Carrier VoIP

Nortel ATM/IP Solution-level Performance Management

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(I)SN09U is an extension of the (I)SN09 software release and supersedes both (I)SN09 and (I)SN09FF for CVoIP applications. (I)SN09 continues to be supported for TDM-only applications. The (I)SN09U software release incorporates all capabilities of (I)SN09, (I)SN09FF, and additional corrective content delivered as part of Nortel's (I)SN09 software robustness program. (I)SN09, (I)SN09FF, and (I)SN09U are valid terms for use within the (I)SN09U software release.

The information in the document is sourced in Canada, the United States of America, and the United Kingdom.

Contents

Nortel ATM/IP Solution-level Performance Monitoring

New in this release

The following sections list what's new in Nortel ATM/IP Solution-level Perfomance Monitoring in (I)SN09U.

Refer to the OSS Advanced Feature Guide for more information about new features in this release.

ATTENTION

This document addresses all Nortel Networks Carrier VoIP solutions. Some statements may not apply to your solution. The North American IAW solution is not included in the (I)SN09U release.

Features

Border Control Point OM enhancements (MCS)

This activity provides operational measurement enhancements for Border Control Point (BCP) usage. These enhancements are intended to provide some degree of parity between the GWC and the SIP Session Manager view of BCP performance measurements.

SIP LINES: CALL FORWARDING INDICATION (CHS)

This activity provides the CS 2000 support for Call Forwarding Indicator and Call Forwarding Reminder for SIP agents that interface to the CS 2000.

Call Forwarding Indicator is provisioned using option CFIND. The SIP client provides a special dial tone to a subscriber who goes offhook when the subscriber has had call forwarding activated.

Call Forwarding Reminder provides a brief one-time ringing to a subscriber who is onhook when call forwarding is active and a call was attempted to the subscriber and forwarded. Enabling/Disabling of Call Forwarding Reminder is not provisioned as a separate option, but is dependent upon the type of call forwarding and also possibly feature data for some call forwarding types.

Overview

ATTENTION
This document addresses all Nortel CVoIP solutions. Some statements may not apply to your solution.

This document describes performance management for the following solutions.

Solution	
International IP solutions	Integrated Access Wireline (IAW) (see "Performance data collection for IP solutions with the CS 2000-Compact architecture" (page 17)) Integrated Access-Cable Media (IAC) (see "Performance data collection for IP solutions with the CS 2000-Compact architecture" (page 17)) Packet Transit-IP (PT-IP) (see "Performance data collection for IP solutions with the CS 2000-Compact architecture" (page 17)) Universal Access-IP (UA-IP) (see "Performance data collection for IP solutions with the CS 2000-Compact architecture" (page 17))
International ATM solutions	Packet Transit-AAL2 (PT-AAL2) (see "Performance data collection for the PT-AAL2 solution" (page 18))
North American IP solutions	Packet Trunking-IP (PT-IP) (see "Performance data collection for IP solutions with the CS 2000-Compact architecture" (page 17)) or Packet Trunking-AAL2 (PT-AAL2) (see "Performance data collection for the PT-AAL2 solution" (page 18)) Integrated Access-Cable Media (IAC) (see "Performance data collection for IP solutions with the CS 2000-Compact architecture" (page 17)) Universal Access-IP (UA-IP) (see "Performance data collection for IP solutions with the CS 2000-Compact architecture" (page 17))
Note: Collectively, these two CVoIP solutions are referred to as ATM solutions.	

Solution	
North American ATM solutions (see Note)	Universal Packet Access (UA-AAL1) (see "Universal Packet Access (UA-AAL1) performance data collection systems" (page 14))
	• Packet Trunking AAL1 (PT-AAL1) There are three distinct architectures supported within the PT-AAL1 solution: — Packet Trunking AAL1 (PT-AAL1) (see "Packet Trunking AAL1 (PT-AAL1) performance data collection systems" (page 13)) — Packet Trunking - SN70 (PT-SN70) (see "Packet Trunking -SN70 (PT-SN70) and Packet Trunking-XA Core (PT-XA Core) performance data collection" (page 15)) — Packet Trunking - XA Core (PT-XA Core) (see "Packet Trunking -SN70 (PT-SN70) and Packet Trunking-XA Core (PT-XA Core) performance data collection" (page 15))
Note: Collectively, these two CVoIP solutions are referred to as ATM solutions.	

Performance strategy

There are three types (or streams) of performance data generated:

- operational measurements (OMs)
- performance measurements (PMs)
- performance data sent to an Engineering and Administration Data Acquisition System (EADAS) data collection system

Operational measurements

The operational measurements (OM) information is a switch administration and maintenance tool. The user uses OMs for the following specified switch administration activities:

- Traffic provisioning: The OMs collect information on how to load equipment. The OMs allow the calculation of the load process for each unit. A unit is a main station or a trunk. This data forecasts future equipment loading and determines future equipment requirements.
- Service monitoring: The OMs can indicate switch service levels. If reduction in service occurs, the analysis of additional data helps to determine the corrective action. Corrective action can include

equipment repair, balance again, or support. Corrective action can occur in near-real time. Network management activities are an example of corrective action that occurs in near-real time. Corrective action can occur over a long period of time.

- Division of revenue: Operational measurements help operating company personnel decide how to separate traffic. The division of traffic volumes to different switch components allows the best division of revenues to occur.
- Feature activation: Specified measurements provide information on how often features are active in the switch. Operating companies or subscribers can use this information to determine the requirement for additional equipment or capabilities.
- Subscriber line usage studies: The user can perform studies on the use of each line to assess the requirement for additional subscriber equipment.
- Problem identification: The OMs display the results of machine diagnostic and testing activity. This information identifies possible problem areas in the switch.

OMs are performance data and are collected from the following components:

- CS 2000 (or CS 2000-Compact, or SN70EM, or XA-Core)
- IW SPM
- CICM
- CS 2000 GWC
- MG 9000
- MG 4000
- DPT SPM
- Media Application Server (MAS)
- Media Gateway 7480
- Media Gateway 15000
- Media Gateway 32000
- Media Gateway 35000
- MS 2000 series
- RTP Media Portal
- Universal Audio Server (UAS)
- Universal Signaling Point (USP)

The OMs are delivered downstream to an operations support system (OSS) by means of several delivery mechanisms:

- the Operational Measurement Delivery (OMD) application on the CS 2000 Core Manager (or SDM) delivers OM performance data from the following components:
  - CS 2000 (or CS 2000-Compact)
  - IW SPM
  - DPT SPM
  - CS 2000 GWC
  - MG 9000
  - MG 4000

  For more information on the OM performance data from these components, see "Operational measurements (CS 2000 architecture)" (page 32) and "Operational measurements (CS 2000-Compact architecture)" (page 45) in this document.

  For more information on the OMD application, see "The Operational Measurement Delivery application" (page 49) in this document.
- EADAS operational measurements are available to a downstream OSS as a live feed of data consisting of specific OM groups. There are two methods for obtaining the EADAS live feed of data:
  - through the MPC card on the input/output controller (IOC)
  - using the GR740 Pass Through application on the CS 2000 Core Manager (or SDM)

  For more information on EADAS, see "EADAS Data Collection" (page 51) in this document.

  Note: EADAS is not widely used outside North America, but the CS 2000 is capable of supporting EADAS interfaces if required.
- The File Transfer Protocol (FTP) pulls USP OMs directly to an OSS USP OMs are not merged with CS 2000 or CS 2000-Compact OMs and are not routed to the CS 2000 Core Manager

  Note: The USP exports operation measurement in the Semicolon Separated Value (SSV) format.
- The CS 2000 GWC pulls quality of service (QoS) OMs for the following components.
  - Media Gateway 7480
  - Media Gateway 15000

— Universal Audio Server (UAS)

— Multimedia Terminal Adapter (MTA)

The CS 2000 GWC forwards these OMs to the QoS Collector Application where they can be viewed or forwarded to the OSS.

Note: Media Gateway 7480/15000 does not support QoS OM or QCA in the PT-AAL2 solution.

For more information, see "Performance management for CS 2000 components" (page 32) and "Quality of Service Collector Application" (page 58).

Performance measurements

PMs are performance data and are collected from the following components:

- CS 2000 GWC
- CICM
- CICM Manager
- Media Gateway 7480
- Media Gateway 15000
- ERS 8600
- Media Server 2000 (MS 2000)
- Session Server
- Universal Audio Server (UAS)
- Universal Signaling Point (USP)
- Multiservice Switch 15000

CS 2000 GWC PMs

CS 2000 GWC PMs are displayed as PM parameters on certain screens in the CS 2000 GWC Manager. In addition CS 2000 GWC PM data relating to GWC-DPT-SERVICES-PM-MIB are viewed in the PM Poller CSV files.

CICM and CICM Manager PMs

CICM and CICM Manager PMs are displayed in realtime on IEMS. The CSV or XML-formatted files are exported to an OSS.

Media Gateway 7480 and Media Gateway 15000 PMs

The PMs for the Media Gateway 7480 and Media Gateway 15000 relate to ATM port statistics. These statistics are collected from the Media Gateway 7480 and Media Gateway 15000 asynchronous transfer mode (ATM) interfaces.

ERS 8600 PMs

ERS 8600 PMs can be viewed on the Device Manager.

Media Server 2000 Series PMs

Media Server 2000 PMs are pulled by the PM Poller and stored in CSV files. The CSV-formatted data can be exported to the OSS.

UAS PMs

UAS PMs can be viewed in real time on the UAS Manager, or they can be pulled in CSV format to the OSS.

USP PMs

Universal Signaling Point (USP) PMs can be viewed on the USP Manager in Semicolon Separated Value (SSV) format.

Multiservice Switch 15000 PMs

Performance data can be viewed in CSV format at the CS 2000 Core Manager, or this CSV-formatted data can be exported from the CS 2000 Core Manager to the OSS. Both 5 and 30 minute PMs are collected by the MDM.

- For PT-AAL1, the standard procedure is to send Multiservice Switch 15000 PMs in CSV format to the OMD application on the CS 2000 Core Manager (or SDM). These Multiservice Switch 15000 PMs can then be accessed in the same way as the CSV files for the CS 2000 OMs.
- For UA-AAL1, the standard procedure is to write Multiservice Switch 15000 CSV files to local disks on the MDM. The PM information is then spooled to the SuperNode Data Manager (SDM) from MDM. The OSS can then collect these CSV files from the SDM.

EADAS operational measurements

Alternatively, the ATM/IP solutions support the export of performance measurements to an Engineering and Administration Data Acquisition System (EADAS) at the OSS.

Note: EADAS is not widely used outside North America, but the CS 2000 is capable of supporting EADAS interfaces if required.

For more information on EADAS, see "EADAS Data Collection" (page 51) in this document.

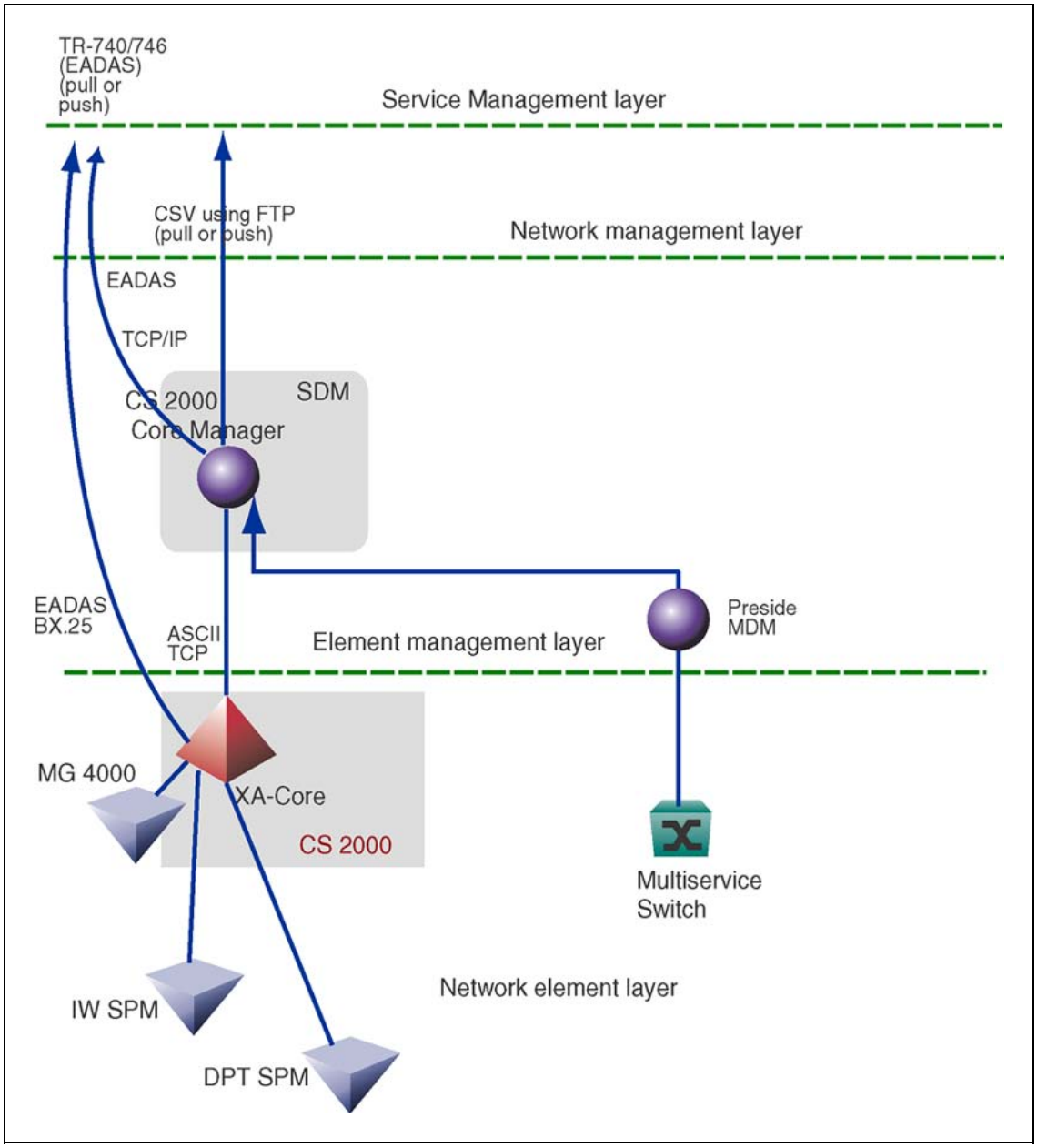
Integrated Element Management System

The Integrated Element Management System (IEMS) acts as a performance aggregation point for supported EMS modules and NEs. For more information on IEMS, see "Integrated Element Management System performance overview" (page 31) in this document.

Performance data collection systems

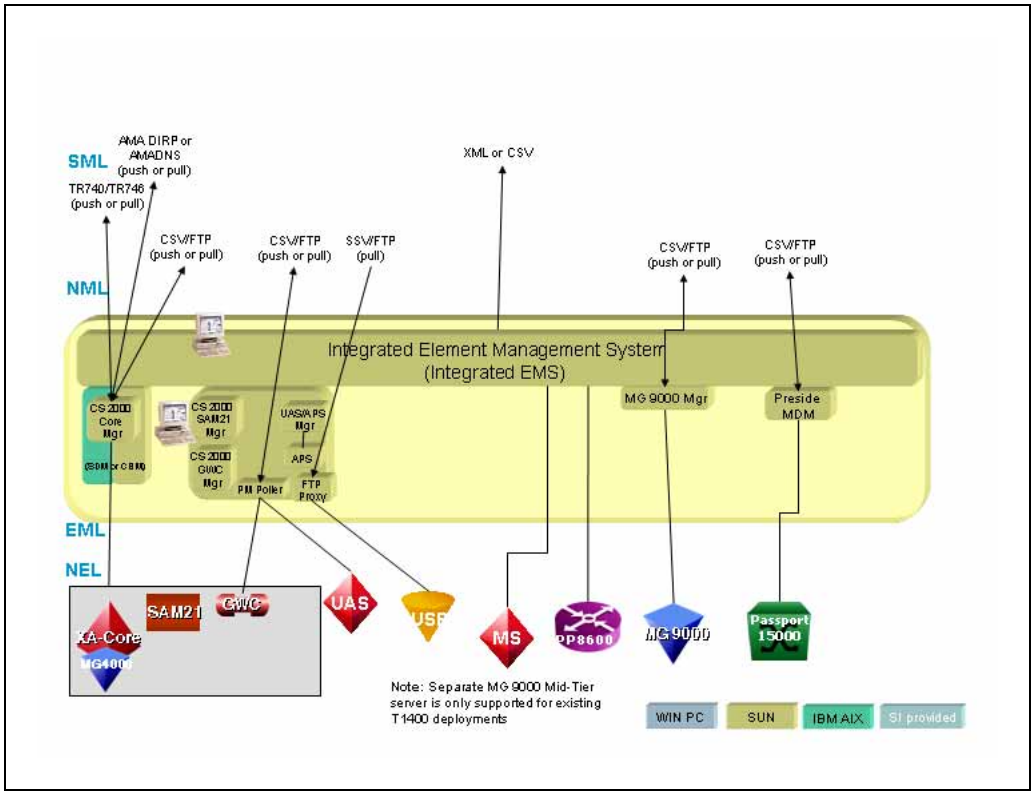
The following figures show a high-level view of how performance data is collected from components in each solution.

Packet Trunking AAL1 (PT-AAL1) performance data collection systems



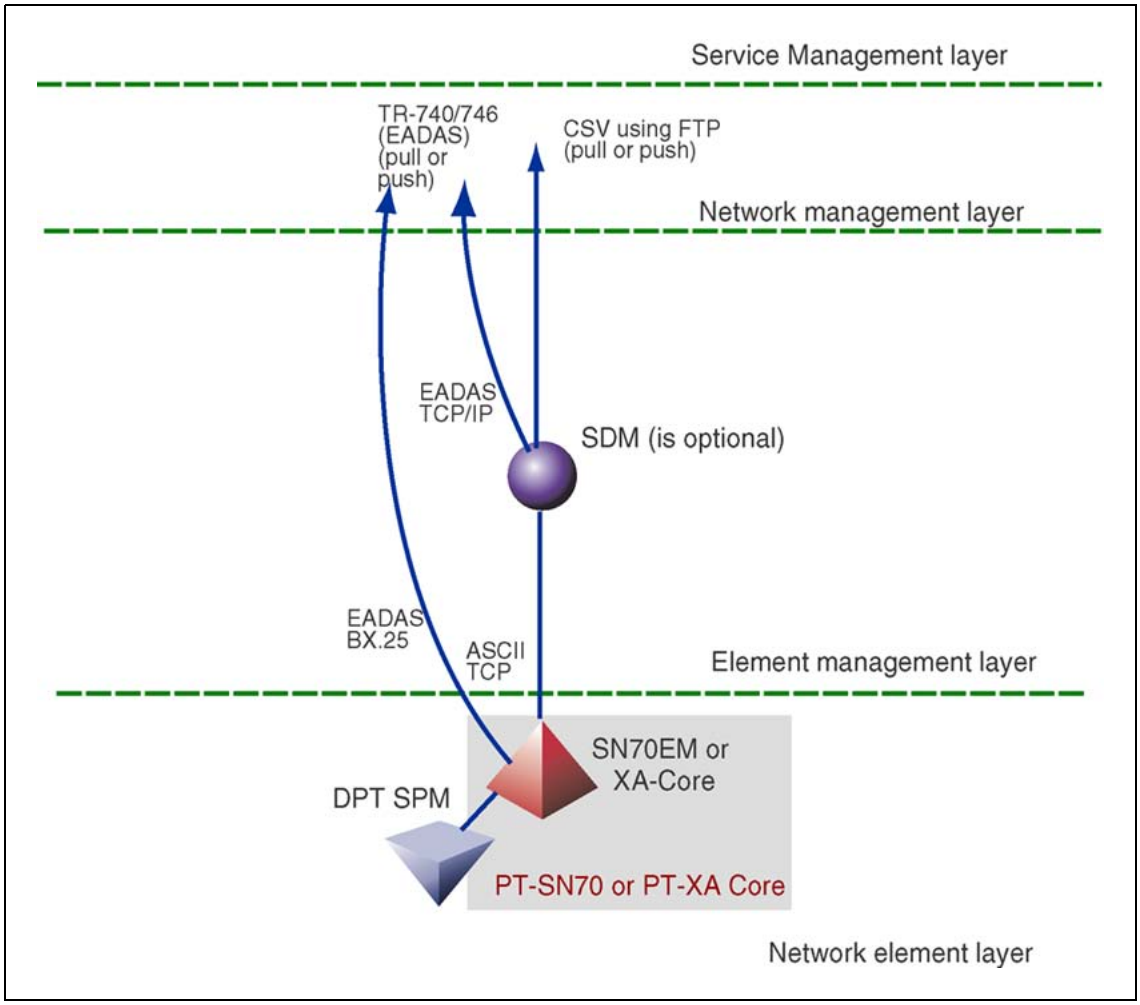
The figure "Universal Packet Access (UA-AAL1) performance data collection systems" (page 14) shows a high-level view of how UA-AAL1 performance data is collected from components that make up the UA-AAL1 solution.

Universal Packet Access (UA-AAL1) performance data collection systems



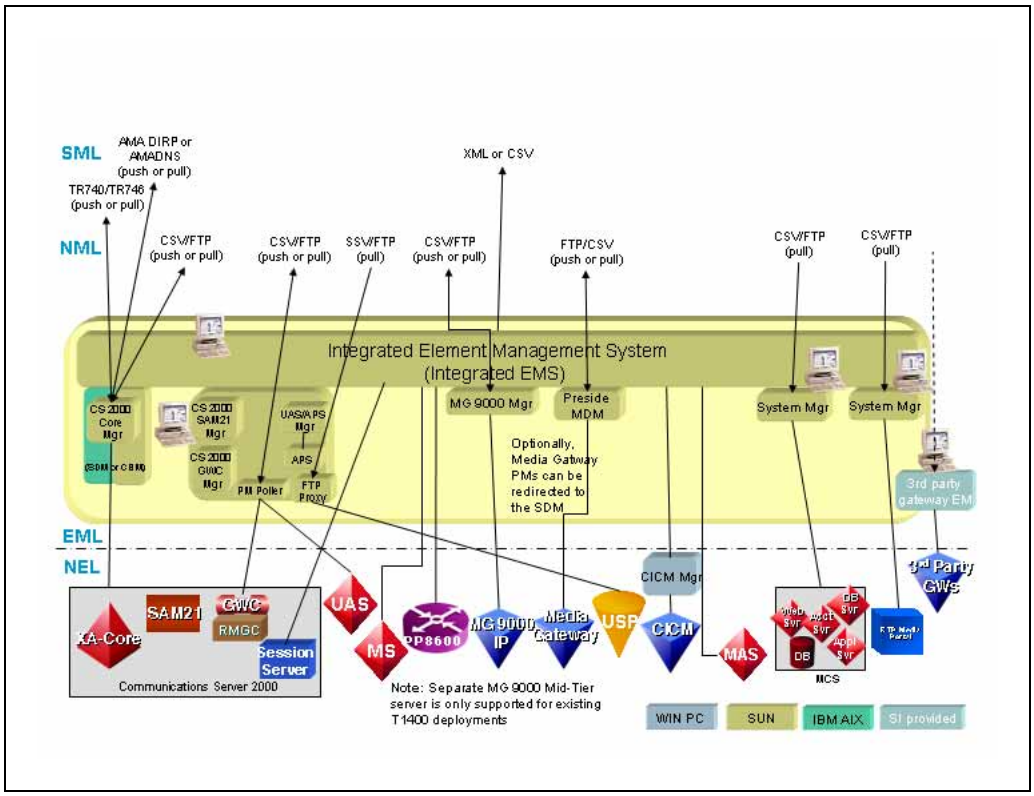
The figure "Packet Trunking -SN70 (PT-SN70) and Packet Trunking-XA Core (PT-XA Core) performance data collection" (page 15) shows a high-level view of how PT-SN70 or PT-XA Core performance data is collected from components that make up the solutions.

Packet Trunking -SN70 (PT-SN70) and Packet Trunking-XA Core (PT-XA Core) performance data collection system



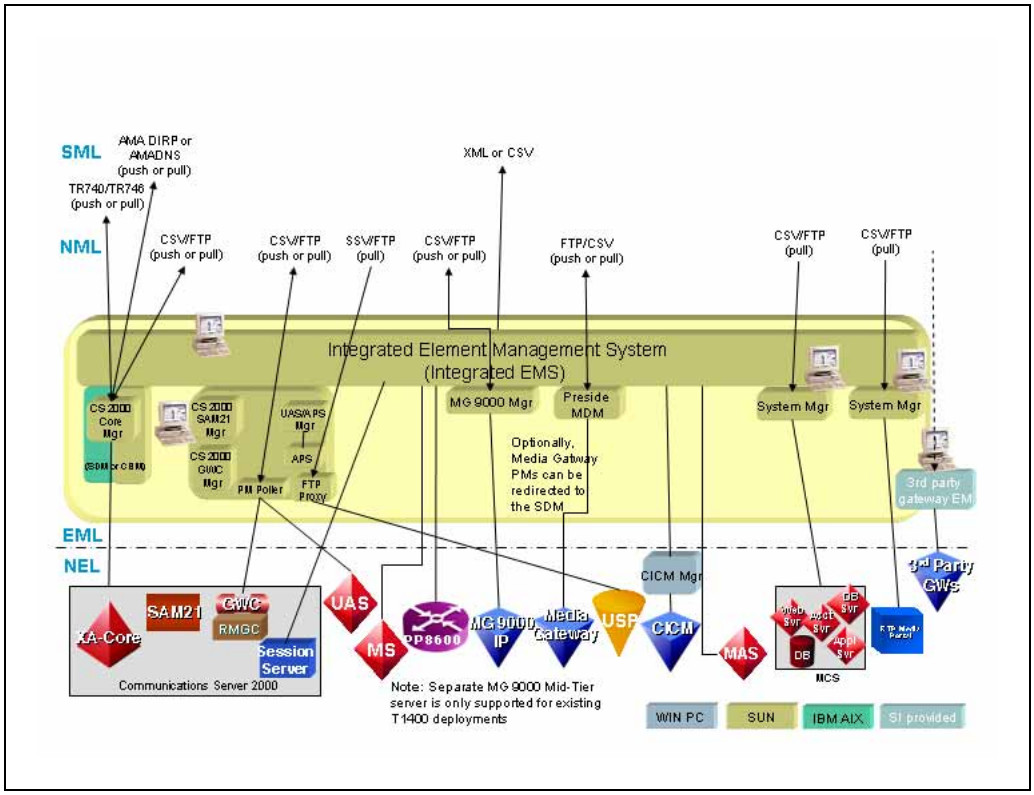
The figure "Performance data collection for IP solutions with the CS 2000 architecture" (page 16) shows a high-level view of how performance data is collected from components in the various IP Solutions when the CS 2000 architecture is employed.

Performance data collection for IP solutions with the CS 2000 architecture



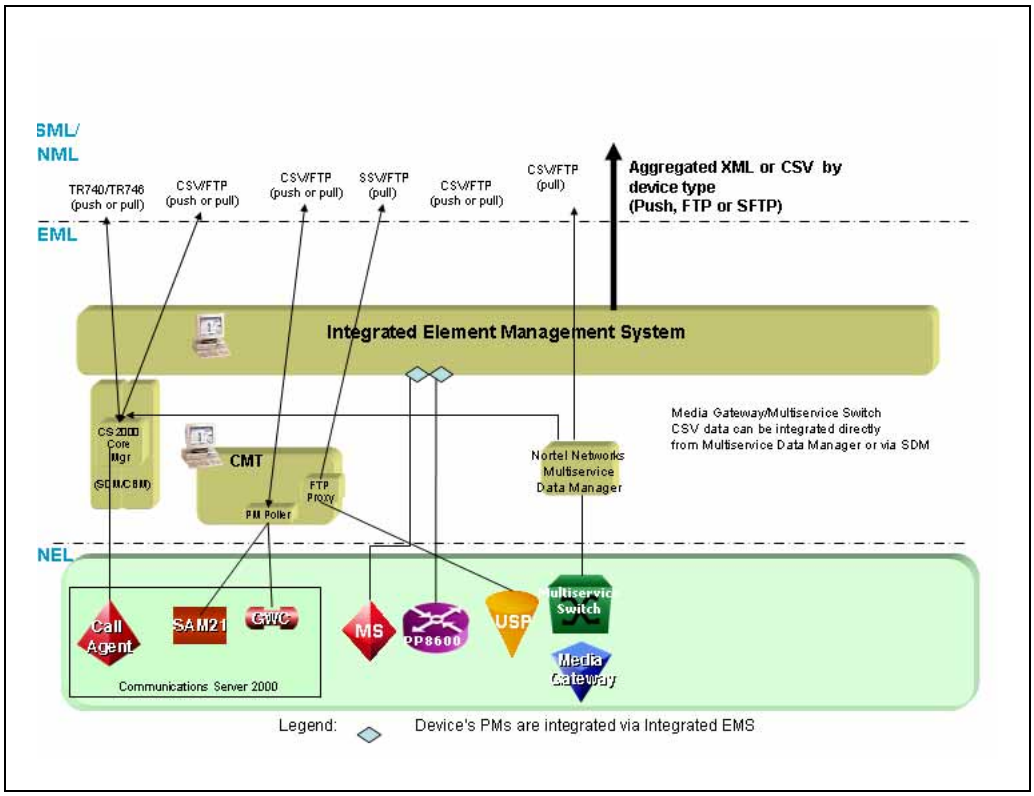
The figure "Performance data collection for IP solutions with the CS 2000-Compact architecture" (page 17) shows a high-level view of how performance data is collected from components in the various IP Solutions when the CS 2000-Compact architecture is employed.

Performance data collection for IP solutions with the CS 2000-Compact architecture



The figure "Performance data collection for the PT-AAL2 solution" (page 18) shows a high-level view of how performance data is collected from components in the PT-AAL2 solution.

Performance data collection for the PT-AAL2 solution



The following tables provide a summary of how performance data is collected for each solution.

- "Performance data collection for PT-AAL1" (page 18)
- "Performance data collection for UA-AAL1" (page 20)
- "Performance data collection for PT-SN70 or PT-XA Core" (page 22)
- "Performance data collection IP solutions with CS 2000" (page 23)
- "Performance data collection IP solutions with CS 2000" (page 23)
- "Performance data collection for the PT-AAL2 solution" (page 29)

The table "Performance data collection IP solutions with CS 2000" (page 23) provides a summary of how performance data is collected for the PT-AAL1 solution. This table lists each component for the PT-AAL1 solution, tells whether the performance data feed is fetched or pushed from the OSS, indicates the type of feed, and identifies the reporting mechanism.

Performance data collection for PT-AAL1

PT-AAL1	Pull or	Type of feed	Reporting mechanism and

component (network element)	push		file format of performance data
CS 2000 (XA-Core)	Pull or push	FTP	CS 2000 Core Manager: CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
	Push or pull	BX.25 permanent virtual circuit (PVC)	EADAS OMs are available at the OSS using a live feed from the MPC card on the IOC. File format TR-740/746
Multiservice Switch 15000	Pull or push	FTP	Data goes to MDM (in CSE format) then is passed to CS 2000 Core Manager, then on to the OSS in CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
MG 4000 (available in North American solutions only)	Pull or push	FTP	CS 2000 Core Manager: CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
	Push or pull	BX.25 permanent virtual circuit (PVC)	EADAS OMs are available at the OSS using a live feed from the MPC card on the IOC. File format TR-740/746
IW SPM ATM	Pull or push	FTP	CS 2000 Core Manager: CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
	Push or pull	BX.25 permanent virtual circuit (PVC)	EADAS OMs are available at the OSS using a live feed from the MPC card on the IOC. File format TR-740/746

PT-AAL1 component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
DPT SPM ATM	Pull or push	FTP	CS 2000 Core Manager: CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
	Push or pull	BX.25 permane nt virtual circuit (PVC)	EADAS OMs are available at the OSS using a live feed from the MPC card on the IOC. File format TR-740/746

The table "Performance data collection with CS 2000-Compact" (page 26) provides a summary of how performance data is collected for the UA-AAL1 solution. This table lists each component for the UA-AAL1 solution, tells whether the performance data feed is fetched or pushed from the OSS, indicates the type of feed, and identifies the reporting mechanism.

Performance data collection for UA-AAL1

UA-AAL1 component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
CS 2000 (XA-Core)	Pull or push	FTP	CS 2000 Core Manager: CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
	Pull or push	BX.25 permanent virtual circuit (PVC)	EADAS OMs are available at the OSS using a live feed from the MPC card on the IOC. File format TR-740/746
CS 2000 SAM21	Pull	FTP	PM Poller collects IPOA OMs from CS 2000 SAM21 Shelf Controller: CSV format
CS 2000 GWC	Pull	FTP	MAPCI using OMSHOW or the OMD application at the CS 2000 Core Manager, and PM Poller: CSV format

UA-AAL1 component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
ERS 8600 (CS LAN)	Pull	SNMP	Device Manager
UAS	Pull	FTP	UAS Manager (real-time display), or PM Poller: CSV format
USP	Pull	FTP	USP Manager: SSV format
Multiservice Switch 15000	Pull or push	Binary (FMIP), TCP/IP, FTP	Data is pushed to MDM using binary (FMIP) at the end of the five minute period. From MDM, the CSV format data is pushed to the CS 2000 Core Manager using TCP/IP, or pulled directly from MDM using FTP.
MG 9000 (UA-AAL1, UA-IP, and Int'l UA-IP only)	Pull	FTP	MG 9000 Manager: CSV format
MG 4000	Pull or push	FTP	CS 2000 Core Manager: CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
	Pull or push	BX.25 permanent virtual circuit (PVC)	EADAS OMs are available at the OSS using a live feed from the MPC card on the IOC. File format TR-740/746
IW SPM ATM	Pull or push	FTP	CS 2000 Core Manager: CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746

UA-AAL1 component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
	Pull or push	BX.25 permanent virtual circuit (PVC)	EADAS OMs are available at the OSS using a live feed from the MPC card on the IOC. File format TR-740/746
MS 2000	Pull	SNMP	PM Poller: CSV format

The table "Performance data collection for PT-SN70 or PT-XA Core" (page 22) provides a summary of how performance data is collected for the PT-SN70, or PT-XA Core solutions. This table lists each component for the PT-SN70, or PT-XA Core solutions, tells whether the performance data feed is fetched or pushed from the OSS, indicates the type of feed, and identifies the reporting mechanism.

Performance data collection for PT-SN70 or PT-XA Core

ATM component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
SN70EM or XA-Core	Pull or push	FTP	SDM or MAPCI: CSV format
	Pull or push	BX.25 PVC	EADAS OMs are available at the OSS using a live feed from the MPC card on the IOC. File format TR-740/746
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the SDM. File format TR-740/746
DPT SPM	Pull or push	FTP	SDM CSV format

Note: For PT-SN70 and PT-XA Core, the SDM is optional.

ATM component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
	Pull or push	BX.25 PVC	EADAS OMs are available at the OSS using a live feed from the MPC card on the IOC. File format TR-740/746
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the SDM. File format TR-740/746
Note: For PT-SN70 and PT-XA Core, the SDM is optional.			

The table "Performance data collection IP solutions with CS 2000" (page 23) provides a summary of how performance data is collected for the IP solutions when a CS 2000 architecture is employed. This table lists each component for the IP solutions. This table indicates whether the performance data feed is fetched or pushed from the OSS, indicates the type of feed, and identifies the reporting mechanism.

Performance data collection IP solutions with CS 2000

Component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
CS 2000 (XA-Core)	Pull or push	FTP	CS 2000 Core Manager: CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
	Pull or push	BX.25 permanent virtual circuit (PVC)	Third-party computer at the OSS connected to the XA-Core MPC card at the IAC. File format TR-740/746
CS 2000 SAM21	not applicable	not applicable	CS 2000 SAM21 does not provide performance management data

Component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
CS 2000 GWC	Pull	SNMP	Performance measure ments from MIB-based counters are viewed at the CS 2000 GWC Manager (real time), and PM Poller: CSV format. In addition, some OM data relating to CS 2000 GWC capacity and overload conditions is sent to the CS 2000.
ERS 8600 (CS LAN)	Pull	SNMP	Device Manager
UAS	Pull	SNMP	UAS Manager (real-time display), or PM Poller: CSV format. ***Note:*** Data for UAS QoS OMs are pulled by the CS 2000 GWC and sent to the QoS Collector Application, then forwarded to the OSS as IPDRs (real-time streaming or in an IPDR file)
Media Gateway 7480/15000 (Media Gateway 7480 is part of Int'l solutions only)	Pull	Binary (FMIP) using FTP	Data is pushed to MDM using binary (FMIP) at the end of the five minute period. MDM: The OSS receives CSV files from the MDM (FTP - pull only) CS 2000 Core Manager: The OSS receives CSV files (FTP - pull or push) from the CS 2000 Core Manager. ***Note 1:*** Data for Media Gateway 7480/15000 QoS OMs are pulled by the CS 2000 GWC and sent to the QoS Collector Application then forwarded to the OSS as IPDRs (real-time streaming or in an IPDR file). ***Note 2:*** Data for a single Media Gateway 7480/15000 QoS OM is pulled by CS

Component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
			2000 GWC and sent to the CS 2000 where the data can be viewed on the MAPCI or written to CSV files and sent to the OSS by the CS 2000 Core Manager.
Multimedia Terminal Adapter (MTA) (IAC and Int'l IAC solution only)	Pull		MTA QoS OMs are pulled by the CS 2000 GWC and sent to the QoS Collector Application then forwarded to the OSS as IPDRs (real-time streaming or in an IPDR file)
USP	Pull	SNMP	USP Manager: SSV format
MG 9000 (UA-AAL1, UA-IP, and Int'l UA-IP only)	Pull	SNMP	MG 9000 Manager: CSV format
IW SPM IP (PT-IP, Int'l PT-IP, Int'l UA-IP and IAC only)	Pull or push	FTP	CS 2000 Core Manager: CSV format
MS 2000	Pull	SNMP	PM Poller: CSV format
CICM	Pull or push	FTP	XML or CSV
Session Server	Push	FTP	IEMS integrated feed in XML or CSV format
Media Application Server MAS	Push	FTP	IEMS integrated feed in XML or CSV format
RTP Media Server	Push	FTP	IEMS integrated feed in XML or CSV format
Multimedia Communication Server (MCS)	Push	FTP	IEMS integrated feed in XML or CSV format

The table "Performance data collection with CS 2000-Compact" (page 26) provides a summary of how performance data is collected for the IP solutions when the CS 2000-Compact architecture is employed. This table

lists each component for the IP solutions, tells whether the performance data feed is fetched or pushed from the OSS, indicates the type of feed, and identifies the reporting mechanism.

Performance data collection with CS 2000-Compact

Component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
CS 2000 (XA-Core)	Pull or push	FTP	CS 2000 Core Manager: CSV format
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
	Pull or push	BX.25 permanent virtual circuit (PVC)	Third-party computer at the OSS connected to the XA-Core MPC card at the IAC. File format TR-740/746
CS 2000-Compact	Pull or push	FTP	CS 2000 Core Manager: call processing performance data in CSV format
	Not applicable	Not applicable	Call Agent Manager with tpcmtc application allows viewing of memory and processor usage for the Call Agent
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
CS 2000 SAM21	not applicable	not applicable	CS 2000 SAM21 does not provide performance management data

Component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
CS 2000 GWC	Pull	SNMP	MAPCI using OMSHOW or the OMD application at the CS 2000 Core Manager, and PM Poller: CSV format. In addition, some OM data relating to CS 2000 GWC capacity and overload conditions is sent to the CS 2000.
ERS 8600 (CS LAN)	Pull	SNMP	Java Device Manager (JDM)
MS 2000	Pull	SNMP	PM Poller: CSV format
UAS	Pull	SNMP	UAS Manager (real-time display), or PM Poller: CSV format ***Note:*** Data for UAS QoS OMs are pulled by the CS 2000 GWC and sent to the QoS Collector Application, then forwarded to the OSS as IPDRs (real-time streaming or in an IPDR file).
Media Gateway 7480/15000 (Media Gateway 7480 is part of Int'l solutions only)	Pull	Binary (FMIP) using FTP	Data is pushed to MDM using binary (FMIP) at the end of the five minute period MDM: The OSS receives CSV files from the MDM (FTP - pull only) CS 2000 Core Manager: The OSS receives CSV files (FTP - pull or push) from the CS 2000 Core Manager. ***Note 1:*** Data for Media Gateway 7480/15000 QoS OMs are pulled by the CS 2000 GWC and sent to the QoS Collector Application then forwarded to the OSS as IPDRs (real-time streaming or in an IPDR file).

Component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
			Note 2: Data for a single Media Gateway 7480/QoS OM is pulled by CS 2000 GWC and sent to the CS 2000 where the data can be viewed on the MAPCI or written to CSV files and sent to the OSS by the CS 2000 Core Manager.
Multimedia Terminal Adapter (MTA) (IAC and Int'l IAC solutions only)	Pull		MTA QoS OMs are pulled by the CS 2000 GWC and sent to the QoS Collector Application then forwarded to the OSS as IPDRs (real-time streaming or in an IPDR file)
USP	Pull	SNMP	USP Manager: SSV format
MG 9000 (UA-AAL, UA-IP, and Int'l UA-IP only)	Pull	SNMP	MG 9000 Manager: CSV format
IW SPM IP (PT-IP, Int'l PT-IP, Int'l UA-IP and IAC only)	Pull or push	FTP	CS 2000 Core Manager: CSV format
CICM	Pull or push	FTP	XML or CSV
Session Server	Push	FTP	IEMS integrated feed in XML or CSV format
Media Application Server (MAS)	Push	FTP	IEMS integrated feed in XML or CSV format
RTP Media Server	Push	FTP	IEMS integrated feed in XML or CSV format
STORM	Push	FTP	IEMS integrated feed in XML or CSV format

The table "Performance data collection for the PT-AAL2 solution" (page 29) provides a summary of how performance data is collected for the PT-AAL2 solution. This table lists each component for the PT-AAL2 solution, tells whether the performance data feed is fetched or pushed from the OSS, indicates the type of feed, and identifies the reporting mechanism.

Performance data collection for the PT-AAL2 solution

Component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
CS 2000-Compact	Pull or push	FTP	CS 2000 Core Manager: call processing performance data in CSV format
	Not applicable	Not applicable	Call Agent Manager with tpcmtc application allows viewing of memory and processor usage for the Call Agent
	Pull or push	TCP/IP	EADAS OMs are available at the OSS using the GR740 Pass Through Application on the CS 2000 Core Manager. File format TR-740/746
CS 2000 SAM21	not applicable	not applicable	CS 2000 SAM21 does not provide performance management data
CS 2000 GWC	Pull	SNMP	MAPCI using OMSHOW or the OMD application at the CS 2000 Core Manager, and PM Poller: CSV format. In addition, some OM data relating to CS 2000 GWC capacity and overload conditions is sent to the CS 2000.
ERS 8600 (CS LAN)	Pull	SNMP	Java Device Manager (JDM)
MS 2000	Pull	SNMP	PM Poller: CSV format
USP	Pull	SNMP	USP Manager: SSV format
CICM	Pull or push	FTP	XML or CSV

Component (network element)	Pull or push	Type of feed	Reporting mechanism and file format of performance data
Media Gateway 7480/15000 (Media Gateway 7480 is part of Int'l solutions only)	Pull	Binary (FMIP) using FTP	Data is pushed to MDM using binary (FMIP) at the end of the five minute period MDM: The OSS receives CSV files from the MDM (FTP - pull only) CS 2000 Core Manager: The OSS receives CSV files (FTP - pull or push) from the CS 2000 Core Manager. ***Note:*** Media Gateway in the PT-AAL2 solution, does not support TRK QoS OM or QCA.
Multiservice Switch 15000	Pull or push	Binary (FMIP), TCP/IP, FTP	Data is pushed to MDM using binary (FMIP) at the end of the five minute period. From MDM, the data is pushed to the CS 2000 Core Manager using TCP/IP, or pulled directly from MDM using FTP.

Integrated Element Management System performance overview

The Integrated Element Management System (IEMS) performance module enables the user to create templates, collect data, generate reports, and transfer data and report files from the supported EMS modules and NEs to the OSS.

IEMS offers a scheduler that allows data collection to take place at specified user-configured time intervals. Based on the time interval given, the scheduler schedules the data collection process. The scheduler can also schedule periodic reports to be generated. Based on the settings, the user can specify which report should be generated, when, and how often. The scheduler also allows the user to specify table cleanup and periodic table deletion.

IEMS integrates performance feeds from multiple EMSs. Comma separated (CSV) and XML protocols are supported to enable integration with most performance systems.

Performance thresholds can be set to predefined performance levels. Performance reports can be customized. The system generates historical and current data. Reports can be customized according to data selection, how the data is grouped, and presentation of the data.

For more information on the IEMS performance base, see *IEMS Performance Management*, NN10327-711.

Performance management for CS 2000 components

This section provides a more detailed discussion of performance management for the ATM and IP solutions. The following topics are covered in this section:

Operational measurements (CS 2000 architecture)

Operational measurements (OMs) are measurements of the performance and traffic load of the CS 2000, CS 2000 GWC, IW SPM, MG 4000, DPT SPM, SN70EM or XA Core, MAS, and USP.

Note 1: Only QoS OMs are collected from the Media Gateway 7480, Media Gateway 15000, and the UAS. In addition, for the IP solutions, performance data for a single TDM trunk-based OM group (TRKQOSOM) is collected from the Media Gateway 7480 and Media Gateway 15000. TRKQOSOM can be viewed from the MAPCI and the CS 2000 Core Manager forwards the OM data in CSV format. All other Media Gateway 7480, Media Gateway 15000, and UAS performance data is in the form of PMs.

Note 2: The MG 9000 provides a limited amount of OM performance data that is collected by the CS 2000 GWC (DTSR and CES OMs) and

is forwarded to the CS 2000. Most MG 9000 OMs are collected and viewed at the MG 9000 Manager and the OSS

Note 3: For the CS 2000 GWC, most performance data is MIB-based PMs that are viewed at the CS 2000 GWC Manager, or in the PM Poller CSV files. However, the CS 2000 GWC does provide a limited amount of performance data for a few OM groups that deal with overload conditions and CS 2000 GWC capacity. This CS 2000 GWC OM data is sent to the CS 2000 where it can be viewed at the MAPCI, or it is sent to the OSS by way of the CS 2000 Core Manager.

Note 4: USP OMs are pulled directly to an OSS by means of the File Transfer Protocol (FTP) and are not routed to the CS 2000 Core Manager. USP OMs are not merged with CS 2000 or CS 2000-Compact OMs. The USP exports operation measurement in the Semicolon Separated Value (SSV) format.

OMs are continually updated by the system in order to give a current view of the health and throughput of a switch. OMs collect two kinds of measurements from applications running on the switch:

- events
- states

Every time an event occurs, the system increases a peg count, and the event is said to be pegged. For example, when an Interworking Spectrum peripheral module (IW SPM) changes state from in-service to system busy, an OM register is incremented by one.

States are measured regularly by the system, and used to update usage counts. Periodic sampling of states is based on a 100-second cycle (slow), or a 10-second cycle (fast) scan.

Specific performance parameter counts are collected in registers and related registers are arranged together in an OM group. The collection interval period can be changed from between 5 to 30 minutes, through office parameter settings. One minute before the end of the collection interval, all active registers become holding registers and the active registers are cleared.

OMs for the CS 2000, IW SPM, CS 2000 GWC, Media Gateway 7480, Media Gateway 15000, MG 4000, and MG 9000 DPT SPM, MSN70EM, are collected at the network element level and transferred to the SN70EM or XA-Core for viewing from a MAP level. The OMs can be viewed on the MAP by typing OMSHOW at the CI level. When using OMSHOW to view OM data, the active registers usually display zeros except for the last minute of the collection period.

These OMs can also be retrieved by the CS 2000 Core Manager OM Delivery application. The OMs are grouped into user-defined report elements, formatted into CSV format, and delivered to a customer OSS The OMD application writes the OMs to CSV files locally on disks at the CS 2000 Core Manager (or SDM). The CSV files can be transferred outbound (based on a set schedule) or left on the disks for collection by file transfer protocol (FTP) requests from the OSS.

The following table shows where the OMs for each component can be viewed.

Component	MAP	OSS	QoS Collector
CS 2000	X	X	
IW-SPM	X	X	
CS 2000 GWC	X	X	
Media Gateway 7480 (See Notes 3 and 4)	X	X	X
Media Gateway 15000 (See Notes 3 and 4)	X	X	X
Media Server 2000		X	
MG 4000	X	X	
MG 9000 (See Note 1)	X	X	
DPT SPM	X		
USP (See Note 2)		X	

Note 1: Only a subset of MG 9000 OMs are collected with CS 2000 (or CS 2000-Compact) OMs. Most MG 9000 OMs are collected and viewed at the MG 9000 Manager and the OSS.

Note 2: USP OMs are pulled directly to an OSS by means of the File Transfer Protocol (FTP) and are not routed to the CS 2000 Core Manager. USP OMs are not merged with CS 2000 or CS 2000-Compact OMs. The USP exports operation measurement in the Semicolon Separated Value (SSV) format.

Note 3: Media Gateway 7480/15000, and UAS provide QoS OMs that can be viewed at the QoS Collector Application or at the OSS.

Note 4: Media Gateway 7480/15000 using the PT-AAL2 solution, does not support QoS OM or QCA.

Note 5: OMs for the following can be viewed on IEMS: Session Server, CICM, CICM Manager, Media Application Server (MAS), Multimedia Communication Server (MCS) Manager, Media Server 2000, and ERS 8600.

Component	MAP	OSS	QoS Collector
SN70EM	X		
UAS (See Note 3)		X	X

Note 1: Only a subset of MG 9000 OMs are collected with CS 2000 (or CS 2000-Compact) OMs. Most MG 9000 OMs are collected and viewed at the MG 9000 Manager and the OSS.

Note 2: USP OMs are pulled directly to an OSS by means of the File Transfer Protocol (FTP) and are not routed to the CS 2000 Core Manager. USP OMs are not merged with CS 2000 or CS 2000-Compact OMs. The USP exports operation measurement in the Semicolon Separated Value (SSV) format.

Note 3: Media Gateway 7480/15000, and UAS provide QoS OMs that can be viewed at the QoS Collector Application or at the OSS.

Note 4: Media Gateway 7480/15000 using the PT-AAL2 solution, does not support QoS OM or QCA.

Note 5: OMs for the following can be viewed on IEMS: Session Server, CICM, CICM Manager, Media Application Server (MAS), Multimedia Communication Server (MCS) Manager, Media Server 2000, and ERS 8600.

Note: For more information, refer to the *DMS-100 Family North American DMS-100/200 Operational Measurements Reference Manual*, 297-8021-814.

Impact of Packet Trunking-IP, Packet Transit-IP, UA-AAL1 or PT-AAL1 on the fixed loss plan

Echo in the end office is controlled by inserting an increasing amount of loss on the connections as the connection delay increases, up to the point where ECAN (echo cancellation) is required.

The Fixed Loss Plan provides guidelines for the amount of loss needed for each type of connection based on the length of the connection. The standard loss values are 0 dB, 3 dB, and 6 dB.

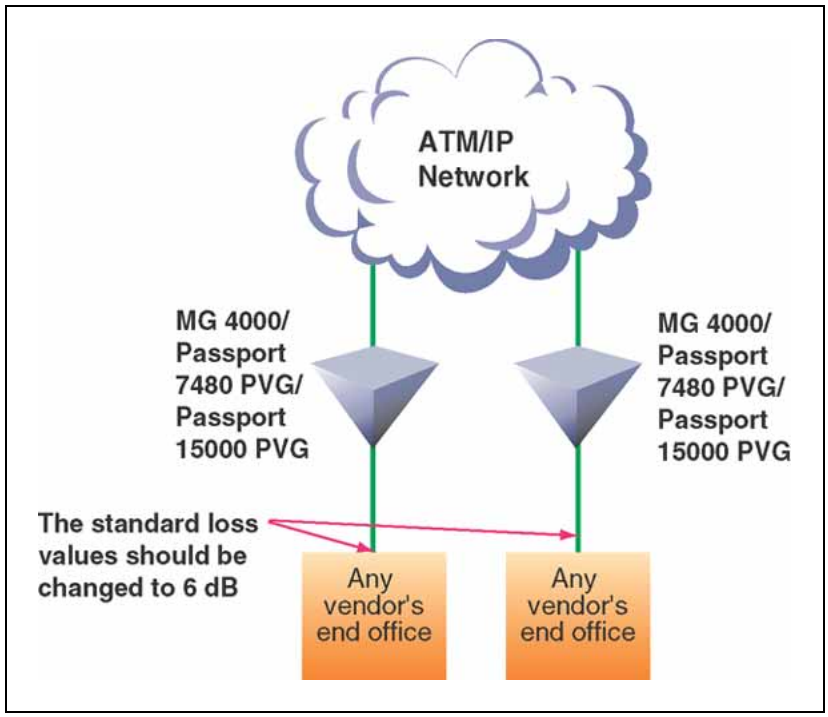
PT-IP and UA-AAL1 and PT-AAL1 affect the Fixed Loss Plan due to the larger delays incurred by packetization. A connection that traverses the packet network has the equivalent delay of 1000 miles of cable even if the connection is physically confined to a single office.

Note: Loss is implemented at the end office, not at the tandem office (see the figure "Loss is implemented at the end office" (page 36)).

Therefore any end office connection that traverses a packet network without ECAN should be provisioned with the maximum amount of additional loss (6 dB), consistent with the loss plan and regardless of physical distance.

Note: If you apply ECAN to a trunk or trunk group and a voice band modem call comes through, the echo canceller recognizes the answer tone from the answering modem. The answer tone is a 2100 Hz tone with period phase reversals. The echo canceler then goes clear channel analog, and therefore does not affect the modem or data rate.

Loss is implemented at the end office



Performance management for ERS 8600 (IP solutions and UA-AAL1)

ERS 8600 performance is managed by the Device Manager. Device Manager allows you to perform the following performance management functions:

- configure performance data collection
- retrieve performance data collection
- view the performance data collection

For additional information on the ERS 8600, see *Managing the Passport 8000 Series Switch Using Device Manager*, 313195A, *Managing the Passport 8000 Series Switch Using the Command Line Interface Release 3.2, 313194*A, and *Networking Concepts for the Passport 8000 Series Switch*, 313196A.

Performance management for Multiservice Switch 15000 (ATM solutions)

Multiservice Switch 15000 performance is measured using the Multiservice Data Manager (MDM). Each Multiservice Switch shelf collects its statistics every five minutes and sends them to each MDM that collects PM statistics. The MDM then converts the Multiservice Switch node input into CSV format records and creates files for the five minute data. These five minute summaries are also merged into 30 minute records (in CSV format), by the MDM, to provide the OSS with a historical view of the network. Five minute and 30 minute performance summaries (in CSV format) are sent from the MDM to the CS 2000 Core Manager. From the CS 2000 Core Manager, this data is pushed or pulled to the OSS using FTP.

For more information on Multiservice Switch 15000 performance, refer to *Nortel Multiservice Switch 15000, Media Gateway 15000 and MDM in Succession Performance (PT-AAL1/UA-AAL1/UA-IP)*, NN10158-711 (NA only).

Performance management for Media Gateway 7480/15000 (IP solutions)

Each Media Gateway collects its statistics every 5 minutes and sends them to each MDM that collects PM statistics.

For the Media Gateway 7480/15000, PMs can be viewed at the Multiservice Data Manager (MDM) or can be pulled or pushed to the OSS.

On MDM, the Performance Measurements Stream Processor (PMSP) server application manages performance. The PMSP server application converts the statistics into CSV formatted 5-minute records. It also creates 30-minute data records by aggregating six 5-minute data records. These are referred to as 5-minute and 30-minute PMs.

MDM transfers the data records directly to the OSS applications or to the CS 2000 Core Manager depending on the network configuration.

For more information, refer to *Nortel Multiservice Switch 15000, Media Gateway 150000 and MDM Performance*, NN10158-711 (NA only).

These PMs are collected by the Media Gateway on a 15-minute interval basis and are stored in the statistics file(s) on the Media Gateway 7480/15000 (for more information, refer to *Nortel Multiservice Switch 7400/15000/20000 Data Management*, NN10600-561, in the section on statistics collection). For more information, refer to *MDM Management Data Provider User Guide*, 241-6001-309. Currently, only a subset of the Media Gateway 7480/15000 PMs are available for collection. This subset of PMs

consists of asynchronous transfer mode (ATM) port statistics, and logical processor statistics (refer to *MDM MDP Data Formats Reference Guide*, 241-6001-806)

In addition to the PMs described above, there are also quality of service (QoS) statistics reported by the Media Gateway 7480/15000 at the end of each TDM trunk call. (This functionality applies only to Media Gateway 7480/15000 in IP solutions with hardware that supports H.248 or ASPEN VSP3.) The CS 2000 GWC associated with these trunk calls passes on the statistics to the CS 2000, or CS 2000-Compact. When the QoS thresholds for packet loss, jitter and delay are exceeded for Media Gateway 7480/15000 trunk calls, registers for OM group TRKQOSOM are incremented by the CS 2000, or CS 2000-Compact system software. The name TRKQOSOM refers to trunk quality of service operational measurements.

As CS 2000 GWC based trunk calls are released, the QoS data for that call are compared to the QoS OM threshold values. If call data exceeds the QoS OM thresholds value for that statistic, the OM value associated with the appropriate CS 2000 GWC based-trunk group is incremented. QoS reporting does not record every violation of the QoS OM threshold, but rather provides a general indication of the QoS for the whole trunk group. In order to minimize network traffic during heavy call loads, a minimum of only 16 QoS OM threshold violations (in a 15 minute period) for that trunk group are guaranteed to be reported by the system even if many more occurred.

The thresholds values for packet loss, jitter, and delay are datafilled as office parameters in table OFCVAR. You can disable QoS reporting on any given CS 2000 GWC by using the GWC Manager. Once this is done, all the Media Gateways associated with that CS 2000 GWC no longer report end of call QoS statistics. This action disables QoS OM pegging for the Media Gateway 7480 and Media Gateway 15000 based trunk members that are datafilled on the affected CS 2000 GWC.

OM group TRKQOSOM contains entries for each GWC based trunk group that is datafilled in the CS 2000 or CS 2000-Compact. In order for a trunk group to appear in OM group TRKQOSOM, you must datafill table TRKMEM so that at least one member of the trunk group resides on a GWC. Each entry in OM group TRKQOSOM contains a CLLI (common-language location identifier) as well as threshold crossing counters for packet loss, jitter, and delay (or latency).

For more information on OM TRKQOSOM, see *Communication Server 2000 Performance Management*, NN10149-711.

In addition, the QoS Collector Application receives QoS statistics from the Media Gateway 7480/15000, MTA, and UAS. The data from these gateways are collected by the CS 2000 GWC and forwarded on to the QoS Collector

application (see the "Quality of Service Collector Application" (page 58)). The QoS statistics consists of metrics for packets sent, packets received, packet loss, octets sent, octets received, inter-arrival latency, and jitter.

Performance management for Media Gateway 9000

OMs for the MG 9000 statistics are displayed at the MG 9000 Manager at the Performance Statistics Browser. OMs are also sent to the OSS through the performance collector and formatter (PCF).

> ***Note:*** Some OMs that originate at the MG 9000 are transmitted to the associated GWC and from there, are forwarded on to the CS 2000. OM DSTR (dial-tone speed recording) is an example. For more information, see *MG 9000 Performance Management*, NN10140-711.

The OMs for the MG 9000 are presented through the Performance Browser and are accessed by selecting the statistics tab for each OM category. When a resource is selected in the Performance Statistics Browser, all the statistics that are accumulated for that node are presented in the various statistics tabs available for selection.

The CSV OM file collection application or PCF for the MG 9000 resides in the element management layer. This Java-based application will interface with both the device layer and the network management layer. The scope of the OMs to be collected involve only those that are part of the MG 9000 network. Further, the delivered OMs are a small subset of the overall OMs, which are either collectable or collected at the MG 9000 element manager (EM).

The user interface and configuration of the PCF application are text-based. After initial configuration of the list of devices to collect from, very little user interaction occurs with the collection application. Files are retrieved by an network management layer OSS application for data processing and analysis.

Input for the PCF application consists of the configuration file, a text file that contains a list of MG9000 devices that OMs are to be collected for. Any relevant configuration or status information will be contained in this file.

The output consists of two files generated when the PCF runs:

- The CSV text file.
- The Log text file. This file contains process information and any logs necessary for debugging purposes. The log will be created using Syslog if possible. At the time of this writing the debug logs are created using System.out print statements.

The following QoS OMs are generated by the MG 9000 and can be viewed using the MG 9000 Manager browser:

- Jitter

- Latency
- numPktsSent (the total number of packets sent in a 15 minute interval)
- PktsLost (the percentage of packets lost)
- numCalls (the total number of calls in a 15 minute interval)
- numBadCalls (the number of bad calls that exceeded threshold values in a 15 minute interval)

The MG 9000 Manger also allows you to configure the QoS threshold parameters.

For more information on MG 9000 Performance, refer to the *MG 9000 Performance Management*, NN10140-711.

Performance management for CS 2000 SAM21 (UA-AAL1)

You have the option of configuring the PM Poller (which is one of the CS 2000 Management Tools applications) to collect Internet Protocol over ATM (IPOA) operational measurements (OMs) from the CS 2000 SAM21 asynchronous transfer mode (ATM) Shelf Controller. The performance data collected by the PM Poller is made available to the operations support system (OSS) for further processing. See "PM Poller" (page 55) in this document for additional information. For information on configuring the PM Poller to collect these IPOA OMs, see *ATM/IP Solution-level Configuration Management*, NN10409-500.

Performance management for CS 2000 Gateway Controller (IP solutions and UA-AAL1)

You can view OM data for the CS 2000 GWC on the MAP by typing OMSHOW at the CI level. OMs can also be retrieved by the CS 2000 Core Manager OM Delivery application.

Additional CS 2000 GWC performance data is available through the PM Poller. Refer to the "PM Poller" (page 55) section below for more information.

Performance related data for the Kerberos application running on the GWC card is obtained by manually executing scripts on the CS 2000 Management Tools server. For more information see, *Gateway Controller Performance Management*, NN10208-711.

Some OMs that originate on gateways such as the MG 9000 are collected by the CS 2000 GWC and forwarded on to the CS 2000. For example, dial-tone speed recording (DTSR) OM collection for MG 9000s is done by CS 2000 GWCs. The statistics are collected by the CS 2000 GWC and then sent to the XA-Core.

For more information, refer to *Gateway Controller Performance Management*, NN10208-711, the *DMS-100 Family North American DMS-100/200 Operational Measurements Reference Manual*, 297-8021-814, or the *SDMC OM Delivery Application User Guide*, 297-2667-321.

Performance management for Session Server (PT-IP and Intl PT-IP solutions)

The Session Server records operational measurements (OMs) for various performance related data items. These OMs are essential information sources for determining preventive and corrective maintenance actions, as well as identifying provisioning problems or capacity limitations. The majority of OMs are directly related to the SIP Gateway application running on the Session Server.

OMs are viewed using an available command line interface (CLI) accessed through a secure shell (SSH) connection to the Session Server or through IEMS. OM data recorded on one unit of a Session Server is completely independent of data recorded on its mate unit. Data is not transferred from one unit to another during synchronization activities.

Operational measurements, related to SIP-T DPT call capacity limits and collected on the core, collect information related to current equipment and software load capacities, showing the load process for each SIP-T DPT trunk group. This data forecasts future equipment loading and determines future equipment requirements.

Operational measurements can indicate service level degradation for the Session Server based on alarms indicating that resources are running low. This information helps to determine the corrective action which can include equipment repair.

For more information, refer to *Session Server Performance Management*, NN13342-711.

Performance management for Universal Audio Server (IP solutions and UA-AAL1)

Performance measurements are collected through audio server component MIB-based counters and gauges. Counters are set to zero at system initialization and are incremented over time. When the maximum value allowed for the counter is reached, 4,294,967,295, the counter returns to zero. Gauges are similar to counters, but can also be decremented. UAS performance measurement information is configured for reporting and is retrieved through the UAS Manager.

Additional UAS Performance data is available through the PM Poller. Refer to the "PM Poller" (page 55) section in this document.

In addition, for the IP solutions, the QoS Collector Application receives QoS statistics from the Media Gateway 7480, Media Gateway 15000, the Multimedia Terminal Adapter (MTA), and UAS. The data from these gateway are collected by the CS 2000 GWC and forwarded on to the QoS Collector application (see the "Quality of Service Collector Application" (page 58)). The QoS statistics consists of metrics for packets sent, packets received, packet loss, octets sent, octets received, inter-arrival latency, and jitter.

For more information on Universal Audio Server performance, refer to the *Universal Audio Server Performance Management*, NN10139-711.

Performance management for the Universal Signaling Point (IP solutions and UA-AAL1)

The Universal Signaling Point (USP) uses operational measurements (OMs) to track activity on the USP system. The USP also uses special study operational measurements (SSOMs). The user can configure a number of SSOMs to study and track USP system issues that are not covered by the Nortel programmed OMs.

You can view USP OMs and SSOMs directly from USP Manager graphical user interface (GUI) or from the OSS. The USP Manager is an OAM&P application running on a Window 2000 or Window 95 PC. An Ethernet connection on the USP Manager allows you to export to the OSS, both the OMs and SSOMs, through an OM FTP Server. You can export OMs in 5 or 30 minute intervals.

For more information on the USP, see *USP Performance Management*, NN10137-711.

Performance management for SPFS (IP solutions and UA-AAL1)

Overview

The Server Platform Foundation Software (SPFS) uses Management Information Base (MIB) performance measurements (PMs) to collect statistics. SPFS-based performance measurements are defined in the sun-mib file.

For more information, refer to the document that applies to your solution from the following list:

- *PT-AAL2 Solution-level Basics*, NN10441-100
- *Packet Trunking/Packet Transit - IP Solution-level Basics (PT-IP)* NN10442-100
- *UA-AAL1 Solution-level Basics*, NN10443-100
- *Integrated Access Cable Solution-level Basics (IAC)*, NN10444-100
- *Integrated Access Wireline Solution-level Basics (IAW)*, NN10445-100
- *Universal Access - IP Solution-level Basics (UA-IP)*, NN10446-100

The Server Platform Foundation Software (SPFS) uses Management Information Base (MIB) performance measurements (PMs) to collect statistics. SPFS-based performance measurements are defined in the sun-mib file.

Performance measurements

Performance measurements (PMs) are statistics collected about the system using MIB-based peg counters.

Refer to section "SSPFS performance measurements" (page 43).

SNMP PM poller data comma separated value (CSV) output files are located in the "/data/oms" directory on the system.

For procedures to add, configure or delete the SNMP PM poller, refer to *ATM/IP Solution-level Configuration Management*, NN10409-500.

Refer to section "SSPFS performance measurements" (page 43), for a list of the SPFS PMs collected by the PM poller.

SPFS performance measurements

The following table contains the SPFS performance measurements defined in the sun-mib file and collected by the PM poller.

To view a description of each of the SPFS performance measurements defined in the sun-mib file, refer to procedure "Viewing sun-mib SNMP attribute definitions on an SSPFS-based server" (page 63) in this document.

SPFS performance measurements

MIB Objects	Attributes
IP group	
ipForwarding	ipOutDiscards
ipDefaultTTL	ipOutNoRoutes
ipInReceives	ipReasmTimeout
ipInHdrErrors	ipReasmReqds
ipInAddrErrors	ipReasmOKs
ipForwDatagrams	ipReasmFails
ipInUnknownProtos	ipFragOKs
ipInDiscards	ipFragFails
ipInDelivers	ipFramCreates
ipOutRequests	ipRoutingDiscards
IP Address Table	
ipAdEntAddr	ipAdEntBcastAddr
ipAdEntIfIndex	ipAdEntReasmMaxSize
ipAdEntNetMask	
Sun Host Performance group	
rsUserProcessTime	rsVPagesOut
rsNiceModeTime	rsVSwapIn
rsSystemProcessTime	rsVSwapOut
rsIdleModeTime	rsVIntr
rsDiskXfer1	rsIfInPackets
rsDiskXfer2	rsIfOutPackets
rsDiskXfer3	rsIfInErrors
rsDiskXfer4	rsIfOutErrors
rsVPagesIn	rsIfCollisions

Performance management for CS 2000-Compact components

This section provides a more detailed discussion of performance management for the IP solutions when used with the CS 2000-Compact architecture.

Performance management for the following CS 2000 Compact components is the same as for the CS 2000 architecture. For more information on the following CS 2000-Compact architecture components, see "Performance management for CS 2000 components" (page 32).

- Impact to PT-IP on the fixed loss plan (CS 2000-Compact architecture). For more information, see "Impact of Packet Trunking-IP, Packet Transit-IP, UA-AAL1 or PT-AAL1 on the fixed loss plan Does this" (page 35).
- ERS 8600 (CS 2000-Compact architecture). For more information, see "Performance management for Passport 8600 (IP solutions and UA-AAL1)" (page 36).
- Media Gateway 9000 (CS 2000-Compact architecture). For more information, see "Performance management for Media Gateway 9000" (page 39).
- CS 2000 Gateway Controller (CS 2000-Compact architecture). For more information, see "Performance management for CS 2000 Gateway Controller (IP solutions and UA-AAL1)" (page 40)
- Universal Audio Server (CS 2000-Compact architecture). For more information, see "Performance management for Universal Audio Server (IP solutions and UA-AAL1)" (page 41).

Operational measurements (CS 2000-Compact architecture)

The CS 2000 Compact consists of the Call Agent, STORage Management (STORM) card, CS 2000 GWC, Session Server, and the CS 2000 SAM21.

The MAPCI is the tool you use for monitoring the performance of the call processing functions of the Call Agent. Operational Measurements and MAP levels (such as Capacity MAP level) provide you with call processing performance data. The Capacity CI and Capacity MAPCI levels of the MAP contain call processing performance metrics that were introduced in (I)SN05.

Note: This section discusses the use of OMs for the CS 2000-Compact hardware and software. For information on the OM data generated by other components used with the CS 2000-Compact see "Operational measurements (CS 2000 architecture)" (page 32).

OM data can be viewed on the MAP by typing OMSHOW at the CI level. When using OMSHOW to view OM data, the active registers usually display zeros except for the last minute of the collection period.

OMs (for the CS 2000-Compact and CS 2000 GWC) are collected at the network element level and transferred to the Call Agent for viewing from a MAP level. OMs can also be retrieved by the CS 2000 Core Manager OM Delivery application. The OMs are grouped into user-defined report elements, formatted into CSV (comma-separated value) format, and delivered to a customer OSS (operations support system).

> ***Note:*** For more information, refer to the *DMS-100 Family North American DMS-100/200 Operational Measurements Reference Manual* 297-8021-814.

To monitor the performance of the CS 2000-Compact hardware and software platform, you use the Call Agent Manager. The tpcmtc application, of the Call Agent Manager, allows you to monitor statistics relating to the memory and processor usage of the Call Agent hardware and software platform.

For more information on the Capacity performance management (Capacity CI and Capacity MAPCI levels of the MAP), see *Call Agent Performance Management*, NN10153-711, and *Communication Server 2000 Performance Management*, NN10149-711. For information on using the call processing application operational measurements, see *DMS-100 Operational Measurements Reference Manual*, 297-8001-814.

The STORM System panel allows you to perform the following performance-related tasks for the STORM card:

- View alarm threshold information
- Modify thresholds for the STORM CPU usage
- Modify thresholds for the STORM zombie processes
- Modify thresholds for the STORM memory usage

For more information on using the STORM system panel, see *STORM Performance Management*, NN10154-711.

Performance management for the Universal Signaling point-Compact (CS 2000-Compact architecture)

The Universal Signaling Point-Compact (USP-Compact) resides on two identical blades in a CS 2000- Compact shelf. The USP-Compact uses operational measurements (OMs) to track activity on the USP system.

You can view USP OMs directly from USP Manager graphical user interface (GUI) or from the OSS. The USP Manager is an OAM&P application running on a Microsoft Windows 2000 or Microsoft Windows 95 PC. An Ethernet

connection on the USP Manager allows you to export to the OSS, both the OMs and SSOMs, through an OM FTP server. You can export OMs in 5 or 30 minute intervals.

For more information on the USP,see *USP-Compact Performance Management*, NN10138-711.

Tools and utilities

This section discusses tools and utilities for the solutions.

Each component within the solutions includes tools and utilities that are used for performance management. This section does not provide a comprehensive discussion of all the performance management tools available; however a brief discussion is given for the following tools:

- "The Operational Measurement Delivery application" (page 49)
- "EADAS Data Collection" (page 51)
- "Performance monitoring statistics" (page 53)
- "Carrier performance monitoring archival (PMA)" (page 54)
- "PM Poller" (page 55)
- "OMPUSH application" (page 57)
- "Quality of Service Collector Application" (page 58)
- "Performance monitoring statistics" (page 53)

For detailed information about performance tools and utilities for a specific component see the references found in the table "ATM and IP solutions performance management documents" (page 65), at the end of this document.

The Operational Measurement Delivery application

For the PT-SN70 or PT-XA Core architectures, the SDM is optional. If your switch does not include an SDM, then you use the MAPCI and the OMSHOW command to display OMs. You do not use the Operational Measurement Delivery (OMD) application. Therefore this topic does not apply to your switch.

The Operational Measurement Delivery (OMD) application, (one of the CS 2000 Core Manager applications (SDM)), delivers customer selected Operational Measurement data in Comma Separated Values (CSV). The OMD application allows you to:

- group related OMs together into report elements so they can be easily monitored and analyzed
- add registers to the specified OM group in the report element
- delete registers from the specified OM group in the report element
- select a subset of the registers in an OM group
- set the report interval to five minutes or to the office transfer period (15 or 30 minutes) for each report element
- display the existing OM groups for the specified report element while modifying the report element
- display the existing OM registers of the specified OM group while modifying the OM group
- select all of the registers of the specified OM group
- specify when to collect the OM data using data collection schedules
- specify when to rotate the report files using file rotation schedules
- specify when to send report files to a downstream processor and which remote directory to put them in using file transfer schedules
- link report elements, file rotation schedules, data collection schedules, and file rotation schedules together using report registrations
- store OM data to disk files which are available for transfer via Secure File Transfer (SFT) or file transfer protocol (FTP)
- configure the CS 2000 Core Manager to automatically recover previously entered report element configurations without any manual intervention in the event of a shutdown
- include the OM tuple number in the CSV file along with other OM information

The OMD application lets you collect OM data from the CS 2000 (or CS 2000-Compact), CS 2000 GWC, IW SPM, MG 9000, MG 4000, Media Gateway 7480, and Media Gateway 15000, SN70EM or XA-Core, and save the OM data to OM report files on the CS 2000 Core Manager. OM report files can be transferred from the CS 2000 Core Manager to the Operations Support System (OSS) automatically, by OMD, or manually using Secure File Transfer (SFT) or file transfer protocol (FTP).

Note 1: For more information about SFT, refer to *CS 2000 Core Manager Performance Management*, *NN10148-711*, and refer to the *SDM Secure File Transfer User Guide*, 297-5051-913, and the *SuperNode Data Manager OM Delivery Application User Guide*, 297-5051-321.

Note 2: You have the option of configuring the OMD application so that the tuple number, that is part of the OM group information, appears in the CSV file. The inclusion of the tuple number is an optional capability that you can activate or disable at any time by configuring the OMD application at the SDMmtc/Admin/SWIM/Config menu. For information on configuring OMD, see *CS 2000 Core Manager Configuration Management*, NN10104-511. For additional background information on the OMD application, see the *CS 2000 Core Manager Basics*, NN10018-111.

EADAS Data Collection

The Engineering and Administrative Data Acquisition System (EADAS) is an operational support system that provides near real-time data collection and surveillance. EADAS is a third-party alternative to Nortel MAPCI and is based on Telecordia standard TR-746/740. The EADAS package has two components: EADAS Data Collection and EADAS Network Management.

Note: EADAS is not supported in the North American PT-AAL2 solution.

EADAS Data Collection (EADAS DC) software sends operational measurements (OM) data from the Succession office to an EADAS computer for processing and reporting. EADAS Data Collection collects data in three classes: 30-minute class; 60-minute class; and 24-hour class. Each class is divided into logical groups of measurements called sections. The maximum number of sections for the 60-minute class, and the 24-hour class is 255 (0 to 254). The maximum number of sections for the 30-minute class is 999 (0 to 998).

For the CS 2000 architecture there are two methods for obtaining the EADAS live feed of data:

- through the Multiprotocol controller (MPC) card on the input/output controller (IOC)
- using the GR740 Pass Through application on the CS 2000 Core Manager

Note: For the CS 2000-Compact architecture, EADAS is only available by means of the GR740 Pass Through application on the CS 2000 Core Manager.

Series Completion OM data for EADAS

Series Completion (SCMP) is a line option feature that directs calls from a busy directory number (DN) to another specified DN on the same switch. An SCMP OM group provides operational measurement information for SCMP lines in the Succession switch. This OM group records the operational data for each SCMP line in a separate tuple using three OM registers: SCMP overflow (SCMPOVFL); SCMP attempt (SCMPATT); and SCMP usage (SCMPANSR).

All existing SCMP OMs are automatically added to the Engineering and Administrative Data Acquisition System (EADAS) once you issue the EADSECTS command. However, the office parameter EADAS_POPULATE_SCMP_ SECTIONS in table OFCVAR controls whether the system adds new SCMP tuples to EADAS. If the office parameter is set to the default value "Y" (yes), then the new SCMP records or tuples are added to EADAS OM class section 221. If the office parameter

is set to "N" (no), then no new SCMMP records or tuples are added to EADAS. OM registers SCMPTRF, and SCMPMNT collect usage data for the SCMP lines.

For information on provisioning office parameters in table OFCVAR, see *Communication Server 2000 Configuration Management*, NN10193-511.

EADAS Data Collection for PT-SN70 and PT-XA Core

For EADAS data collection in the PT-SN70 (and PT-XA Core) architectures, the SDM is optional. If your PT-SN70 (and PT-XA Core) architecture does not include an SDM, then EADAS collects the performance data by way of a BX.25 data link. The data link has a single dedicated synchronous 24000 baud rate with three BX.25 permanent virtual circuits (PVC). The Multiprotocol controller car (MPC) in the I0C servers as the PT-SN70 (or PT-XA Core) hardware interface card.

Performance monitoring statistics

For SONET configurations, the STS-1 resource module (RM) generates performance statistics for the STS-1 line layer, STS-1 section layer, STS-1 path layer, VT1.5 path layer, and DS-1 path layer. The STS-1 RM gathers these performance monitoring parameters on a 15-minute daily interval for each in-service STS-1 carrier. The PerfMon MAP level and the sublevel commands PPQuery and SilML provide performance monitoring information on STS-1 carriers relating to STS-1 section and line.

For SDH configurations, the STM-1 resource module (RM) generates performance statistics for the STM-1 multiplex section (MS) layer, STM-1 regenerator section (RS) layer, VC-4 path layer, VC-12 path layer, and E1 path layer. The STM-1 RM gathers these performance monitoring parameters on a 15-minute daily interval for each in-service STM-1 carrier. The PerfMon MAP level and the sublevel commands PPQuery and SilML provide performance monitoring information on STM-1 carriers relating to STM-1 RS and MS.

Performance monitoring statistics for ATM connections on the DPT SPM for PT-SN70 and PT-XA Core

Performance monitoring information relating to the ATM interface and connections for the DPT SPM is read from various hardware components on the ATM (asynchronous transfer mode) RM (resource module) card. These are PM statistics and are gathered from the AAL1 layer, or the AAL5 (PT-IP) layer, or the ATM layer and are reported on an aggregate basis or on a virtual circuit basis.

You can access ATM performance information using the following tools:

- the DMS Operational Measurement (OM) system
- MAP commands that report performance monitoring statistics for the current 15 minute period with options for aggregate counts and counts based on individual virtual circuits (VC).

ATMConn MAP commands for performance monitoring

The ATMConn MAP level and sublevels provide commands that allow you to obtain performance monitoring statistics for the ATM (asynchronous transfer mode) connections on the DPT SPM. You can query performance monitoring statistics at the ATM, AAL1, and AAL5 (PT-IP) layers from the ATMConn MAP level and sublevels. For more information, see *DPT SPM ATM Performance Management*, NN10146-711.

Carrier performance monitoring archival (PMA)

Carrier performance monitoring information is collected for MG 4000 carriers and is stored on the core. The data is stored in formatted text files which can be easily printed directly to the terminal or uploaded to a PC or workstation for viewing with a text editor.

Multiple intervals may be stored in the same file, separated by the header information. The header consists of the version, date/time, and fields information. The following is the format for the files.

```
Version:  1.0
Date/Time:  7/28/2002 13:15:00.000
Fields:  spm number, carrier number, carrier type,
performance parameter, value, (performance parameter and
value repeat until all performance parameters are shown)
5,110,OC3S,LBC,150,OPT,90,OPR,92,SEFS,0,CV,0,ES,0,
SES,0
15,111,STS3L,CV,0,ES,0,SES,0,UAS,0
15,115,STS3CP,CV,0,ES,0,SES,0,UAS,0,CVFE,0,ESFE,0,S
ESFE,0,UASFE,0
16,40,VT15P,CV,0,ES,0,SES,0,UAS,0
```

Refer to *MG 4000 Performance Management*, NN10142-711 for more detailed information on Carrier PMA.

PM Poller

The PM poller collects performance attributes from several Succession based network elements (for example, UAS and CS 2000 GWC). The PM Poller is delivered as a sub-package with the CS 2000 Management Tools server software.

The PM Poller Server is the main poller process. It is responsible for launching (and stopping) the device SNMP pollers. The device pollers act as SNMP managers collecting performance data from the polled network devices at a configured polling interval. The data collected, devices the data is collected from, and the interval within which the data is collected, is based upon the profile configuration data. The Poller Server reads this configuration data during start-up of the poller. Upon collecting the pre-configured MIB data attributes from the polled devices, the data is stored in Comma Separated Value (CSV) format in files on the CS 2000 Management Tools server. These files can be viewed locally on the SSPFS server or can be retrieved from the CS 2000 Management Tools server for further review using standard File Transfer Protocol (FTP).

The data collected by the PM device pollers is output in CSV files to the '/data/oms' file output directory. The oms directory contains seven sub-directories (named 1- 7). Each of these sub-directories contain a day's collection of CSV output files (i.e., one sub-directory each for the seven day history the poller maintains). The current day's output files are always written to subdirectory'1'. File rotation will occur just prior to midnight every 24 hour period. When file rotation occurs, the files in sub-directory '7' are removed and contents of all subsequent sub-directories are moved up the directory chain (that is, files in directory 6 are moved to directory 7, 5 to 6, and so on).

A separate file is created for each device during each profile polling interval. When creating the CSV files the poller adheres to the following naming conventions:

```
<NodeType>.<NodeName>.OMs.<ReportName>.Year.Mon.Date_HR.MN
_<TZ>.csv
```

where

NodeType is the node type (GWC, UAS, etc.)
NodeName is a unique node name
ReportName correlates to the associated profile name
TZ is the timezone

An example file name is provided below:

```
GWC.GWC-10_UNIT_1.OMs.GWC.2002.05.02_10.52_EDT.csv
```

The CSV files can be viewed locally on the CS 2000 Management Tools server by using a standard text editor. Alternately the CS 2000 Management Tools server is configured with an snmp-poller ftp userid. You can utilize the FTP to retrieve the CSV output data files for further analysis. When the snmp-poller ftp userid is used to ftp into the CS 2000 Management Tools server, the home directory for this account is the file oms output directory. For security reasons the snmp-poller ftp user only has access the output directory and its sub-directories.

For more information on the PM Poller in international solutions, refer to *PT-AAL2 Solution-level Basics*, NN10441-100, and *Packet Trunking/Packet Transit - IP Solution-level Basics*, NN10442-100.

OMPUSH application

ATTENTION
The OMPUSH application is applicable to the PT-AAL2, Int'l PT-AAL2 and UA-AAL1 solutions.

The OMPUSH application is used to transfer OM files to predefined remote servers by FTP or SFTP. There are two types of OM files pushed by OMPUSH:

- MG 9000 OM files generated by the MG 9000 OM Collector
- SPFS, GWC, UAS, and SAM21 SC OM files collected by the PM Poller application

Note: All OM files need to reside on the same machine for the OMPUSH application.

The OMPUSH application supports a maximum of six file push sessions. Each session is responsible for sending OM files to one destination periodically. The application has its own destination server, destination directory, login user, password, push interval, source of OM files, and file transfer mode.

Quality of Service Collector Application

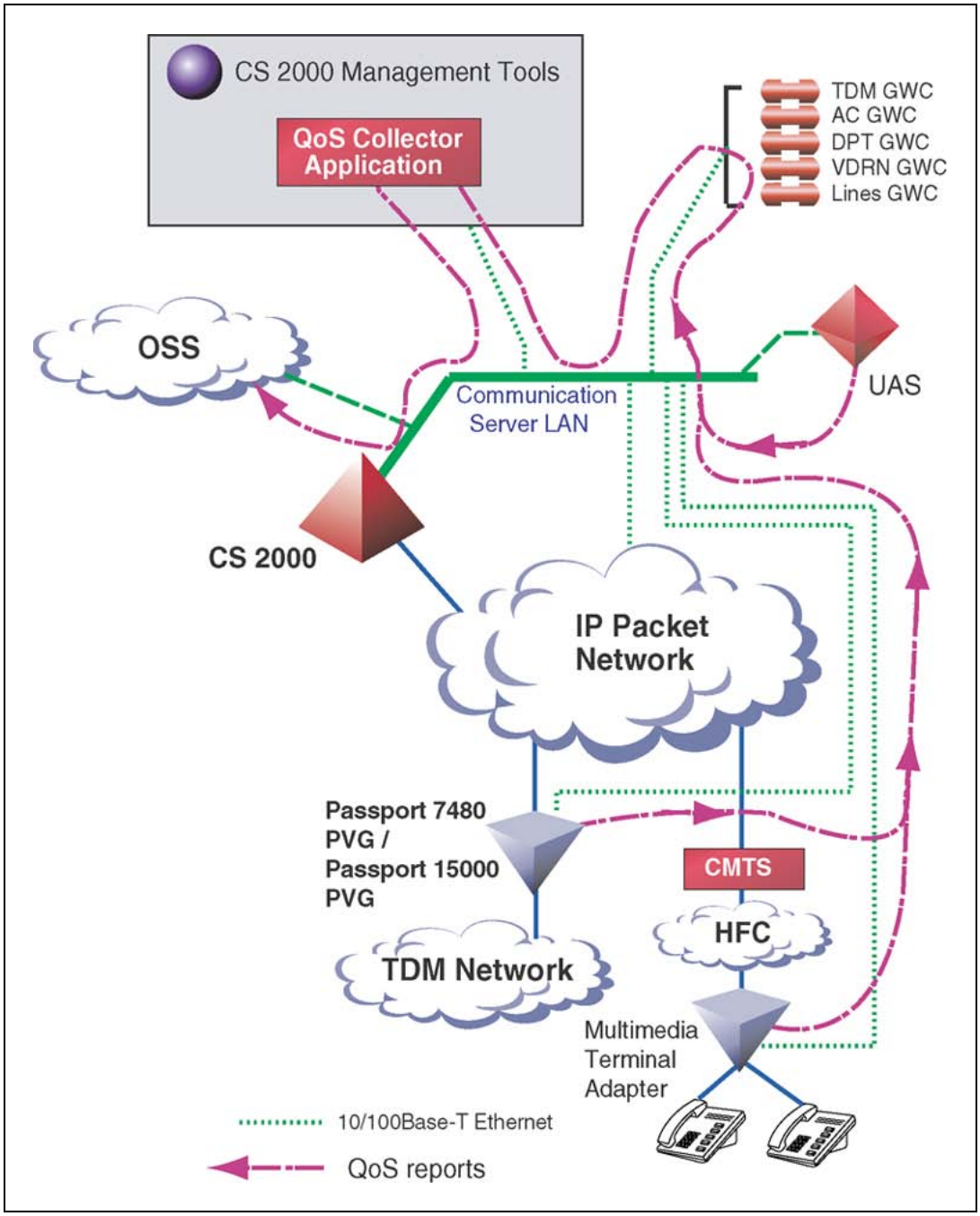
The Quality of Service (QoS) Collector Application is available for all IP solutions.

Note: This tool is not supported for the PT-AAL2 solution.

The QoS Collector Application is one of the software tools included in the CS 2000 Management Tools suite, and is part of the CS2M (CS 2000 Management Components) non-CM load (NCL) software package. The QoS Collector Application can run on the same Sun Netra t14000 on which the Succession Element and Sub-Network Manager (SESM) software is running, and is contained in an operations, administration, and maintenance equipment (OAME) frame.

The QoS Collector Application receives QoS statistics from the Media Gateway 7480, Media Gateway 15000, the Multimedia Terminal Adapter (MTA), and Universal Audio Server (UAS). The data from these gateway are collected by the CS 2000 GWC and forwarded on to the QoS Collector application (see the figure "QoS reporting for IP Solutions" (page 59)). The QoS statistics consists of metrics for packets sent, packets received, packet loss, octets sent, octets received, inter-arrival latency, and jitter.

QoS reporting for IP Solutions



At the end of every call, the QoS Collector Application receives binary QoS records from the GWCs and validates the records, ensuring the record sequence number, version, and length are correct.The QoS Collector Application then converts these records to Internet Protocol Detail Records (IPDR). The IPDRs are then written to a file. All IPDRs are stored on the Qos Collector Application host (a Sun Netra t1400).

The IPDRs can be forwarded to the OSS for processing. The output format of the QoS Collector Application data is a single stream (file) of IPDR Version 3.1-A.0.2 compliant records.

The maximum size of a QCA IPDR record is 840 characters, which is equal to 840 bytes (using UTF-8 encoding).

All gateways (GW) that have a QoS capability that is enabled report QoS statistics. The GWs that are supported are listed below:

- UAS (H.248)
- Motorola CG4500 (NCS)
- Media Gateway (Aspen/VSP2)
- Media Gateway (Aspen/VSP3)
- Media Gateway (VSP3-o)
- Media Gateway (H.248)
- Arris PacketPort (MGCP)
- Askey
- CICM

Note: QoS statistics are only collected on a point-to-point basis between these gateways in a network. The QoS statistics are not collected from all networks that the call passes through. For significant enterprise networks, it is possible to install call//fax/modem transponders to ensure that the enterprise network has adequate internal QoS.

Not all QoS statistics are provided by all media gateways. For example, the UAS does not support the jitter and latency statistics. Therefore, if the binary QoS records, from the UAS, do not contain valid values for any of the QoS statistics, then the values (for example, jitter, or latency) are not included in the output IPDR record.

Real-time streaming of the IPDR stream to the OSS is provided by means of the stream QoS utility. Also, a software tool (displayQoS) is provided with the QoS Collector application to display IPDRs in an output QoS Collector Application file. You can choose from three options for outputting IPDR data to this file:

- display all the IPDRs in the file
- display all the IPDRs for a particular subscriber ID
- display all the IPDRs for a particular media gateway controller

When the QoS reporting software is started on a client (CS 2000 GWC) the software connects to the QoS Collector Application IP address and port based on configuration details established by the CS 2000 GWC Manager.

Once the connection is established, the QoS Collector Application waits to receive data from the client CS 2000 GWC. To ensure the connection is not automatically closed after two hours (if there is no data received) the client sends a "heart beat" message after two hours of inactivity.

For more information on the QoS Collector Application in North American solutions, see *IP Solutions Basics*, NN10300-100 and *ATM/IP Solution-level Configuration Management*, NN10409-500.

For more information on the QoS Collector Application in international solutions, refer to *Packet Trunking/Packet Transit - IP Solution-level Basics*, NN10442-100 and *ATM/IP Solution-level Configuration Management*, NN10409-500.

Log reports

A log report is a message about an important event in the communication server or network component. Log reports include the following information:

- state and activity reports
- changes in state
- reports on hardware or software errors
- test results
- other events or conditions that affect performance

Examples of logs or OMs that can be useful for the following activities are listed below:

- Call processing activity - ACT100
- Call processing activity (CAP103)
- Trunk group activity - E911, KTRK100
- System activity - PM188, QMSACT, syslog
- Link activity and occupancy - many logs report on link activity and occupancy.

  For example KTRK100 collects information on trunks in the following categories:

  — Killer trunk - a trunk that the system seizes repeatedly and then drops. This can be due to the subscriber dropping the line due to a perceived fault.

  — Slow trunk release - a trunk with a low attempt rate and high use. This can be due to the test equipment.

  — Always busy trunk - a trunk that was busy throughout the report period. This can be due to under-engineering, normal high use, or equipment problems.

  — Always idle trunk - a trunk with zero attempts. This can be due to over-engineering, incorrect network management, or malfunctioning equipment.

Viewing sun-mib SNMP attribute definitions on an SPFS-based server

Application

Use this procedure to view the simple network management protocol (SNMP) attribute definitions in the sun-mib file on a Server Platform Foundation Software (SPFS)-based server.

Prerequisites

You need root user privileges.

Action

Perform the following steps to complete this procedure.

Step	Action
	At your workstation
1	Telnet to the server by typing `> telnet <IP address>` and pressing the Enter key. where **`IP address`** is the IP address of the SPFS-based server
2	When prompted, enter your user ID and password.
3	Change to the root user by typing `$ su - root` and pressing the Enter key.
4	When prompted, enter the root user ID and password.
5	Access the directory where the sun-mib file resides by tying `# cd /opt/nortel/snmp-poller/config/profiles/SSSPFS/mibs` and pressing the Enter key.
6	Display the contents of the sun-mib file by typing `$ more sun-mib` and pressing the Enter key.
7	Search for a particular attribute by typing

```
/ <attribute>
```

and pressing the Enter key.

attribute
is the attribute you want to search for

The search is case sensitive.

Example

```
/ ipForwarding
```

Example response

```
ipForwarding OBJECT-TYPE
SYNTAX INTEGER
forwarding (1), --acting as a gateway
not-forwarding (2) -- NOT acting as a gateway
ACCESS read-write
STATUS mandatory
DESCRIPTION
'The indication of whether this entity is acting as an
IP gateway in respect to the forwarding of datagrams
received by, but not addressed to, this entity.  IP
gateways forward datagrams.  IP hosts do not (except
those source-routed via the host).
...
```

8 Repeat step 7 for each SNMP attribute you want to search for.

9 Exit the file display by typing

```
--More--q
```

and pressing the Enter key.

10 You have completed this procedure.

—End—

Task flows

The table "ATM and IP solutions performance management documents" (page 65) lists the various components as well as the documents where you can find specific performance management information (including task flows).

ATM and IP solutions performance management documents

Component	Document
CS 2000	*Communication Server 2000 Performance Management*, NN10149-711
CS 2000-Compact	*Call Agent Performance Management*, NN10153-711
CS 2000 Core Manager	*CS 2000 Core Manager Performance Management*, NN10148-711
GWC	*Gateway Controller Performance Management*, NN10208-711
USP	*USP Performance Management*, NN10137-711
USP-Compact	*USPc (compact) Performance Management*, NN10138-711
IW SPM-ATM	*IW SPM-ATM Performance Management*, NN10143-711 *DPT SPM ATM Performance Management*, NN10146-711
IW SPM-IP	*IW SPM-IP Performance Management*, NN10144-711
MG 4000	*MG 4000 Performance Management*, NN10142-711
MG 9000	*MG 9000 Performance Management*, NN10140-711
UAS	*Universal Audio Server Performance Management*, NN10139-711
CS 2000 Management Tools	*PT-AAL2 Solution-level Basics*, NN10441-100 *PT-IP Solution-level Basics*, NN10442-100 *UA-AAL1 Solution-level Basics*, NN10443-100 *IAC Solution-level Basics*, NN10444-100 *IAW Solution-level Basics*, NN10445-100 *UA-IP Solution-level Basics*, NN10446-100
Multiservice Switch 7480/15000	*Multiservice Switch 7400/15000/20000 Data Management*, NN10600-561

Component	Document
Ethernet Routing Switch 8600	*Managing the Ethernet Routing Switch 8000 Series Switch Using Device Manager*, 313195A *Managing the Ethernet Routing Switch 8000 Series Switch Using the Command Line Interface Release* 3.2, 313194A *Networking Concepts for the Ethernet Routing Switch 8000 Series Switch*, 313196A
Multiservice Switch 15000/Media Gateway 15000	*Multiservice Switch 15000, Media Gateway 15000 and Preside MDM in Succession Networks Performance PT-AAL1/UA-AAL1/UA-IP*, NN10158-711 (NA only)
Multiservice Switch 15000	*MDM Management Data Provider User Guide*, 241-6001-309
CICM	*CICM Performance Management*, NN10248-711
Session Server	*Session Server Performance Management*, NN10342-711
IEMS	*IEMS Performance Management*, NN10327-711

ATM/IP solutions performance management documents

Component	Document
CS 2000	CS 2000 Performance Management, NN10149-711
CS 2000-Compact	Call Agent Performance Management, NN10153-711
CS 2000 Core Manager	CS 2000 Core Manager Performance Management, NN10148-711
GWC	GWC Performance Management, NN10156-711
USP	USP Performance Management, NN10137-711
USP-Compact	USP-Compact Performance Management, NN10138-711
IW SPM-ATM	IW SPM-ATM Performance Management, NN10143-711, or, DPT SPM-ATM Performance Management, NN10146-711
IW SPM-IP	IW SPM-IP Performance Management, NN10144-711
MG 4000	MG 4000 Performance Management, NN10142-711
MG 9000	MG 9000 Performance Management, NN10140-711
UAS	UAS Performance Management, NN10139-711
CS 2000 Management Tools	CS 2000 Management Tools Performance Management, NN10150-711
MG 7480 PVG	Passport Data Collection Guide, 241-5701-611
MG 15000 PVG	Passport Data Collection Guide, 241-5701-611

Component	Document
MG 15000 PVG and Nortel MDM	Passport 15000 and Preside MDM in Succession Networks Performance PT-AAL1, NN10158-711
ERS 8600	*Managing the Passport 8000 Series Switch Using Device Manager Release 5.x.x*, 313195A, *Managing the Passport 8000 Series Switch Using the Command Line Interface Release 3.2, 313194A*, and *Networking Concepts for the Passport 8000 Series Switch*, 313196A

Task flows for PT-SN70 and PT-XA Core

For information on performance measurements for DMS and SPM related equipment on the PT-XA Core, or PT-SN70 architectures, see *Communication Server 2000 Performance Management*, NN10149-711, and *DPT SPM ATM Performance Management*, NN10146-711.

Carrier VoIP

Nortel ATM/IP Solution-level Performance Management

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