 100 Percent Full alarm (critical) indicates that the event message disk space is 100 percent full. To troubleshoot and correct the cause of the Event Message Disk Space 100 Percent Full alarm, refer to the "Event Message Disk Space 100 Percent Full—Billing (55)" section on page 3-42.

Billing Data Corruption Detected—Billing (56)

The Billing Data Corruption Detected alarm (critical) indicates that billing data corruption has been detected. To troubleshoot and correct the cause of the Billing Data Corruption Detected alarm, refer to the "Billing Data Corruption Detected—Billing (56)" section on page 3-42.

Prepaid Subscriber Call Attempt Failed Because of Balance—Billing (57)

The Prepaid Subscriber Call Attempt Failed Because of Balance event functions as an informational alert that a prepaid subscriber call attempt has failed because of the subscriber account balance. The primary cause of the event is that the subscriber has an insufficient balance to place the attempted call. To correct the primary cause of the event, ask the subscriber to deposit more money in his or her account. Additionally, there may be a problem with the billing information on the prepaid server. To correct the secondary cause of the event, verify the billing information on the prepaid server.

Signaling Prepaid Server Inaccessible—Billing (58)

The Signaling Prepaid Server Inaccessible alarm (major) indicates that the signaling prepaid server has become inaccessible. To troubleshoot and correct the cause of the Signaling Prepaid Server Inaccessible alarm, refer to the "Signaling Prepaid Server Inaccessible—Billing (58)" section on page 3-42.

Billing File Name Type Change in Command Line Interface Is Inconsistent—Billing (59)

The Billing File Name Type Change in Command Line Interface Is Inconsistent event serves as an informational alert that a user updated the billing filename type in the CLI. To correct the primary cause of the event, execute a switchover or a platform restart so that the change is propagated to the billing code.

Bad File Detected During Startup—Billing (60)

The Bad File Detected During Startup alarm (major) indicates that a bad file was detected during system startup. To troubleshoot and correct the cause of the Bad File Detected During Startup alarm, refer to the "Bad File Detected During Startup—Billing (60)" section on page 3-42.

Troubleshooting Billing Alarms

This section provides the information needed to troubleshoot and correct billing alarms. Table 3-41 lists all of the billing alarms in numerical order and provides cross-references to the subsections in this section.

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

Table 3-41 Cisco BTS 10200 Billing Alarms

Alarm Type	Alarm Name	Alarm Severity
Billing (2)	Billing Partition Disk Usage Minor Threshold Exceeded—Billing (2)	Minor
Billing (3)	Billing Partition Disk Usage Major Threshold Exceeded—Billing (3)	Major
Billing (4)	Billing Partition Disk Usage Critical Threshold Exceeded—Billing (4)	Critical
Billing (6)	File Transfer Protocol/Secure File Transfer Protocol Transfer Failed—Billing (6)	Major
Billing (7)	Transmission Control Protocol Connection Error—Billing (7)	Critical
Billing (8)	Transmission Control Protocol Packet Receive Failure—Billing (8)	Major
Billing (13)	Database Connection Error—Billing (13)	Critical
Billing (15)	File Write Error—Billing (15)	Major
Billing (29)	Call Data Block Send Failed—Billing (29)	Major
Billing (30)	Domain Name Mapping Failed—Billing (30)	Major
Billing (31)	Port Not Specified—Billing (31)	Major
Billing (32)	Element Management System Address Not Specified—Billing (32)	Major
Billing (33)	File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid—Billing (33)	Major
Billing (35)	All Billing Links at Billing Server Down—Billing (35)	Critical
Billing (37)	Billing Link Failure—Billing (37)	Major
Billing (38)	Event Message Log File Access Error—Billing (38)	Major
Billing (40)	Event Message Encode Failure—Billing (40)	Minor
Billing (41)	Message Content Error—Billing (41)	Minor
Billing (44)	Record Keeping System Switch Occurred—Billing (44)	Major
Billing (45)	Event Message Log File Opened—Billing (45)	Minor
Billing (46)	Event Message Log File Closed—Billing (46)	Minor
Billing (47)	Record Keeping System Unreachable for One Hour—Billing (47)	Minor
Billing (48)	Record Keeping System Unreachable for Three Hours—Billing (48)	Major
Billing (49)	Record Keeping System Unreachable for Five Hours—Billing (49)	Critical

Table 3-41 Cisco BTS 10200 Billing Alarms (continued)

Alarm Type	Alarm Name	Alarm Severity
Billing (52)	Bulk Data Management System Stopped Generating New Billing File—Billing (52)	Critical
Billing (53)	Event Message Disk Space 50 Percent Full—Billing (53)	Minor
Billing (54)	Event Message Disk Space 70 Percent Full—Billing (54)	Major
Billing (55)	Event Message Disk Space 100 Percent Full—Billing (55)	Critical
Billing (56)	Billing Data Corruption Detected—Billing (56)	Critical
Billing (58)	Signaling Prepaid Server Inaccessible—Billing (58)	Major
Billing (60)	Bad File Detected During Startup—Billing (60)	Major

Billing Partition Disk Usage Minor Threshold Exceeded—Billing (2)

The Billing Partition Disk Usage Minor Threshold Exceeded alarm (minor) indicates that a billing partition disk usage minor threshold crossing has occurred. The primary cause of the alarm is that call detail records are accumulating on the disk associated with the billing database in the EMS. This is because data is being written into the database faster than it is being read out of the database. The minor threshold (default value = 70%) has been exceeded. Some fluctuation in disk usage is to be expected as call volume rises and falls during the day. Threshold crossings might step upward (from minor to major to critical) when there is a rapid increase in call volume, and then step downward (critical to major to minor) when call volume slows. To identify the primary cause of the alarm, monitor the alarm. The read should catch up to the write within a few minutes, and the alarm should not remain active. To monitor the alarm, use the **subscribe alarm-report** command. To obtain a summary, use the **report alarm-summary** command. Verify that type = billing is entered in these commands.

For additional troubleshooting information, from the UNIX prompt collect **df -k**.

Billing Partition Disk Usage Major Threshold Exceeded—Billing (3)

The Billing Partition Disk Usage Major Threshold Exceeded alarm (major) indicates that a billing partition disk usage major threshold crossing has occurred. The primary cause of the alarm is that call detail records are accumulating on the disk associated with the billing database in the EMS. This is because data is being written into the database faster than it is being read out of the database. The major threshold (default value = 80%) has been exceeded. Some fluctuation in disk usage is to be expected as call volume rises and falls during the day. Threshold crossings might step upward (from minor to major to critical) when there is a rapid increase in call volume, and then step downward (critical to major to minor) when call volume slows. To identify the primary cause of the alarm, monitor this alarm. The read should catch up to the write within a few minutes, and the alarm should not remain active. To monitor the alarm, use the **subscribe alarm-report** command. To obtain a summary, use the **report alarm-summary** command. Verify that type = billing is entered in these commands. If the alarm does not clear (or step down to a reduced level) in a few minutes, contact Cisco TAC for assistance.

Prior to contacting Cisco TAC, from the UNIX prompt collect **df -k** using the following commands.

```
df -k
du -sh /opt/bms/ftp/billing
```

Billing Partition Disk Usage Critical Threshold Exceeded—Billing (4)

The Billing Partition Disk Usage Critical Threshold Exceeded alarm (critical) indicates that a billing partition disk usage critical threshold crossing has occurred. The primary cause of the alarm is that call detail records are accumulating on the disk associated with the billing database in the EMS. This is because data is being written into the database faster than it is being read out of the database. The major threshold (default value = 90%) has been exceeded. Some fluctuation in disk usage is to be expected as call volume rises and falls during the day. Threshold crossings might step upward (from minor to major to critical) when there is a rapid increase in call volume, and then step downward (critical to major to minor) when call volume slows. To identify the primary cause of the alarm, monitor this alarm. The read should catch up to the write within a few minutes, and the alarm should not remain active. To monitor the alarm, use the **subscribe alarm-report** command. To obtain a summary, use the **report alarm-summary** command. Verify that type = billing is entered in these commands. If the alarm does not clear (or step down to a reduced level) in a few minutes, contact Cisco TAC for assistance.

Prior to contacting Cisco TAC, from the UNIX prompt collect **df -k** using the following commands.

```
df -k
du -sh /opt/bms/ftp/billing
```

File Transfer Protocol/Secure File Transfer Protocol Transfer Failed—Billing (6)

The File Transfer Protocol/Secure File Transfer Protocol Transfer Failed alarm (major) indicates that the billing information FTP/SFTP transfer to the billing server has failed. The primary cause of the alarm is that the Cisco BTS 10200 is unable to connect to a remote host. To correct the primary cause of the alarm, first verify the remote host is reachable. Run the **show billing-acct-addr** command and verify that the billing-server-addr is correct. Change the billing-server-addr, if necessary, by using the **change billing-acct-addr** command. The secondary cause of the alarm is that the Cisco BTS 10200 is unable to log in to remote host. To correct the secondary cause of the alarm, first use the **show billing-acct-addr** command to verify that the user-name is a valid user for the host specified in the billing-server-addr. If the user-name is correct and the TransferType dataword shows FTP, reenter the password by using the **change billing-acct-addr** command. If the user-name is correct and the TransferType dataword shows SFTP, verify that SSH keys have been preconfigured for user-name on both the Cisco BTS 10200 and the remote host. The ternary cause of the alarm is that a file transfer error occurred. To correct the ternary cause of the alarm, first check the Error dataword to see if it gives an indication of the kind of error that occurred. It could be a file-system error on the remote host, or a communication failure between the Cisco BTS 10200 and the remote host. The subsequent cause of the alarm is that the CDB_BILLING_SUPP flag is not set to Y in the call-agent-profile table. To correct the subsequent cause of the alarm, check and verify that the CDB_BILLING_SUPP flag is set to Y in the call-agent-profile table.

Note OpenSSH version 3.9p1 contains a bug that may cause billing file transfers over SFTP to fail.

Use the following information to check the datawords:

The datawords generated by the alarm are Filename (40), FTP address (40), and error (50), where:

- file name—The name of file that the Softswitch is attempting to send to the billing server.
- FTP address—The IP address/domain name of the billing server that the Cisco BTS 10200 is attempting to reach.
- error—One or more of the following data words can be displayed to indicate missing or incorrect information:
  - Log in—The username for the billing server is missing or incorrect in the database, or the user does not have the privilege level to write to the specified directory on the remote billing server.
  - Password—The password for the billing server is missing or incorrect in the database.
  - Connection—The billing-server-addr (IP address/domain name of billing server) is missing or incorrect in the database, or the connection to the billing server is unavailable.
  - Repository—The billing-server-directory identifier is missing or incorrect in the database, or the specified directory is not available on the billing server.

The alarm indicates a failure in making the FTP connection to the remote billing server to transfer billing information from the EMS. This can happen if

1. The FTP information has not been initialized.
2. The information in the Softswitch database does not match the remote billing server:
   a. The log in username (for the billing server) is missing or incorrect in the database.
   b. The username is correct but the user does not have the privilege level to write to the specified directory.
   c. The password (for the remote billing server) is missing or incorrect in the database.
   d. The billing-server-addr (IP address/domain name) is missing or incorrect in the database.
   e. The billing-server-directory identifier (repository) is missing or incorrect in the database.
3. The connection to the remote billing server is unavailable.
4. The specified directory is not available on the remote billing server.

Transmission Control Protocol Connection Error—Billing (7)

The Transmission Control Protocol Connection Error alarm (critical) indicates that an error has occurred on the TCP connection. The primary cause of the alarm is a system call error. To correct the primary cause of the alarm, check the address of the billing server in the Cisco BTS 10200 platform configuration. The secondary cause of the alarm is the Cisco BTS 10200 is not connected to the right address. To correct the secondary cause of the alarm, call Cisco TAC for technical support.

If the alarm is repeating, collect a packet capture between the Cisco BTS 10200 and the billing server prior to contacting Cisco TAC.

Transmission Control Protocol Packet Receive Failure—Billing (8)

The Transmission Control Protocol Packet Receive Failure alarm (major) indicates that a TCP packet receive failure has occurred. The primary cause of the alarm is that the peer went down and the socket closed. To correct the primary cause of the alarm, check the status of the peer and bring it up if it is down.

Database Connection Error—Billing (13)

The Database Connection Error alarm (critical) indicates that a database connection error has occurred. The primary cause of the alarm is that the SQL server is down. To correct the primary cause of the alarm, restart SQL server. If restarting SQL server does not correct the problem and clear the alarm, contact Cisco TAC for technical support.

Prior to contacting Cisco TAC, collect the following additional information.

From the EMS UNIX prompt, collect the following information:

```
ps -ef
nodestat
```

From the CLI prompt, collect the following information:

```
status system
```

File Write Error—Billing (15)

The File Write Error alarm (major) indicates that a file write error has occurred. The primary cause of the alarm is that a system error has occurred. The Cisco BTS 10200 system may be out of file descriptors. To correct the primary cause of the alarm, contact Cisco TAC for technical support.

Prior to contacting Cisco TAC, collect the following information from the UNIX prompt:

```
sysdef -i
df -k
```

Call Data Block Send Failed—Billing (29)

The Call Data Block Send Failed alarm (major) indicates that a CDB send has failed. The primary cause of the alarm is that a TCP send call has failed. To correct the primary cause of the alarm, check the port number and address of blg and bmg processes in he platform.cfg file. The secondary cause of the alarm is that both the EMS servers are down. To correct the secondary cause of the alarm, check if both EMS servers are down. If both EMS servers are down, bring at least one EMS server up.

Domain Name Mapping Failed—Billing (30)

The Domain Name Mapping Failed alarm (major) indicates that a domain name mapping has failed. The primary cause of the alarm is that the wrong DNS server name mapping is specified in the Cisco BTS 10200 configuration files. To correct the primary cause of the alarm, check the opticall.cfg and platform.cfg files for the correct mapping information.

Port Not Specified—Billing (31)

The Port Not Specified alarm (major) indicates that a port has not been specified or configured. The primary cause of the alarm is that the port is not specified in platform.cfg file. To correct the primary cause of the alarm, check the platform.cfg file and add the argument to blg -port 15260.

Element Management System Address Not Specified—Billing (32)

The Element Management System Address Not Specified alarm (major) indicates that an EMS address has not been specified or configured. The primary cause of the alarm is that either the primary or secondary EMS address has not been specified in the platform.cfg file. To correct the primary cause of the alarm, check the platform.cfg file to verify the process BLG and to add the missing addresses to the file.

File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid—Billing (33)

The File Transfer Protocol/Secure File Transfer Protocol Parameters Invalid alarm (major) indicates that the FTP/SFTP parameters configuration is not valid or the parameters have not been fully configured. The primary cause of the alarm is that the billing-acct-addr table is not fully provisioned with the information needed to perform file transfers. To correct the primary cause of the alarm, check billing-acct-addr fields by using the **show billing-acct-addr** command. For FTP file transfer, ensure that the billing-server-addr, billing-server-directory, user-name, and password (not displayed) are provisioned. Also ensure that the sftp-supp is set to N. For SFTP file transfer, ensure that the billing-server-addr, billing-server-directory, and user-name are provisioned. Also ensure that the sftp-supp is set to Y.

All Billing Links at Billing Server Down—Billing (35)

The All Billing Links at Billing Server Down alarm (critical) indicates that all of the billing links to the billing server are down. The primary cause of the alarm is that the cable connection to the Billing Server may have been pulled out. To correct the primary cause of the alarm, restore cable connection to the Billing Server. The secondary cause of the alarm is that an **ifconfig down** command may have been executed on the interfaces. To correct the secondary cause of the alarm, execute an **ifconfig up** command on the interfaces.

Billing Link Failure—Billing (37)

The Billing Link Failure alarm (major) indicates that a link to the billing server has failed. The primary cause of the alarm is that an interface cable may have been pulled. To correct the primary cause of the alarm, restore the cable connection. The secondary cause of the alarm is that an **ifconfig down** command may have been executed on the interface. To correct the secondary cause of the alarm, execute an **ifconfig up** command on the interface.

Event Message Log File Access Error—Billing (38)

The Event Message Log File Access Error alarm (major) indicates that an EM log file access error has occurred. The primary cause of the alarm is that a system error has occurred. The Cisco BTS 10200 system may be out of file descriptors. To correct the primary cause of the alarm, contact Cisco TAC. The secondary cause of the alarm is that a system hard drive may be faulty. To verify the secondary cause of the alarm, cause the BDMS to switch over to its mate node.

Event Message Encode Failure—Billing (40)

The Event Message Encode Failure alarm (minor) indicates that an EM encode failure has occurred. The primary cause of the alarm is that there is a problem with the format of the data being sent to the RKS. To correct the primary cause of the alarm, contact Cisco TAC.

Message Content Error—Billing (41)

The Message Content Error alarm (minor) indicates that a message content error has occurred. The primary cause of the alarm is that there is a mismatch between what the sender populated in the message and what the receiver expects. To correct the primary cause of the alarm, contact Cisco TAC.

Record Keeping System Switch Occurred—Billing (44)

The Record Keeping System Switch Occurred alarm (major) indicates that a RKS switch has occurred. The primary cause of the alarm is that billing changed the destination RKS (the RKS to which event messages are transmitted). The change could have been triggered by a communication problem with an RKS, or by an attempt to reestablish RKS communication. No further action is required to correct the primary cause of the alarm.

Event Message Log File Opened—Billing (45)

The Event Message Log File Opened alarm (minor) indicates that an event message log file has been opened. The primary cause of the alarm is that a log file has been created for the storage of event messages that cannot be transmitted to an RKS. No further action is required to correct the primary cause of the alarm.

Event Message Log File Closed—Billing (46)

The Event Message Log File Closed alarm (minor) indicates that an event message log file has been closed. The primary cause of the alarm is that an open event message log file has been closed. No further action is required to correct the primary cause of the alarm.

Record Keeping System Unreachable for One Hour—Billing (47)

The Record Keeping System Unreachable for One Hour alarm (minor) indicates that the RKS servers have been unreachable for 1 hour. The primary cause of the alarm is that billing has not been able to communicate with any RKS for the past hour. To correct the primary cause of the alarm, check the status of the primary and secondary RKS servers and attempt to bring them into service. Verify that the radius-profile table and call-agent-profile table are provisioned such that communication with the RKS servers is possible.

Record Keeping System Unreachable for Three Hours—Billing (48)

The Record Keeping System Unreachable for Three Hours alarm (major) indicates that the RKS servers have been unreachable for 3 hours. The primary cause of the alarm is that billing has not been able to communicate with any RKS for the past 3 hours. To correct the primary cause of the alarm, check the status of the primary and secondary RKS servers and attempt to bring them into service. Verify that the radius-profile table and call-agent-profile table are provisioned such that communication with the RKS servers is possible.

Record Keeping System Unreachable for Five Hours—Billing (49)

The Record Keeping System Unreachable for Five Hours alarm (critical) indicates that the RKS servers have been unreachable for 5 hours. The primary cause of the alarm is that billing has not been able to communicate with any RKS for the past 5 hours. To correct the primary cause of the alarm, check the status of the primary and secondary RKS servers and attempt to bring them into service. Verify that the radius-profile table and call-agent-profile table are provisioned such that communication with the RKS servers is possible.

Bulk Data Management System Stopped Generating New Billing File—Billing (52)

The Bulk Data Management System Stopped Generating New Billing File alarm (critical) indicates that the BDMS has stopped generating new billing files. The primary cause of the alarm is that call detail records are accumulating on the disk associated with the billing files in the EMS. This is because data is being written into the billing files faster than it is being forwarded to the Billing Mediation Server. The FTP to the Billing Mediation Server may not be working. The maximum disk partition for billing records has been exceeded or the maximum number of files has been exceeded. To correct the primary cause of the alarm, check the Billing Mediation Server node name, user name and password specified in the BILLING_ACCT_ADDR table and log files. Correct any errors to let FTP start again. If billing_server_directory = “/dev/null”, primary files under billing_directory are not forwarded or deleted automatically. In this case, files have to be manually deleted or moved out, and the BDMS needs to be restarted before it begins to generate new billing files.

Event Message Disk Space 50 Percent Full—Billing (53)

The Event Message Disk Space 50 Percent Full alarm (minor) indicates that the event message disk space is 50 percent full. The primary cause of the alarm is that the event message storage has reached 50% of the maximum storage space allowed. To correct the primary cause of the alarm, move the event message files out of the specified directory. Store them in another location, or discard them.

Event Message Disk Space 70 Percent Full—Billing (54)

The Event Message Disk Space 70 Percent Full alarm (major) indicates that the event message disk space is 70 percent full. The primary cause of the alarm is that the event message storage has reached 70% of the maximum storage space allowed. To correct the primary cause of the alarm, move the event message files out of the specified directory. Store them in another location, or discard them.

Event Message Disk Space 100 Percent Full—Billing (55)

The Event Message Disk Space 100 Percent Full alarm (critical) indicates that the event message disk space is 100 percent full. The primary cause of the alarm is that the event message storage has been completely filled. No additional event messages will be written to the disk until more space is made available. To correct the primary cause of the alarm, move the event message files out of the specified directory. Store them in another location, or discard them.

Billing Data Corruption Detected—Billing (56)

The Billing Data Corruption Detected alarm (critical) indicates that billing data corruption has been detected. The primary cause of the alarm is that the billing data stored on disk may have become corrupted due to a power outage, ungraceful shutdown, or hard-drive failure. To correct the primary cause of the alarm, make sure that the BDMS that detected the problem has gone to the out-of-service state. Leave the BDMS in the out-of-service state and contact Cisco TAC for assistance.

Signaling Prepaid Server Inaccessible—Billing (58)

The Signaling Prepaid Server Inaccessible alarm (major) indicates that the signaling prepaid server has become inaccessible. The primary cause of the alarm is that all the prepaid servers are down. To correct the primary cause of the alarm, check the operating status of the prepaid servers. If possible, place the prepaid servers back into service. The secondary cause of the alarm is that the IP network between the Cisco BTS 10200 POTS feature server (FS) and the prepaid servers is down. To correct the secondary cause of the alarm, check and correct any problems in IP network.

Bad File Detected During Startup—Billing (60)

The Bad File Detected During Startup alarm (major) indicates that a bad file was detected during startup. The primary cause of the alarm is that a bad billing file was generated due to a CPU failure, power outage, ungraceful shutdown, or disk failure. To correct the primary cause of the alarm, delete the bad file or correct the content of the file and upload the corrected file to the BMS system. If the bad file is not deleted or or corrected, it remains on the system and is not automatically sent by FTP to the BMS system.