Carrier VoIP

CICM Performance Management

NN10248-711

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New in this release

The following sections detail what's new in *CICM Performance Management* (NN10248-711) for release (I)SN09U.

- "Feature impacts" (page 5)
- "Other changes" (page 5)

Feature impacts

There have been no feature updates to the document in this release.

Other changes

See the following section for information about changes that are not feature-related:

Performance metrics

The list of metrics gathered by the Centrex IP Client Manager (CICM) node and CICM Element Manager (CICM-EM) is updated. See "Performance metrics" (page 24).

CICM Performance Management

The *CICM Performance Management* NTP (NN10248-711) provides the performance management strategy and procedures for Centrex IP Client Manager (CICM) nodes (gateways) and their element managers (EM). This document is part of the CICM customer documentation suite. The complete list of documents in the suite is identified in *CICM Basics* (NN0044-111).

Navigation

- "Performance management overview" (page 7)
- "Operational measurements" (page 11)
- "Basic and extended QoS statistics reporting for CICM nodes" (page 11)
- "Performance management procedures" (page 15)
- "IEMS with CICM and CICM-EM nodes" (page 18)
- "Performance metrics" (page 24)

Performance management overview

Operational measurements (OM) define measurement criteria. Office Parameters set OMs collections and reporting criteria.

Office parameters are initially set by Nortel to meet design criteria and switch configuration. Service providers can provision performance management on the Centrex IP Client Manager (CICM) by configuring Office Parameters for OMs on all element managers (EM).

Navigation

- "Capacity and performance limitations" (page 8)
- "Traffic loading" (page 9)
- "Architectural resilience" (page 10)
- "Software resilience" (page 10)

Capacity and performance limitations

Beginning with release SN08, there is support for up to 8 pairs of CPN5385 CPU cards per SAM21 shelf and one pair of CPV5370 CPU cards per SAM16 shelf. The capacity limits for each pair are identified in "CICM capacity attributes" (page 8).

CICM capacity attributes

Capacity attribute (maximum)	SAM16 platform (CPV5370)	SAM21 platform (CPN5385)
Provisionable lines	1,023	3,069
Simultaneous Terminal Sessions	2,500	4,096
Historical Terminal Entries	10,000	10,000
Simultaneous Active Half-Calls	512	3,069
BHHCA	7,200	21,600
RUDP Messages/Sec	500	500
H.248 Messages/Sec	100	250

The definitions of these attributes are as follows:

- **Provisionable Lines**

  The maximum number of lines. A Centrex IP Client Manager (CICM) line corresponds to a LEN on the CS2000. This represents the number of users that a CICM node can accommodate.

- **Simultaneous Terminal Sessions**

  The maximum number of simultaneous terminal sessions equates to the number of terminals that are currently connected to the CICM, even if these terminals do not have users logged on to them.

- **Historical Terminal Entries**

  As a new terminal connects to the CICM node, information about the terminal is automatically added to the CICM MIB (that is, firmware load, and so on). As each terminal identifies itself uniquely to the CICM node, it is possible to ensure that the same entry is re-used when this terminal connects again.

  Each new terminal that has never connected to a CICM node generates a new entry in the MIB. However, because this configuration data uses memory resources, there is a limit to the amount of historical information that is saved on the CICM node. When this maximum is reached, additional new connections are denied access until other entries are cleared manually using the CICM Element Manager (CICM-EM). When this maximum is reached, an alarm is raised.

This limit also represents the maximum number of terminals that can be serviced by a single enterprise profile.

To conserve memory resources, Nortel recommends that you remove the historical terminal entry for any terminals removed from the network.

- **Simultaneous Active Half-Calls**

  The CICM node knows only about half-calls. Even if the second half of a call is also hosted by the same CICM node, the CICM has no knowledge of this and treats them as independent call halves.

  The number of simultaneous half-calls represents the maximum number of half-calls that can be established at any one time by the CICM node. Once the maximum is reached, new call attempts (incoming or outgoing) are denied.

  Any single terminal can support up to eight simultaneous active call halves, using various features such as multiple destination numbers (DN), call hold, and so on.

- **BHHCA**

  Busy Hour Half Call Attempts (BHHCA) represents the maximum rate at which half call attempts can be made per hour. Once the BHHCA reaches 80% of the set value, a minor alarm is raised. At 100%, a major alarm is raised, and at 150% a critical alarm is raised and no additional calls are permitted. The critical alarm clears automatically once the BHHCA drops to below 100% for more than 5 minutes. The major alarm is cleared once the BHHCA drops to below 80% for 5 minutes. The minor alarm clears once BHHCA drops below 80% for 15 minutes.

- **RUDP Messages/Sec**

  Reliable User Datagram Protocol (RUDP) is the transport mechanism for the UNIStim protocol. UNIStim is the protocol used for all messaging between the CICM node and its terminals. The incoming message rate is throttled to prevent the CICM node from becoming overloaded.

- **H.248 Messages/Sec**

  H.248 is the messaging protocol used between the CICM node and the gateway controller (GWC). Similarly, the incoming message rate from the GWC is throttled to prevent the CICM node from becoming overloaded.

Traffic loading

Beginning with release SN08, there is support for the following capacities, for either the SAM16 (CPV5370) or the SAM21 (CPN5385) platforms:

- per Centrex IP Client Manager (CICM) node resource card pair
  - — subscriber line provisioning capacity for SAM21 is 3,069 and SAM16 is 1,023

  - BHHCA is 21,600 for SAM21 and 7,200 for SAM16
  - active calls is 3,069 for SAM21 and 512 for SAM16

- scalable solution by adding more CICM node resource cards
- one pair of CICM Element Manager (CICM-EM) cards is needed for CS2000
  - able to support up to 100 CICM resource card (node) pairs
- per gateway controller (GWC) resource card pair:
  - subscriber line provisioning capacity is 8,200
  - BHHCA is 38,000

Architectural resilience

Each Centrex IP Client Manager (CICM) node pair is partitioned into two identical independent physical nodes: Node A and Node B, one card per node. The CICM node uses a SAM21 hardware platform with dual cPCI backplane.

The two CICM nodes for a SAM16 hardware platform are contained in two half shelves. There is one pair of CPV5370 CPU cards per shelf. Each CICM node, or half shelf, having one CPU card and a hot swap controller card.

Towards the gateway controller (GWC), the two cards present themselves as a single network entity (one CPU is the master, the other is a hot-standby slave). The terminals are configured with one IP address which fails over to the other node when a failure or maintenance occurs.

The redundancy of node pairs allows the CICM or CICM Element Manager (CICM-EM) to react promptly to a node failure by switching all terminals to the remaining active node with minimal service loss. With CPN5385 CPU cards, redundancy for the CICM and CICM-EM node pairs can be increased by installing them onto different SAM21 shelves.

With CPV5370 CPU cards, the pair of CICM cards are installed onto the same SAM16 shelf, while the CICM-EM cards are installed in separate CPX1204 chassis for redundancy.

Software resilience

The Centrex IP Client Manager (CICM) nodes use Microsoft Windows XP Embedded as their operating system, while the CICM Element Manager (CICM-EM) uses Microsoft Windows 2000.

Operational measurements

Operational measurements (OM) provide information on the performance of the components of the network. Periodic scans of network components and activities result in the collection, storage and transmission of data. Operating company personnel set the office parameters that define the way OMs are collected, stored, transmitted and reported.

Types of OMs:

- Event OMs— increment each time a predetermined event occurs. These events are predefined in the software.
- Usage OMs—increment at preset intervals if the appropriate device is in use. These registers are predefined in the software.
- High Watermark OMs—measure the highest level of usage within a set time interval.

The OMs, and especially the High Watermark OMs, can be used as a benchmark of the levels of traffic-dependent activity on the switch during the current interval.

For additional OM information and the reasons for incrementing each register, refer to *Carrier Voice over IP Performance Management Operational Measurements Reference* (NN10264-709v1 through v4).

Basic and extended QoS statistics reporting for CICM nodes

The Quality of Service (QoS) for each call through a Nortel IP Phone that is connected to a Centrex IP Client Manager (CICM) node can be enabled, reported by the system, and read by a telco administrator.

The method of reporting and the supported IP Phones is in QoS reporting for CICM node calls, in *CICM Basics* (NN10044-111).

The procedure Enabling or disabling QoS reporting, is in *CICM Configuration Management* (NN10240-511).

"Application of QoS statistics for Nortel IP Phones" (page 12) identifies the QoS parameters that are collected for the various phone sets. The headings represent as follows:

- P1 is for the phase 1 IP Phones
- P2 is for the phase 2 IP Phones
- abbrev is the abbreviation of the parameter name that appears in an extended report

- parameter names are listed in alphabetical order and described after the table

Application of QoS statistics for Nortel IP Phones

P1	P2	Parameter name	Abbrev	Basic	Extended
	X	Average Burst Density	BDA		X
	X	Average Burst Length in MS	BLA		X
	X	Average Discard Rate	DRA		X
	X	Average Gap Density	GDA		X
	X	Average Gap Length in MS	GLA		X
	X	Average Loss Rate	LRA		X
	X	Average Network Loss Rate	NLRA		X
	X	Average Noise Level	NLA		X
	X	Average One Way Delay	OWDA	X	X
	X	Average Signal Power	SPA		X
	X	Burst Count	BC		X
	X	Burst R Factor	BRF		X
	X	Conversational R Factor	CRF		X
	X	Conversational Quality MOS	CM		X
	X	Echo Return Loss	ERL		X
	X	End System Delay	ESDA		X
X	X	Far End Originated Loss	FEOL	X	X
	X	Gap R Factor	GRF		X
X	X	Jitter Average	JA	X	X
X	X	Jitter High Water Mark	JHW		X
	X	Listening Quality MOS	LM		X
	X	Listening R Factor	LRF		X
	X	Local Silence Suppression	SS		X
	X	Local Rx and Tx Codec Type	rC/tC		X
	X	Local Rx and Tx Packetization Rate	rPR/tPR		X
	X	Maximum One Way Delay	OWDM		X
	X	MIU Discard Percentage	MDiP		X
	X	MIU Duplicate Percentage	MDP		X
	X	MIU Duration	MD		X
	X	MIU Loss Percentage	MLP		X
	X	MIU Out of Order Percentage	MOOOP		X

P1	P2	Parameter name	Abbrev	Basic	Extended
	X	MIU per Packet	MPP		X
	X	Number of RTP packets Rx/Tx	rP/tP	X	X
	X	Number of RTP packets Out of Order	rPOOO		X
	X	Octets Rx/Tx	rO/tO	X	X
X	X	Round Trip Average	RTA		X
X	X	Round Trip High Water Mark	RTHW		X

This table describes the QoS parameters in "Application of QoS statistics for Nortel IP Phones" (page 12).

Quality of Service parameter description

Parameter	Description
Average Burst Density (BDA)	An 8:8 fixed-point value (scaled by 256) for the average percentage of MIUs lost or discarded during burst periods.
Average Burst length in MS (BLA)	The milliseconds for the average length of all burst periods that have occurred on the call.
Average Discard Rate (DRA)	An 8:8 fixed-point value (scaled by 256) for the total average percentage of MIUs discarded.
Average Gap Density (GDA)	An 8:8 fixed-point value (scaled by 256) for the average number of MIUs lost or discarded within gap periods.
Average Gap Length in MS (GLA)	The milliseconds for the average length of all gaps that have occurred on the call.
Average Loss rate (LRA)	An 8:8 fixed-point value (scaled by 256) for the total average percentage of MIUs lost or discarded.
Average Network Loss Rate (NLRA)	An 8:8 fixed-point value (scaled by 256) for the total average percentage of MIUs lost in the network.
Average Noise Level (NLA)	The decibels for the ratio of the silent period background noise level to the overflow signal power.
Average One Way Delay (OWDA)	The milliseconds for the average one-way delay.
Average Signal Power (SPA)	The decibels for the ratio of the signal level to the overflow signal level, measured only for packets containing speech energy.
Burst Count (BC)	The number of bursts that have occurred on the call.
Burst R Factor (BRF)	The R factor during a burst period, where a burst is the longest sequence of packets bounded by lost or discarded packets.
Conversational R Factor (CRF)	The segment of the call that is carried over the network segment outside of the real-time portal (RTP) segment (for example, a cellular network); it relates to the outward voice path from the VoIP termination for which this metrics block applies.

Parameter	Description
Conversational Quality MOS (CM)	10 to 50 for MOS 1.0 to 1.5 respectively for the estimated mean opinion score (MOS) for conversational quality.
Echo Return Loss (ERL)	The decibels for the sum of the measured echo return loss (ERL) and the echo return loss enhancement (ERLE), that is, the ratio of a transmitted voice signal that is reflected back to the talker.
End System Delay (ESDA)	The milliseconds for the most recently specified or calculated end system delay; this includes: • the sample accumulation and encoding delay • the average jitter buffer delay • the decoding and playout delay
Gap R Factor (GRF)	The R factor during a gap period, where a gap is the period of time between two bursts.
Jitter Average (JA)	The average in 1/65536 seconds of the incoming real-time portal (RTP) packets inter-arrival time due to transmission (routing, queuing delay, and so on) through the network
Jitter High Water Mark (JHW)	The maximum in 1/65536 seconds of the incoming real-time portal (RTP) packets inter-arrival time due to transmission (routing, queuing delay, and so on) through the network.
Listening Quality MOS (LM)	10 to 50 for MOS 1.0 to 1.5 respectively for the estimated mean opinion score (MOS) for listening quality.
Listening R Factor (LRF)	The direct measurement of the quality or transmission quality for the segment of the call that is carried over the real-time portal (RTP) session; the measurement is from the effects of: • the CODEC type • the packet loss • discard • burstiness • delay
Local Silence Suppression (SS)	Indicates if SS was used.
Local Rx and Tx CODEC Type (rC/tC)	Indicates the CODEC type.
Local Rx and Tx Packetization Rate (rPR/tPR)	Indicates the frame duration in milliseconds.
Maximum One Way Delay (OWDM)	The milliseconds for the maximum one-way delay.

Parameter	Description
MIU Discard Percentage (MDiP)	An 8:8 fixed-point value (scaled by 256) for the percentage of MIUs that were handled by the call channel and were discarded by the endpoint.
MIU Duplicate Percentage (MDP)	An 8:8 fixed-point value (scaled by 256) for the percentage of MIUs that were handled by the call channel and were discarded by the endpoint.
MIU Duration (MD)	The milliseconds for the duration of each MIU.
MIU Loss Percentage (MLP)	An 8:8 fixed-point value (scaled by 256) for the percentage of MIUs that were handled by the call channel and were lost in the network.
MIU Out of Order Percentage (MOOOP)	An 8:8 fixed-point value (scaled by 256) for the percentage of MIUs that were handled by the call channel and were discarded by the endpoint.
MIU per Packet (MPP)	The total number of MIUs in each real-time portal (RTP) packet.
Number of RTP Packets Rx/Tx (rP/tP)	The number of real-time protocol (RTP) packets received and transmitted.
Number of RTP Packets Out of Order (rPOOO)	The number of real-time protocol (RTP) packets received out of sequence.
Octets Rx/Tx (rO/tO)	0 (zero) in all reports for the number of octets sent and received because no IP Phone set supports it.
Round Trip Average (RTA)	The average in 1/65536 seconds of the incoming Real-Time Transport Control Protocol (RTCP) packets round trip time.
Round Trip High Water Mark (RTHW)	The maximum in 1/65536 seconds of the incoming RTCP packets round trip time.

Performance management procedures

Navigation

- "Viewing CICM operational measurements" (page 15)
- "Viewing CICM node status and statistics" (page 16)
- "Viewing connections, terminals, and packets performance statistics" (page 17)
- "Viewing chassis components status" (page 18)

Viewing CICM operational measurements

Follow this procedure to view Centrex IP Client Manager (CICM) operational measurements (OM).

You can view CICM OMs using the command **OMSHOW**, which displays or prints a report for the specified OM group.

The Active class of OMs contains the OM groups that are current for the software load. The Holding class of OMs contains the OM groups for the previous measurement cycle.

Step	Action
1	Go to the LMM Interface.
2	Type **OMSHOW LMD ACTIVE** to view the current 15-minute operational measurements for the peripheral modules. LMD is the OM group that provides traffic information for the peripheral modules (PM). All remote units on the CS2K are displayed with an index number before its name.
3	Add the index number after the entry to show the OMs for a specific remote unit. For example, **OMSHOW LMD ACTIVE 2**.
4	Press **Enter**.
5	Type **OMSHOW LMD HOLDING** to view the previous 15-minute measurements.
6	Press **Enter**.

—End—

Viewing CICM node status and statistics

Follow this procedure to view these Centrex IP Client Manager (CICM) status and statistics for each node:

- node status (master or slave)
- service status (running or idle)
- node maintenance status
  - — current reboot count
- version (software version running on the node)
- terminal service status (started, stopped, or shutting down)
- number of logged in users (total login count)
- number of active terminals
  - — details of terminal login statistics show the type of terminals
- number of active calls (total call count)

Follow this procedure to view the CICM node status and statistics for each node.

Step	Action
	From the CICM-EM home page
1	Select the CICM node from the pick-list.
2	Click **view the status of the following CICM** . *The **cicm status** page opens.*
3	Click **perform maintenance on <cicm_name>**. *The maintenance status page opens.*
4	Scroll down the page to view the status and statistics for each node.
	From the reset counter
5	Perform these steps to reset the Current Reboot Count, Total Login Count or Total Call Count: a. Select the node. b. Select the counter from the pick-list. c. Click **reset counter**. *The selected counters are reset.* *The Line Login Count and Total Call Count statistics are automatically reset when the node reboots.*

—End—

Viewing connections, terminals, and packets performance statistics

Follow this procedure to view the performance statistics on each Centrex IP Client Manager (CICM) node.

Step	Action
	From the CICM home page
1	Select the CICM to view.
2	Click **view the status of the following CICM**. *The **status cicm** page opens.*
3	From the **performance monitoring** pick-list, select **Connections**. *The Connections section opens.*

4 From the **performance monitoring** pick-list, select **Terminals**.

The Terminal login statistics section opens.

5 From the **performance monitoring** pick-list, select **Packets**.

The Packet rates statistics section opens .

—End—

Viewing chassis components status

Follow this procedure to view the chassis components status for a Centrex IP Client manager (CICM) node.

Step	Action

Go to the CICM home page

1 From the **view the status of the following cicm** pick-list, select the CICM node to view.

The cicm status page opens.

2 Click **view status of chassis components**.

The cicm status page updates, showing the chassis components details.

3 Scroll down the page to view the card and fan status, and CPU temperature.

—End—

IEMS with CICM and CICM-EM nodes

The Integrated Element Manager System (IEMS) is an interface in the Carrier Voice over IP (VoIP) network that provides access to the alarms and logs for a network element. The IEMS is accessed using a graphical user interface (GIU), and it also interacts with the CICM Element Manager (CICM-EM) GUI.

The CICM-EM integrates with the IEMS. The CICM alarms, logs, and performance metrics are formatted to be compatible with IEMS.

Both the CICM and the CICM-EM nodes can raise alarms and faults to the IEMS. The CICM-EM raise alarms associated with the EM Platform (for example, memory shortage), and communicate with the CICM nodes that it

manages, but does not have knowledge of the alarms and faults generated by the CICM nodes. Each CICM node sends alarms as SNMP traps directly to the IEMS such that the CICM-EM is unaware of the alarms.

See "CICM fault architecture" (page 20) for an overview of the CICM fault architecture.

See "CICM performance architecture" (page 20) to view the elements of the CICM Performance architecture.

Navigation

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- "Component IDs" (page 22)
- "Logs" (page 23)
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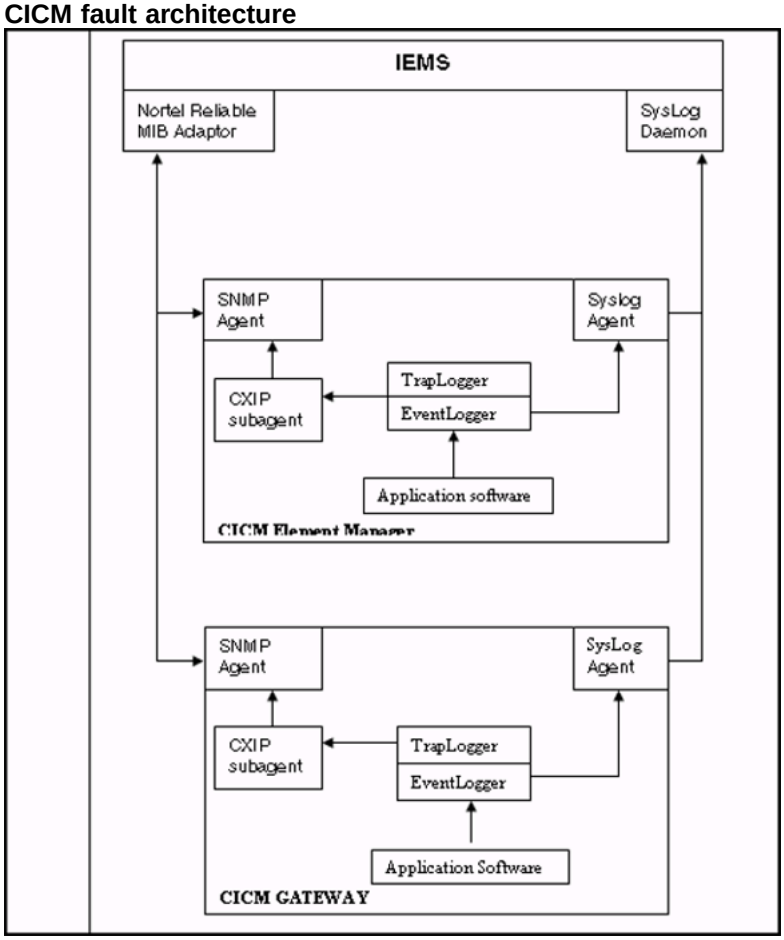
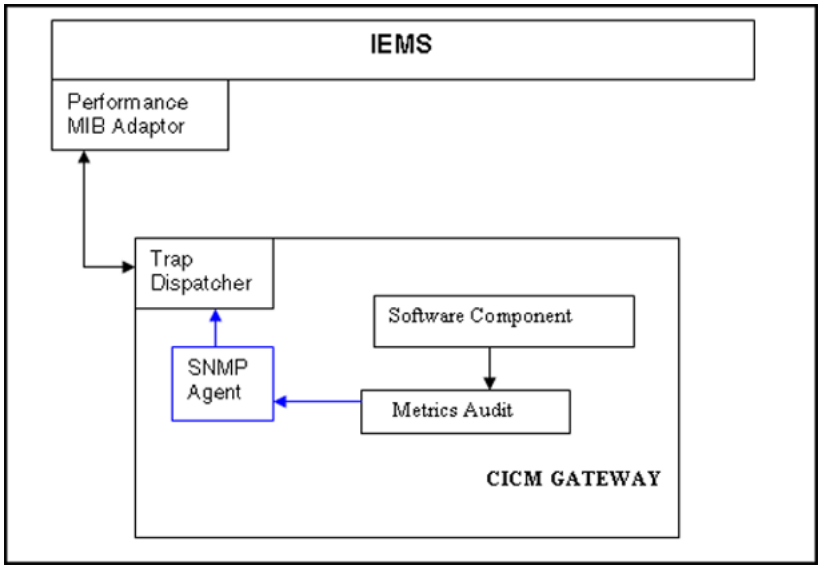
- "Audit logs" (page 24)
- "Debug logs" (page 24)

CICM fault architecture



CICM performance architecture



Alarms

All alarms are sent to the Integrated Element Manager System (IEMS) as an SNMP trap, and as a log to SYSlog. Each trap sent from the Centrex IP Client Manager (CICM) incorporates the following information:

- sequence number
- severity indicator
- component ID
- category of alarm
  - — communications
  - — quality of service
  - — processing error
  - — equipment
  - — environment
- notification ID
- description
- time stamp
- probable cause
- specific problem
- correlation ID list

The alarm severity is classification is shown in "Alarm severity" (page 21).

Alarm severity

Alarm severity	Service affecting	Action required	Recommended timeliness of the action	Target reporting time
Critical	yes	yes	immediate action required	within 2 seconds
Major	yes	yes	rapid action required—next work shift	within 30 seconds
Minor	no (only a few are affected)	yes	soon—could be delayed for a day or two	within 2 minutes
Warning	no	no	later—investigate if alarm reoccurs	within 5 minutes

Fields which are valid for alarm raises are:

- nortelNMIcurrentTxNotificationSequenceNum
- nortelNMIalarmComponentId
- nortelNMIalarmCategory
- nortelNMIalarmNotificationID
- nortelNMIalarmDescription
- nortelNMIalarmTimeStamp
- nortelNMIalarmProbableCause
- nortelNMIalarmSpecificProblem
- nortelNMIalarmCorrelationIdList
- nortelNMIalarmNeVendorSpecificInfo
- nortelNMIalarmTechnologySpecificInfo

Fields which are valid for alarm clears are:

- nortelNMIcurrentTxNotificationSequenceNum
- nortelNMIalarmComponentId
- nortelNMIalarmDescription
- nortelNMIalarmTimeStamp
- nortelNMIalarmCorrelationIdList

Component IDs

The Centrex IP Client Manager (CICM) is divided into the following objects for reporting alarms:

- the CICM Element Manager (CICM-EM)
- a CICM node
- the platform which the CICM-EM and the CICM nodes use

These objects contain sub-objects. When they are appended together with the alarm type they form the Component ID. See the "Component IDs" (page 23).

Component IDs

Object	Sub Object	Component Id
CICM element manager	Node (CICM)	CICMEM<NN>;CICMEM.NODE.<cicmID+node>
	General	CICMEM<NN>;CICMEM.GENERAL.<cicmID+node>
CICM node	User	CICM<NN>;CICM.USER.<user id>.<event>
	Terminal	CICM<NN>;CICM.TERMINAL.<Terminal id>.<event>
	Endpoints	CICM<NN>;CICM.EP.<Endpoint Number>.<event>
	Network Transport	CICM<NN>;CICM.NET.<event>
	VMG	CICM<NN>;CICM.VMG.<VMG id>.<event>
	General	CICM<NN>;CICM.GENERAL.<event>
CICM platform	User	CICM[EM]<NN>;CICMP.USER.<event>
	Console	CICM[EM]<NN>;CICMP.CON.<event>
	Network connections	CICM[EM]<NN>;CICMP.NET.<event>
	Mate node	CICM[EM]<NN>;CICMP.MATE.<event>
	Chassis	CICM[EM]<NN>;CICMP.CHAS.<event>
	Cards	CICM[EM]<NN>;CICMP.CARD.<card number>.<event>
	Logs	CICM[EM]<NN>;CICMP.LOGS.<event>
	Software Component	CICM[EM]<NN>;CICMP.SW.COMP<component number>
	Configuration database	CICM[EM]<NN>;CICMP.CONF.<event>

Logs

Both the Centrex IP Client Manager (CICM) nodes and the CICM Element Manager (CICM-EM) are responsible for sending their logs to the Integrated Element Manager System (IEMS). Logs are not exchanged between the CICM and CICM-EM.

Logs are sent to the IEMS using CUSTLOG or security log formats through a syslog agent. Three log streams are used to send logs to up to three different syslog daemons (that is, IEMS). This is a change from previous CICM releases, where all logs were stored on the CICM. In release (I)SN08, logs are stored on the CICM, but the CICM also sends logs to CUSTLOG, Audit Log, and Security Log streams.

Each log is formatted specifically for each of the three streams.

CICM uses the syslog protocol to send logs to the IEMS. CICM and CICM-EM both act as log senders. They are only able to send syslog messages; they are not able to receive or relay syslog messages. UDP port 514 (the syslog port) is used to send the syslog messages to the IEMS. The log packet must be less than 1024 bytes.

Custlog

The Centrex IP Client Manager (CICM) logs the following events using the custlog format, and output the logs to the custlog stream:

- Service affecting state changes
- Specific customer/blm requested events
- Data corruptions/data mismatches

- Shutdown and restart of processes

Security logs

Security Logs are generated from the Centrex IP Client Manager (CICM) nodes as follows:

- upon successful/unsuccessful login from an IP Phone or m6350 Softclient
- logout from an IP Phone or m6350 SoftClient

Security Logs are generated from a CICM Element Manager (CICM-EM) as follows:

- upon launching CICM-EM from Integrated Element Manager System (IEMS)

The CICM logs the following events using the security log format and output the logs to the security log stream.

- unsuccessful terminal logins
- successful terminal logins

Audit logs

Audit logs are generated from the Centrex IP Client Manager (CICM) on executing flow-through commands at OSSGATE, for example, ado, and deo.

The audit logs are in the same format as the security logs. The following actions are logged to the audit stream:

- all configuration changes made by the CICM Element Manager (CICM-EM) administrator, for example, when CICM nodes are added
- all mtc actions performed by the device, restarts for example

Debug logs

Debug logs are used by Nortel support personnel only, not the service provider. Debug logs were not changed in release (I)SN08, but they can now be viewed using the Centrex IP Client Manager Element Manager (CICM-EM) Web page interface. Debug logs are not sent through syslog to the Integrated Element Manager System (IEMS).

Performance metrics

Performance metrics are generated by both the Centrex IP Client Manager (CICM) nodes and the CICM Element Managers (CICM-EM). They are passed northbound into the Integrated Element Manager System (IEMS), where they are available for display and are aggregated with other IEMS southbound feeds into a single OSS feed.

The CICM node and CICM-EM gather the following metrics:

- transmitted bytes per second
- received bytes per second
- logged In users
- half-call attempts
- active connections
- percentage CPU used
- percentage memory used
- number of logs
- active sessions

Each of these metrics is collected, averaged over a specified time interval, and stored in the MIB. Measurements relating to call traffic are taken every five minutes. Other measurements are collected and averaged over 15-minute or 30-minute intervals. You can configure the collection period.

The metrics are transferred in the standard Carrier Voice over IP (VoIP) performance MIB. Each metric contains:

- the instance of the object, for example, SAM21 x blade y
- the property of the object being reported, for example, processor occupancy
- the type of the property, for example, gauge
- the value, for example, 22%

Carrier VoIP

CICM Performance Management

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