3745 Communication Controller Model A
3746 Nways Multiprotocol Controller
Models 900 and 950

Planning Series:

Management Planning Guide

GA27-4239-02

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3746 Nways Multiprotocol Controller
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Note

Before using this information and the product it supports, be sure to read the general information under “Notices” on page xi.

Third Edition (October 2001)

This edition applies to the 3745 Communication Controller Models A and 3746 Nways® Multiprotocol Controller Models 900 and 950.

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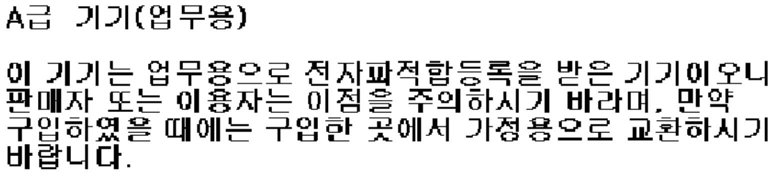

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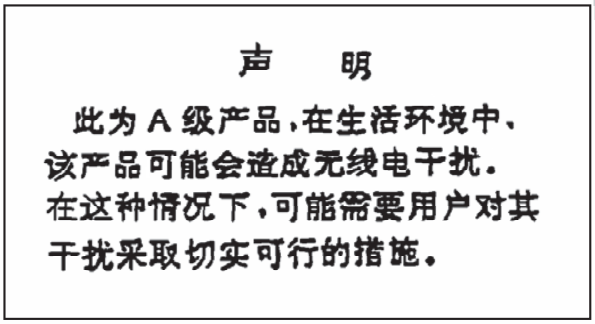

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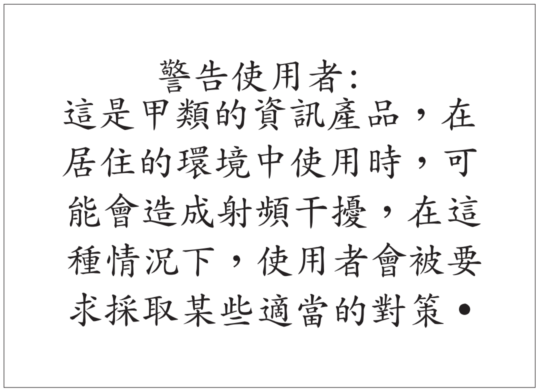

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Safety

First see the following manual: *3745 Communication Controller All Models, 3746 Nways Multiprotocol Controller Models 900 and 950 Safety Information*, GA33-0400.

Notice to Users

The IBM 3746 Expansion Unit Model 900 and IBM 3746 Nways Multiprotocol Controller Model 950 are manufactured according to the International Safety Standard IEC 60950.

Active Remote Couplers (ARCs) and the X.21 Interface, housed within the IBM 3746 Expansion Unit Model 900 and IBM 3746 Nways Multiprotocol Controller Model 950, and supplied by IBM, do not use or contain excessive voltages. An excessive voltage is one that exceeds 42.4 V peak ac or 60 V dc. They interface with the IBM 3746 Expansion Unit Model 900 and IBM 3746 Nways Multiprotocol Controller Model 950 using Safety Extra Low Voltages (SELV) only.

What Is New in This Book

This book has been revised to clarify and correct Network Performance Monitor (NPM) definitions.

The technical changes and additions are indicated by a vertical line (|) to the left of the change.

About This Guide

The *3745/3746 Planning Series* is designed to help you plan the installation and configuration of the IBM 3745 Communication Controller Models A and IBM 3746 Nways® Multiprotocol Controller Models 900 and 950. The *Planning Series* also describes the information you must gather to install and integrate 3746 Controllers into Advanced Peer-to-Peer Networking®/High-Performance Routing (APPN®/HPR) and Internet Protocol (IP) environments.

The *3745/3746 Planning Series* consists of a set of Planning Guides that replace, update and obsolete the *Planning Guide*.

Who Should Use the 3745/3746 Planning Series

The *3745/3746 Planning Series* is intended for network planners, network specialists, and system programmers responsible for collecting the information required for the installation and network integration of 3745 Communication Controller Models A and 3746 Expansion Unit Model 900 in an SNA environment, as well as the 3746-950 and 3746-900 as APPN/HPR network nodes and IP routers.

How the 3745/46 Planning Series Is Organized

Important:

1. If you already use the existing *Planning Guide*, IBM recommends that you read the new *Planning Series* to learn about new features and to become familiar with the new structure in which planning information is presented.
2. When planning the installation and configuration of 3746 controllers you must use the *IBM 3745 Communication Controller Models A, IBM 3746 Nways Multiprotocol Controller, Models 900 and 950: Overview*along with the *3745/3746 Planning Series* to have all required information.
3. The 3745/3746 documentation is updated periodically in response to your needs and to reflect product evolutions. Because of the time delay necessary to update hard media (books that are printed and available on CD-ROM), it is highly recommended that you periodically check the IBM 3745/3746 documentation on the Web for the latest versions of the documents (see “Additional Information on the Web” on page xxi).

Refer to the appropriate Planning Guide for the parameters to be customized for the installation and operation of:

- 3745 Communication Controller Models A
- 3746 Nways Multiprotocol Controller Models 900 and 950
- Network Node Processor (NNP)
- Multiaccess Enclosure (MAE)
- Service Processor
- Distributed Console Access Facility (DCAF) and TME® 10 remote consoles
- Java™ Console
- Network management

When you define 3746 resources controlled by NCP, record the information in the worksheets provided for the Controller Configuration and Management application.

The *3745/3746 Planning Series* consists of the following planning guides:

Overview, Installation, and Integration, **GA27-4234**

Starts with a general overview of 3746 planning and then explains the various 3745 and 3746 installation and upgrade scenarios.

The guide also explains the options available for the basic integration of the controller and its service processor into your network. There are MOSS-E worksheets for these options, which are to be filled out for the IBM service representative who does the actual controller installation or upgrade. The appendixes:

- Show the panels of the MOSS-E service processor customization function
- Describe the support offered by each level of the 3746 Licensed Internal Code

ESCON Channels, **GA27-4237**

After an overview of ESCON® architecture and the adapters, the publication explains the configuration and tuning. This can be done with either the ESCON Generation Assistant (EGA) tool or the Controller Configuration Management (CCM) tool.

The publication also includes examples of various types of ESCON configurations.

Note: For information about using ESCON adapters on the MAE, refer to the *Multiaccess Enclosure Planning* guide.

Token Ring and Ethernet, **GA27-4236**

Helps you with the configuration and definitions of your 3746 Network Node token-ring adapters (TRAs) for APPN/HPR-, IP-, and NCP-controlled traffic.

There are MOSS-E worksheets for the token-ring information needed by the IBM service representative to install or update your machine.

Although no longer available from IBM, the guide explains 3746 Ethernet support and Ethernet adapter configuration.

The token-ring (IEEE 802.5) and Ethernet (IEEE 802.3) standards are discussed in the appendixes.

Note: For Multiaccess Enclosure Ethernet information, refer to the *Multiaccess Enclosure Planning* guide.

Serial Line Adapters, **GA27-4235**

Provides an overview of the serial line adapters, and describes the support for X.25, frame relay, PPP, and SDLC.

The two ways that the 3746 supports ISDN (LIC16 adapter[1] and terminal adapters) are explained, including how ISDN lines can be used as backups for other types of lines.

[1] No longer available

An appendix describes the frame-relay support in each NCP level since frame relay was introduced in NCP Version 6.

Note: For Multiaccess Enclosure ISDN information, refer to *Multiaccess Enclosure Planning*.

Physical Planning, **GA27-4238**

Gives information to help you plan the physical site used by the 3745/3746 frames, Service Processor, and Network Node Processor: the physical dimensions, electrical characteristics, and so on. It also gives this information for the various components of the 3745/3646, such as the Multiaccess Enclosure, Controller Extension, LICs, LCBs, ARCs, and so on.

The cable descriptions include feature codes (FCs) and part numbers used when ordering them.

The guide includes and explains the controller installation sheets, which show what IBM has installed on your machines.

Plugging sheets for keeping track of your installed LICs, ARCs, and cables are provided along with examples and explanations of their use.

Note: This type of information for the Multiaccess Enclosure is in the *Multiaccess Enclosure Planning* guide.

Management Planning Guide, **GA27-4239**

Starts with a management overview covering:

- The Tivoli® NetView® program
- Performance management
- Service Processor
- Network Node Processor
- APPN Topology Integrator

Then there are chapters about:

- APPN/HPR Network Node management
- NetView Performance Monitor
- Remote console support
- IBM Remote Support Facility
- 3746 IP router management
- Multiaccess Enclosure APPN/HPR Network Node management
- X.25 network

There are MOSS-E worksheets for the network management parameters needed by the IBM service representative to install or upgrade your machine.

The guide also explains MOSS-E Service Processor Customization.

There is an example of ESCON Management Information Base (MIB) definitions.

Note: For Multiaccess Enclosure management information, refer to the *Multiaccess Enclosure Planning* guide.

Multiaccess Enclosure Planning, **GA27-4240**

Provides information about the Multiaccess Enclosure and its adapters (ATM, ESCON, and so on) and how to configure them.

For information about:

- Multiaccess Enclosure APPN/HPR Network Node management, refer to the *3745/3746 Planning Series: Management Planning Guide*
- Physical site planning and the cables, refer to the *3745/3746 Planning Series: Physical Planning*

Protocol Descriptions, **GA27-4241**

Is an in-depth description of these protocols used by the 3746:

- APPN/HPR
- IP

The detailed discussions of how the 3746 and Multiaccess Enclosure support these protocols help you understand the purpose of the protocol parameter definitions and what types of information are needed for the most efficient operation of your 3745/3746-connected networks.

CCM Planning Worksheets (online)

These example worksheets for the 3746 and MAE can be used to plan the actual definitions of the many CCM parameters you need to configure for your 3746.

These worksheets are available in PDF format at:

ibm.com/networking/did/3746bks.html#Customer

Where to Find More Information

While planning a migration, you must use the following documents in addition to the *3745/3746 Planning Series* guides:

- IBM *3745 Communication Controller Models A and 170, 3746 Nways Multiprotocol Controller Models 900 and 950: Overview*, GA33-0180
- IBM *3745 Communication Controller All Models, 3746 Nways Multiprotocol Controller Model 900: Console Setup Guide*, SA33-0158 (This guide contains information about remote console access to 3745/3746-900s via an SNA/subarea, APPN, or TCP/IP path and using a modem.)

Also, you may need to use the following additional documents:

- IBM *3746 Nways Multiprotocol Controller Model 900 and 950: Controller Configuration and Management: User's Guide*, SH11-3081 (IBM recommends that you prepare controller definitions before installing a 3746. To obtain a stand-alone version of the Controller Configuration and Management that runs on an OS/2® workstation, contact your IBM marketing representative.)
- *3746 Nways Multiprotocol Controller Model 950: User's Guide*, SA33-0356 (This guide contains information about routine operations, installing and testing the communication line adapters, service processor, and remote consoles.)
- *Planning for Integrated Networks*

Be sure to use the latest editions of these documents. This will ensure that you have up-to-date and complete information about the 3746 controllers.

The following *IBM International Technical Support Organization* redbooks provide useful information about 3746 implementation:

- *APPN Architecture and Product Implementations Tutorial*, GG24-3669

- *IBM 3746 Nways Multiprotocol Controller Model 950 and IBM Model 900: APPN Implementation Guide*, GG24-2536
- *Subarea Network to APPN Network Migration Guide*, SG24-4656
- *IBM 3746 Nways Multiprotocol Controller Model 950 and Model 900: IP Implementation Guide*, SG24-4845

Be sure to see the other relevant documents listed in the bibliography at the back of this guide.

Additional Information on the Web

You can access the latest news and information about IBM network products, customer service and support, and information about microcode upgrades at:

www.ibm.com/

The latest versions of the *Planning Series* and other 3745/3746 documentation are available in PDF format at:

www.ibm.com/networking/did/3746bks.html#Customer

CD-ROM

Starting with engineering change F12380, the Licensed Internal Code (LIC) is shipped on a CD-ROM. The complete 3745/3746 documentation set is also included on the CD-ROM.

Examples: 3745 Models A and 3746 *Planning Series*, 3746 NNP and Service Processor Installation and Maintenance Guides, CCM *User's Guide*, 3746-950 *User's Guide*, and others. See the bibliography for the complete name and form number of the books.

3745/3746 documentation is in PDF format. Acrobat Reader for OS/2® is included on the CD-ROM to allow you to read the PDF files and print all or part of a book.

Accessing CD-ROM Information

To access the CD-ROM from a service processor equipped with a CD-ROM drive, use the following procedure:

1. Install the CD-ROM in the service processor CD-ROM drive.
2. In the MOSS-E main panel, open the **View** menu and select **Information**.
3. Double-click **CD-ROM documentation**. Your browser automatically opens and displays the documentation home page.
4. Click any highlighted text (blue and underlined) to go to the material that interests you:
   a. Click **Documentation** to access 3745/3746 books.
   b. Click the icon marked PDF that corresponds to the item that interests you.

      The Acrobat Reader automatically opens and displays the file in the full-panel mode. Use the **Page Up** and **Page Down** keys to move through the document.

      Press **Esc** to display the Reader menus that allow you to print all or part of the file.

      When you close the Acrobat Reader, you return to the browser.

      When you close the browser, you return to the MOSS-E Documentation menu.

Each document file has one or more of the following identifiers:

- Date
- Form number
- Engineering change level
- Revision code.

Check these identifiers on future releases of the CD-ROM to see if the documents that you use have been updated.

How to Use the 3745/3746 Planning Series

Your Responsibility as a Customer

You are responsible for performing the tasks listed in Table 1. These tasks are not performed by IBM personnel as part of the machine installation and basic operations. They can, however, be performed by IBM on a fee basis.

Table 1 (Page 1 of 3). Customer Tasks

Task	Where to Find Information
Network design:	Network design is not covered in this book. Refer to the following IBM books for SNA, APPN/HPR, and IP network planning guidance: • *Planning for Integrated Networks* • IBM redbooks: – *Subarea Network to APPN Network Migration Guide* – *IBM 3746 Nways Multiprotocol Controller Model 950 and IBM Model 900: APPN Implementation Guide* – *IBM 3746 Nways Multiprotocol Controller Model 950 and IBM Model 900: IP Implementation Guide* – *IBM Nways 2216 Multiaccess Connector Description* – *IBM 2216 Multiaccess Connector ESCON Solutions*
Physical planning: Before the IBM service representative arrives to install your controller, make sure that you have met the necessary requirements for the following: • Electric power • Floor space with service clearances • Space for the cables • The RSF switched line • The Controller Expansion (FC 5023) • Other components (such as the service processor).	"Physical Planning Details" chapter in the *3745/3746 Planning Series: Physical Planning*
Controller hardware configuration definitions: Decide what type of attachments (lines) and how many of each type you need.	This input is necessary for the IBM ordering system (CF3745). For more information, refer to the *3745/3746 Planning Series: Physical Planning*.

Table 1 (Page 2 of 3). Customer Tasks

Task	Where to Find Information
Software definitions and tuning: • ESCON port, host link, and station definitions; ESCON resource, TCP/IP, and VTAM® tuning	Refer to: • “ESCON Adapters” chapter in the *3745/3746 Planning Series: ESCON Channels* • “ESCON Channel Adapter” chapter in the *3745/3746 Planning Series: Multiaccess Enclosure Planning* • “ESCON Configuration Examples” chapter in the *3745/3746 Planning Series: ESCON Channels*
• Token-ring port and station definitions; PU and LU maximum limits; port sharing with NCP-controlled traffic; duplicate addresses; token-ring APPN, IP, and/or NCP resource tuning and VTAM tuning	• “Token-Ring Adapters” chapter in the *3745/3746 Planning Series: Token Ring and Ethernet*
• Serial line (SDLC, PPP, frame-relay, and X.25) port and station definitions; location of CLPs, LICs, LCBs, and ARCs; maximum CLA line connectivity; CLP backups	• “Serial Line Adapters” chapter in the *3745/3746 Planning Series: Serial Line Adapters* • “3746 SDLC Support” chapter in the *3745/3746 Planning Series: Serial Line Adapters*
• Multiaccess Enclosure: hardware planning and configuration; software configuration and tuning	• *3745/3746 Planning Series: Multiaccess Enclosure Planning* • *3745/3746 Planning Series: Physical Planning*
• Use of the Controller Configuration and Management (CCM) application.	• *IBM Controller Configuration and Management User's Guide*, SH11-3081. Also refer to: • *IBM 3746 Nways Multiprotocol Controller Model 950 and IBM Model 900: APPN Implementation Guide* (an IBM redbook) • *IBM 3746 Nways Multiprotocol Controller Model 950 and IBM Model 900: IP Implementation Guide* (an IBM redbook).
Filling out: • 3746 plugging sheets To keep a record of the processors and couplers (and their addresses) installed in the 3746 frame.	Refer to: • “Plugging Sheets for 3745 and 3746” chapter in the *3745/3746 Planning Series: Physical Planning*
• *CCM User's Guide*, SH11-3081 worksheets To plan the 3746 and MAE logical resource definitions. They can then be used when configuring the 3746 and MAE using the CCM.	• *3745/3746 Planning Series: CCM Planning Worksheets*

Table 1 (Page 3 of 3). Customer Tasks

Task	Where to Find Information
NetView definitions in VTAM, the MOSS-E, NPM, CCM, NetView/360, and Tivoli NetView (formerly NetView for AIX) for: • APPN traffic • IP traffic • NetView alert path	Refer to: • “3746 Management Overview” chapter in the *3745/3746 Planning Series: Management Planning Guide* • “3746 APPN/HPR Network Node Management” chapter in the *3745/3746 Planning Series: Management Planning Guide* • “3746 IP Router Management” chapter in the *3745/3746 Planning Series: Management Planning Guide*.
Controller, service processor, and network node processor definitions. For example: • Link IPL port information • Password management • NetView alert reporting path definitions • DCAF LU definitions • Ethernet port definitions for SNMP • Service processor token-ring and IP LAN addresses	Refer to “Controller and Service Processor Integration” chapter in the *3745/3746 Planning Series: Overview, Installation, and Integration*. Fill out the worksheets in the various *Planning Series* guides. These worksheets are used by the IBM service representative during installation.
Remote console definitions (using DCAF): • Ensure that the necessary hardware and software is available for the type of console attachment chosen • Service processor definitions for DCAF • DCAF installation and configuration on the remote console	Refer to: • “Remote Customer Consoles” chapter in the *3745/3746 Planning Series: Management Planning Guide* • For the 3746-900, refer to the *3745 Console Setup Guide* • For the 3746-950, refer to the *IBM 3746 Nways Multiprotocol Controller Model 950 User’s Guide*
Connection to the IBM remote support facility (RSF): • Service processor connection (modem) definitions • Customer definitions for RSF records.	Refer to the “Connecting to the IBM Remote Support Facility” chapter in the *3745/3746 Planning Series: Management Planning Guide*
Problem determination through the MOSS-E and NetView	For the 3746-900, refer to: • *Problem Analysis Guide* accessed online from the MOSS-E • *3745 Models A: Alert Reference Guide* • *3745 All Models: Advanced Operators Guide*

Finding Your Way Around in the New Planning Series

If you are familiar with the layout of the old *3745 Communication Controller Models A and 3746 Models 900 and 950: Planning Guide*, GA33-0457, Table 2 should help you find which of the eight new books of the planning series contains the information that you need.

Note: Some of the chapters in the *Planning Guide* have been split into two or more new chapters in one or more new guides.

Table 2 (Page 1 of 2). Location of Old Planning Guide Chapters in New Planning Guides

Old Planning Guide		New Planning Series Book	
Chapter	**Chapter Name**	**Chapters**	**Guide Name**
1	3745 and 3746 General Information	--	Not included in the new guides
2	APPN/HPR Overview	1	*Protocol Descriptions*
3	Internet Protocol (IP) Overview	2	*Protocol Descriptions*
4	3746 ATM Support	4	*Multiaccess Enclosure Planning*
5	Token-Ring/802.5	B	*Token-Ring and Ethernet*
6	Ethernet Overview	C	*Token-Ring and Ethernet*
7	Frame Relay Overview	4, 5	*Serial Line Adapters*
8	Point-to-Point Protocol (PPP) Overview	4	*Serial Line Adapters*
9	X.25 Overview	2, 3, 5, 7	*Serial Line Adapters* *Management Planning*
10	ISDN Adapters	8	*Serial Line Adapters*
11	ESCON Overview	1	*ESCON Channels*
12	3745 and 3746 Installation and Upgrade Scenarios	2	*Overview, Installation, and Integration*
13	Configuration Scenarios	6	*Multiaccess Enclosure Planning*
14	3746 Planning Overview	1	*Overview, Installation, and Integration*
15	ESCON Adapters	1, 2, 3	*ESCON Channels*
16	Token-Ring Adapters	1, 2, 3	*Token-Ring and Ethernet*
17	Ethernet Adapters	4, 5	*Token-Ring and Ethernet*
18	Serial Line Adapters	1	*Serial Line Adapters*
19	3746 SDLC Support	3, 4	*Serial Line Adapters*
20	Multiaccess Enclosure	1	*Multiaccess Enclosure Planning*
21	Multiaccess Enclosure Adapters Overview	2	*Multiaccess Enclosure Planning*
22	ESCON Channel Adapter	8	*Multiaccess Enclosure Planning*
23	Multiaccess Enclosure ISDN Support	5	*Multiaccess Enclosure Planning*
24	3746 Configuration Overview	--	Not included in the new guides
25	Welcome to the CCM	--	Not included in the new guides
26	Multiaccess Enclosure Configuration	7	*Multiaccess Enclosure Planning*
27	3746 Base Frame ESCON Configuration Examples	1	*ESCON Channels*
28	Configuring the MAE ESCON Channel Adapter	8	*Multiaccess Enclosure Planning*

Table 2 (Page 2 of 2). Location of Old Planning Guide Chapters in New Planning Guides

Old Planning Guide		**New Planning Series Book**	
Chapter	**Chapter Name**	**Chapters**	**Guide Name**
29	3746 Management Overview	1	*Management Planning*
30	3746 APPN/HPR Network Node Management	2	*Management Planning*
31	3746 IP Router Management	6	*Management Planning*
32	MAE APPN/HPR Network Node Management	2	*Management Planning*
33	MAE IP Router Management	6	*Management Planning*
34	Controller and Service Processor	3	*Overview, Installation, and Integration*
35	Customer Consoles and DCAF	4 1 1	*Management Planning* *Overview, Installation, and Integration* *Token-Ring and Ethernet*
36	Connecting to the IBM Remote Support Facility	5	*Management Planning*
37	Performance Management with NetView Performance Monitor	3	*Management Planning*
37	3746 IP Router Management	6	*Management Planning*
38	MOSS-E Worksheets for Controller Installation (3745)	A A A	*Overview, Installation, and Integration* *Management Planning* *Token-Ring and Ethernet*
39	Parameter Cross-Reference Table	B	*Overview, Installation, and Integration*
40	CCM Worksheets for Controller Configuration Definitions	1	*CCM Planning Worksheets* (online)
41	Multiaccess Enclosure Worksheets	2	*CCM Planning Worksheets* (online)
42	Familiarizing Yourself with the Installation Sheets	2	*Physical Planning*
43	Plugging Sheets for the 3746 Nways Multiprotocol Controller	3	*Physical Planning*
44	Physical Planning Details	1	*Physical Planning*
A	3746-9x0 Microcode Levels (EC)	D	*Overview, Installation, and Integration*
B	ESCOM MIB	A	*Management Planning*
C	MOSS-E Service Processor Customization Function	C	*Overview, Installation, and Integration*

Chapter 1. 3746 Management Overview

This chapter gives an overview of network management relevant to the operation of the 3746 Network Node. The addition of the NNP to allow the 3746 to function as a stand-alone APPN network node, IP router, or both and the recent addition of the Multiaccess Enclosure (MAE) with its APPN and IP functions, gives a number of options for managing the hardware and software running in these platforms.

The management tasks associated with the 3746 are:

- Reporting hardware and software alerts
- APPN and IP topology management
- Configuration management with the CCM (including MAE)
- Performance management with Network Performance Monitor (NPM)

Management can be divided up into local and remote management. Local management is carried out from the service processor (SP), but this can also be done from remote workstations by using DCAF. Remote management is carried out from different platforms, which can be distributed or centralized. Management information is forwarded from the SP, and the APPN and IP control points to management software running on a variety of hardware platforms. Different protocols can be used to transport this data.

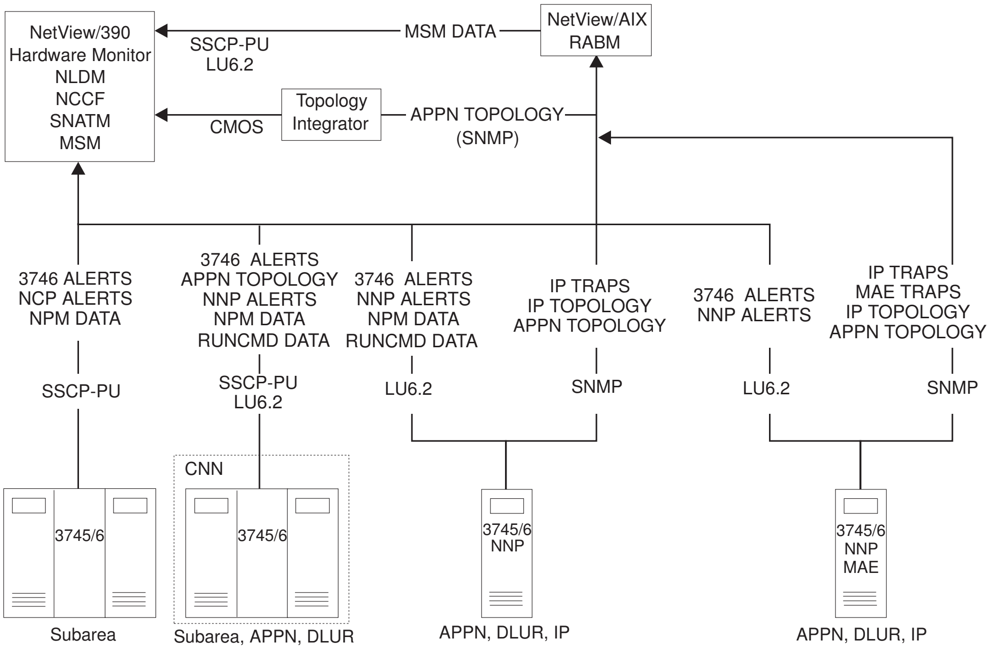

Figure 1. 3746 Management Options

Figure 1 shows the available hardware and software configurations reporting management data to different management platforms. Table 3 on page 2 gives an overview of the management options for each configuration. The options are discussed in greater detail in the following sections.

Table 3. Summary of Management Options

Networking Architecture	Management Data Available	Management Software	Transport	Refer to:
Subarea SNA	3746 Alerts NCP Alerts NPM Data	NetView for OS/390 NetView for OS/390 NPM	SSCP-PU	Page 55
Subarea SNA APPN (CNN)	3746 Alerts NNP Alerts NPM Data RUNCMD Data	NetView for OS/390 NetView for OS/390 NPM NetView for OS/390	LU6.2 LU6.2 LU6.2 LU6.2 to SSCP-PU	Pages 2 and 55
APPN (NNP) DLUR	3746 Alerts NNP Alerts NPM Data RUNCMD Data	NetView for OS/390 NetView for OS/390 NPM NetView for OS/390	LU6.2	Pages 2 and 55
IP (NNP)	IP Traps IP Topology APPN Topology	NetView/AIX NetView/AIX, MSM RABM, SNATM	SNMP	Pages 10, 21, and 24
APPN (MAE) DLUR (MAE)	3746 Alerts NNP Alerts	NetView for OS/390 NetView for OS/390	LU6.2	“MAE APPN/HPR Network Node Management” chapter in the *3745/3746 Planning Series: Multiaccess Enclosure Planning*
IP (MAE)	IP Traps MAE Traps IP Topology APPN Topology	NetView/AIX NetView/AIX, MSM NetView/AIX, MSM RABM, SNATM	SNMP	Pages 2, 10, 21, and 24.
APPN (MAE)	SNMP Traps APPN Traps	NetView/AIX	SNMP	

NetView for OS/390 Management of APPN Networks Overview

Tivoli NetView V2R4 includes a feature for managing APPN networks called the NetView APPN Topology and Accounting Management (APPNTAM). This feature works with corresponding agent functions to gather and record data about APPN networks.

NetView V3R1 was enhanced to include functions for managing the topology and status of both subarea and APPN networks. For more information on SNA and APPN management, refer to *Dynamic Subarea and APPN Management Using NetView V3R1,* SG24-4520. For APPN, these enhancements include:

- Integration of the APPN Topology and Accounting Management (APPNTAM) feature into the Enterprise Option of NetView V3R1. It is now called the SNA Topology and Accounting Manager (SNATAM), and it provides support for both APPN and subarea topology.
- The CMIP services function is no longer part of NetView in V3R1. Instead, NetView utilizes the CMIP services function present in VTAM® V4R3 in order to communicate with agents.
- Support for the VTAM SNATAM agent shipped as a part of VTAM V4R3.
- The CM/2 agent is now shipped as part of NetView and has been renamed the APPN Topology and Accounting Agent (APPNTAA). This agent is also available for the IBM 2217 and 3746 NNP.

- Support for the dynamic topology and status of LUs. With the SNA topology manager in NetView Version 3, LU information is not automatically collected from the VTAM agent for all LUs. This choice was made in order to reduce the network traffic and the number of objects created and maintained in the NetView Resource Object Data Manager (RODM). Application LUs and APPN control points will automatically be reported by the VTAM agent to the SNA topology manager when local and network topology is being collected from the VTAM agent.

  Note: The NetView RODM is an object-oriented data cache. Objects in RODM represent resources in the network. The data cache is located entirely in the memory of the host processor resulting in fast access to data and high transaction rates.
- Session monitor support for DLUR/S sessions, border nodes, and VR-TGs. The session monitor will be able to indicate whether the SSCP-PU and SSCP-LU sessions are using the Dependent LU Requester/Server (DLUR/S) pipe. The session monitor has also been enhanced to indicate in the APPN route displays whether the APPN route for a session traverses VR-TGs or crosses APPN networks.

The Topology Management function can obtain, monitor, control and graphically display the topology of your APPN networks by providing:

- Collection and storage of APPN topology data, including real-time updates, in the RODM data cache
- Dynamic, graphical display of APPN topology, using the NGMF
- Control of SNA ports and links using commands on the NGMF pull-down menus, the operator console, and Command Tree/2

The Accounting Management function provides centralized collection of LU 6.2 session and conversation accounting information. This information is logged to the system management facilities (SMF) or a user-defined external log.

You can automate these functions using the NetView automation facilities, such as command lists and the automation table. In addition, you can automate using methods and objects stored in RODM.

SNATAM Structural Overview

SNATAM provides APPN management functions according to a manager-agent relationship. This feature uses the Open System Interconnect (OSI) system management model. Management service is provided by one or more managing systems, which gather and correlate data from multiple managed systems. The managing systems provide this service through one or more management applications, called managers, which communicate using OSI Common Management Information Protocol (CMIP) with management applications at the managed systems, called agents.

The topology manager and accounting manager applications are separate entities that can be installed and initialized independently. You can install the topology manager application on a NetView central system. You can install the accounting manager application on a NetView central system and on a NetView distributed system.

The corresponding SNATAM agent applications reside on VTAM and on APPN NNs and ENs that use the OS/2® Communications Manager/2 platform. The SNATAM agent includes both the topology agent and the accounting agent applications that can be initialized independently.

In all cases, the CMIP services must be active to support the manager-agent communications. Communication between the manager and agent applications is over LU 6.2 sessions using OSI CMIP and the SNA multiple domain support (MDS), this is known as *CMIP Over SNA* (CMOS).

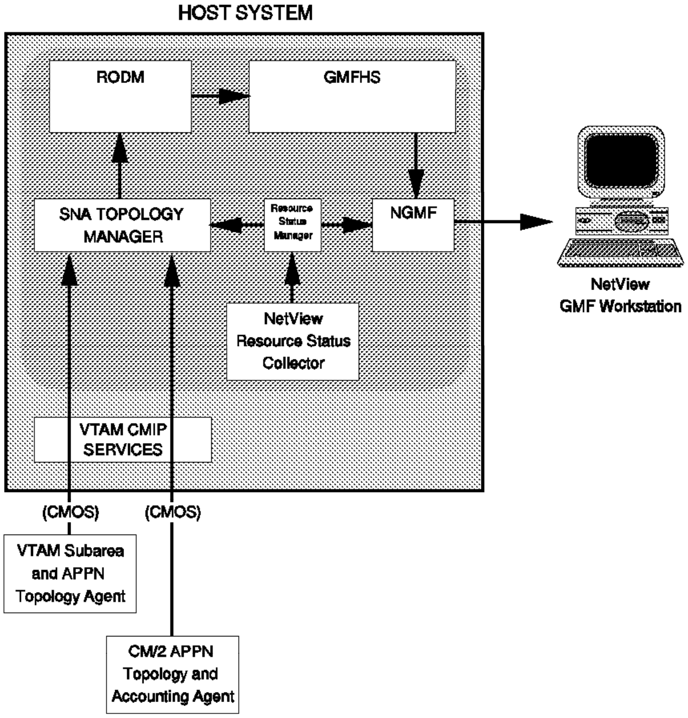

Figure 2. Structural Overview of SNATAM

Figure 2 illustrates the structure of the SNATAM feature. The topology agent on the OS/2 system is gathering and forwarding topology information to the topology manager. The accounting agent is gathering and forwarding accounting data to the accounting manager. Note that each manager application can gather information from multiple agent applications; each agent application can forward data to multiple manager applications.

VTAM CMIP Services

The VTAM CMIP services component allows communication between the SNATAM manager and agent applications using VTAM MS transport. MS transport uses LU 6.2 sessions for the actual communications between systems in the network. The CMIP data exchanged between the manager and agent applications is encapsulated in MDS-MUs and transported over these LU 6.2 sessions using the management services MDS-SEND and MDS-RECEIVE transaction programs. The CMIP services task or program comprises the OSI Layers 5 to 7 and other services, such as internal MIB API.

SNATAM Topology Manager Overview

The topology manager works with one or more topology agents to gather the APPN topology information of your APPN networks, as well as to monitor the networks for any topology or resource status changes. Agent applications can be on APPN network nodes (NNs) and end nodes (ENs). NNs provide network and local topology support; ENs provide local topology support.

The topology agent forwards APPN topology and status information upon request to the topology manager. The topology manager correlates and stores this data in RODM according to the SNATAM topology data model. It dynamically creates objects in RODM and updates the status of these objects as information is received from the topology agents in the network.

The topology manager allows you to manage APPN resources, namely logical links and ports, at the agent nodes. When you issue a command to start monitoring network or local topology, the topology manager sends a request to the agent. The agent sends the requested topology data to the manager, then continues to send status and configuration updates to the manager. The agent also activates and deactivates ports and links when it receives those commands from the manager. An agent can interact with one or more managers, each requesting the same or different data.

SNATAM Topology Data

The SNATAM topology manager gathers topology data from the topology agent nodes in the network. The two types of topology being collected and monitored are:

Network topology

This is your APPN backbone topology. It contains information about NNs, virtual routing nodes (VRNs), and transmission groups (TGs) between nodes that are part of an APPN intermediate routing network. Topology manager should request network topology from at least one agent network node in each subnetwork.

Local topology

This is local information about NNs, ENs, and low-entry networking nodes (LENs), the connections between nodes, and the ports and links that make up the connections. A node must have a topology agent installed to support local topology monitoring.

NGMF Graphic Views of APPN

The SNA topology manager uses the NGMF to provide the graphical interface for displaying and monitoring APPN resources stored in RODM. APPN views are updated dynamically as changes occur in the network. This ensures that the most current status and configuration are available to the operator. Operators can use the views to monitor the status of the APPN network, navigate through the network, locate failed resources, activate and deactivate links and ports, and control topology monitoring.

Topology Manager Functions

The functions available with the topology manager enable you to perform the following functions:

- Monitor APPN network topology to view the connectivity between APPN network nodes. The views are updated dynamically with configuration and status changes of the network nodes and the TGs between them.
- Monitor APPN local topology to view agent nodes and their TGs, ports, and logical links. Local topology also displays adjacent NNs, ENs, and LENs. These views are updated dynamically with configuration and status changes to nodes, TGs, links, and ports.
- Control the status of ports and links (activate, deactivate, and recycle).
- Navigate from high-level aggregate views to real resources, using functions such as the More detail, Fast path to failing resource, and Locate resource pull-down menu selections.
- Display views of an APPN network, including views of:
  - All APPN subnetworks being monitored (with each subnetwork as an aggregate object)
  - An individual APPN subnetwork (an aggregate view representing NN domains and the TG circuits between NNs)
  - A particular domain of an NN
  - Local connections of a node (TG, links, ports, and adjacent nodes)
  - A particular connection (a TG or link and the adjacent node)
- Display information about resources such as CP and link names, TG numbers, and the NETID of a subnetwork.
- Identify which NNs, ENs, and TGs have additional capabilities and display what they are. For example, NN capabilities can include border node and directory server. TG capabilities can include support for CP-CP sessions.
- Use existing NGMF functions to navigate and edit views.
- Automate operations using RODM objects.
- Create user-defined objects and views in RODM for customized operation.

Figure 3 on page 7 gives an example of a subarea network topology displayed by SNATAM.

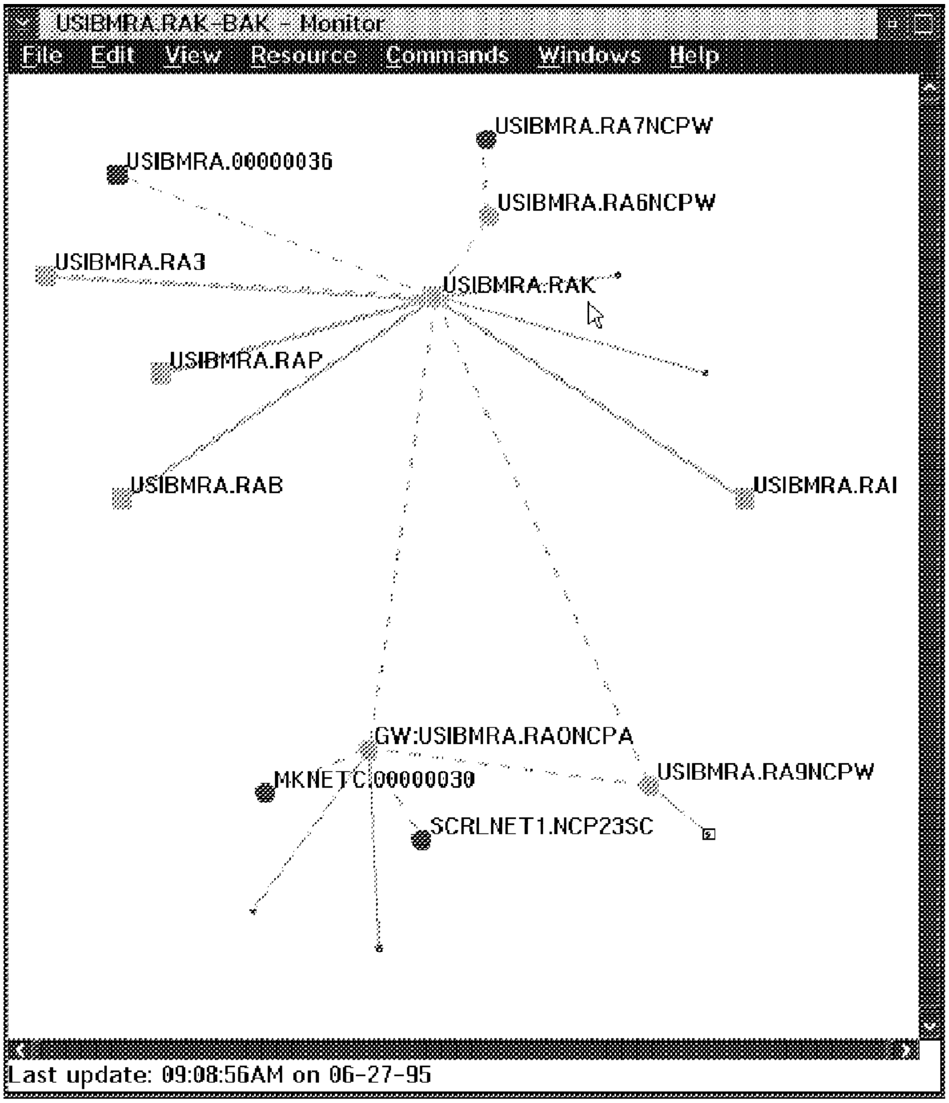

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Figure 3. APPN Topology Example

APPN Topology Integrator

The APPN Topology Integrator application (referred to as the *integrator*) is an application that runs on any OS/2 WARP® or WARP Connect workstation with Communications Manager/2 (CM/2) V1R1 or later and TCP/IP V3R0. The integrator enables the management of SNMP devices through CMIP. Together with the NetView SNA Topology and Accounting Manager (SNATAM) and the APPN Topology and Accounting Agent (APPNTAA), the integrator is part of a complete solution providing for the management of APPN topology.

SNATAM provides APPN management functions according to a manager-agent relationship. This relationship is defined by the International Organization for Standardization (ISO) in terms of a managing system and a managed system, respectively. The manager applications for APPN topology are NetView applications. Agent applications, including APPNTAA and the integrator, which collect information for transmission to NetView, reside on APPN network nodes and end nodes that use the CM/2 platform. Communication between the manager and agent applications is over APPC sessions using Open Systems Interconnection (OSI) Common Management Information Protocol (CMIP) and the Systems Network Architecture (SNA) Multiple-Domain Support (MDS). To support the CMIP Services, the integrator uses the Management Services (MS) transport.

The integrator is installed, started, and maintained entirely separately from the manager function (see “NetView for OS/390 Management of APPN Networks Overview” on page 2).

How the Topology Manager and Integrator Work Together

The Topology Manager application works with one or more integrators to gather topology from the SNA network. The integrator is needed to provide APPN topology information from SNMP devices. An integrator can be located on an APPN NN or EN.

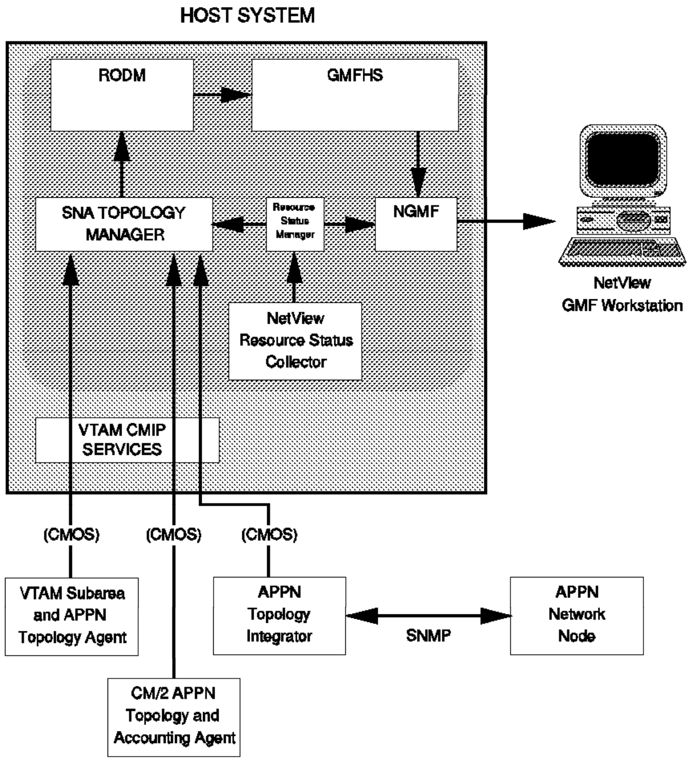


Figure 4. APPN Topology Integrator

When an operator issues a command to start monitoring topology at a node with an SNMP agent, the topology manager sends a request to the integrator. The integrator obtains the requested network or local topology data from the respective SNMP agent and sends the data to the manager. It continues to send status and configuration updates to the manager by polling the SNMP agent for topology changes. An integrator can support approximately 200 concurrent monitor requests.

Note: Each monitor request is handled in a separate OS/2 thread. Although OS/2 can handle a theoretical maximum of 4095 processes or threads, the system default value is 256.

The integrator can also activate and deactivate ports and links at an SNMP device upon receiving requests from the manager if these actions are supported by the SNMP agent at the device.

NetView for OS/390 Management of IP Networks

NetView provides a solution for the monitoring and control of IP resources under GMF. The IP resources can be displayed on the same screen as subarea and APPN SNA resources, and controlled in the same way. This product is called *MultiSystem Manager* (MSM).

MultiSystem Manager uses a manager-agent relationship to manage LAN and IP workgroups. This relationship consists of a managing system, referred to as the *topology manager*, and managed systems, referred to as *topology agents*.

MultiSystem Manager Release 2 enables management of the following IP resources:

- Networks
- Locations
- Subnets
- Segments
- Routers
- Hosts
- Bridges
- Hubs
- Interfaces

The MSM topology agents are supported for the following software platforms:

- NetView/6000
- NetView for AIX[2]
- LAN Network Manager Entry
- LAN Network Manager
- Novell NetWare

The role of the topology agents is to monitor all of the resources controlled by the workstation in which the agent resides and to dynamically communicate any changes in resource status to the topology manager. The NetView/6000 agent retrieves topology information from the NetView/6000 database only when requested by MSM. Resource status changes are sent to MSM by NetView/6000.

Managing System

MSM consists of a base component and features for the different environments. Figure 5 on page 11 provides more detail showing the components of the MSM base code.

[2] After NetView for AIX V4R0, the product is named Tivoli NetView.

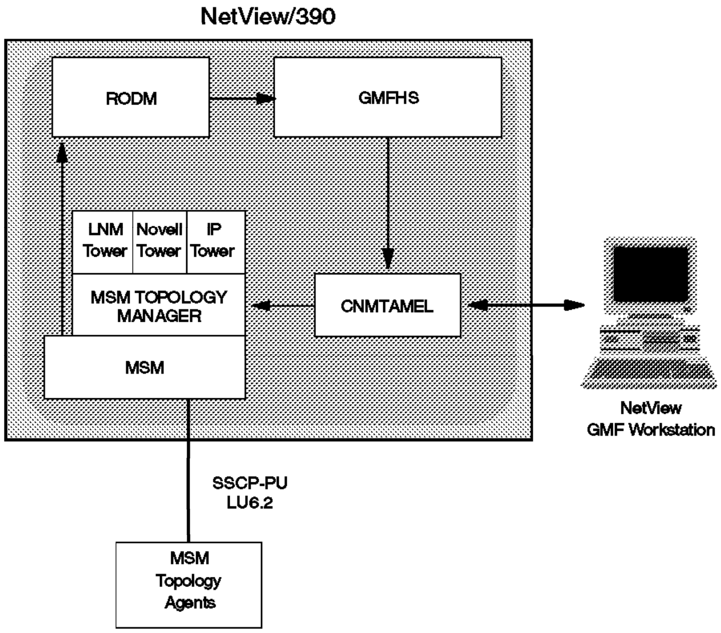


Figure 5. Detail of MultiSystem Manager and NetView Component Parts

MSM consists of the following components:

- NetView REXX command lists with a REXX alternative library

  Note: With SAA REXX/370 installed, the command lists run compiled. Without the SAA REXX/370 installed, the command lists will run with the alternative library.

- NetView command processors
- NetView panels
- Load files for the MSM data model

The command lists and command processors can run in one or several NetView autotasks (for load balancing).

The MSM topology manager performs the following tasks:

- Dynamically discovers the topology and status of the network.
- Stores this information in the NetView Resource Object Data Manager (RODM).
- Automatically processes topology and status updates from the topology agents.

Centralized and integrated LAN and IP management can be achieved, because status information about your networks and all LAN and IP resources is stored in RODM. The information in RODM relates to the information received from your topology agents. In addition, MSM allows graphical management of LAN and IP resources by displaying the information on the NetView Graphic Monitor Facility (NGMF) workstation. Figure 5 shows you how MSM works in the NetView environment.

MultiSystem Manager Presentation Services

Using NGMF you can navigate through the views of your networks. Figure 6 on page 15 gives you an example of the IP views created by MultiSystem Manager.

As a result of the object-oriented approach used in the data repository (RODM), the IP objects/views created by MSM can easily be integrated with other types of objects/views in RODM (for example LAN adapter, NetWare requester or SNA objects).

Manager-to-Agent Communication

The MSM topology manager communicates with the topology agents by means of NetView RUNCMD commands across SNA sessions. Topology agents communicate with MSM through RUNCMD responses, alerts and resolutions.

RUNCMD

RUNCMD commands are SNA Network Management Vector Transports (NMVTs) that you send from NetView to a service point application. The workstation topology agent translates each NetView RUNCMD command into the specific workstation command. Command response NMVTs contain information about the workstation or about the result of a workstation command. After the workstation processes a command from NetView, the topology agent builds a command response, imbeds it in an SNA/MS NMVT and sends it to NetView.

Alerts and Resolutions

Alerts in this context are SNA/MS NMVTs sent from service point applications to NetView. The alerts from the service points will appear in the hardware monitor component of NetView.

The topology agent sends an alert when it wants to notify the topology manager of a topology or status change. When all of the problems associated with a resource are corrected, the topology agent sends a resolution notification to the topology manager indicating that the resource has now returned to a satisfactory status.

Monitoring Resources

Once the initial status for the managed resources is stored in RODM, the MSM agents can notify NetView of topology or status changes by sending alerts to NetView.

The NetView Automation Table routes the alerts to the topology manager and the GMFHS event manager. The topology manager queries RODM for the topology resources. If the resources that caused the topology change alert are not found in RODM, the topology manager will create them.

The MSM IP Tower

MSM utilizes functions of the following products to enable centralized management of IP network environments:

- AIX® NetView Service Point V1.2 or V1.2.1 (referred to hereafter as the *service point*)
- AIX SystemView® NetView/6000 V2.1 (referred to hereafter as *NetView/6000*) or NetView for AIX V3.[3]

MSM uses a manager-agent relationship to manage IP networks. This relationship consists of a managing system referred to as the topology manager and a managed system, referred to as the *topology agent*. MSM provides the topology manager, that runs on the NetView for MVS® management platform. Each NetView for AIX V3 includes a topology agent that reports on all of the resources controlled by that IP manager.

The data collected by MSM from the managed NetView for AIX V3 systems is stored in the RODM and is presented on the NGMF workstation in graphical form. You still need to run NetView for AIX V3 on one or multiple workstations, all of them managing their own resources.

NetView/6000 is a comprehensive management tool for distributed heterogeneous, multivendor devices on TCP/IP networks. It provides an open network management platform that enables the integration of Simple Network Management Protocol (SNMP) and Common Management Information Protocol (CMIP) applications.

Most common is SNMP, which is a TCP/IP recommended standard that enables managers to ask agents to retrieve and change information about network objects. Those objects make up a collection called the *Management Information Base* (MIB). The MIB is not an actual database residing somewhere on the network: the individual pieces of information, called MIB objects, reside on the agent system, where they can be accessed using the GET-command and changed SET-command at the manager's request. This is how NetView/6000 manages network objects.

NetView/6000 is an AIX application; some of the functions it provides are as follows:

- Dynamic discovery and management of IP resources:
  - Networks
  - Segments
  - Routers
  - Hubs
  - Bridges
  - Hosts
  - Adapters
- Configuration, fault and performance management
- Threshold monitoring and automation facility
- Host communications with NetView for MVS using Service Point
- Alert filtering
- Interface with Ingres database

[3] After NetView for AIX V4R0, the product is named Tivoli NetView.

- Graphical user interface using OSF/Motif and X-Windows System standards
- SNMP and NetView/6000 command line commands

NetView for AIX V3 adds the following functions:

- Enhanced database support to manage trap, topology and collected SNMP data using, additionally:
  - DB2/6000
  - Informix
  - Oracle
  - Sybase
- Enhanced event handling including trap-forwarding, multiple dynamic workspaces and operator-less event automation
- Integrated System Resource Monitoring Tool
- Distributed discovery and management using Systems Monitor V2
- Enhanced APIs
- Backup Manager function

Note: For further information on NetView for AIX V3, refer to the NetView for AIX V3 manuals.

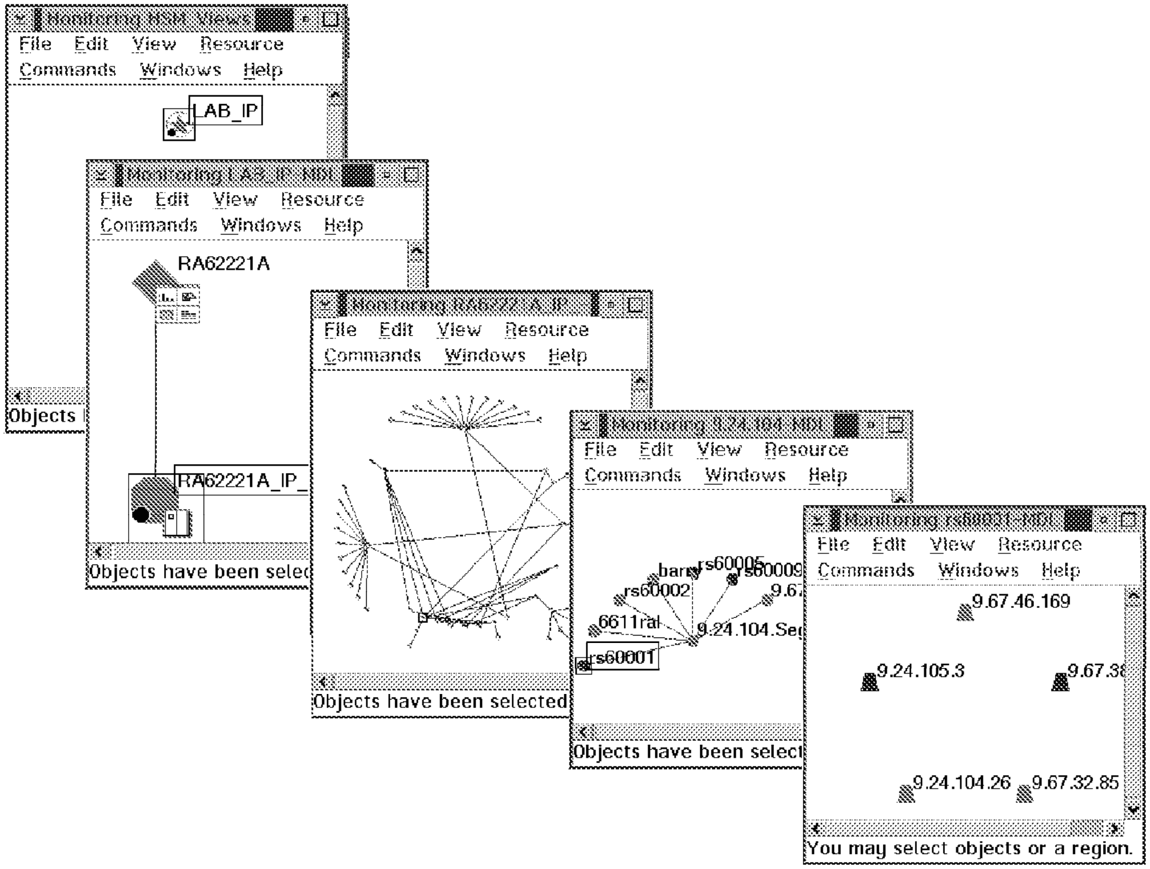
Example IP Views

This section gives some examples of how IP resources are displayed by NGMF.

The View Hierarchy

Included in the following is a simple scenario in which the NGMF operator navigates down by double-clicking on resources to display IP Internet views. Details on the views are explained in the next chapter.

An overview of the view hierarchy is provided in Figure 6 on page 15 to illustrate how to click your way down to the IP Internet view.



Objects

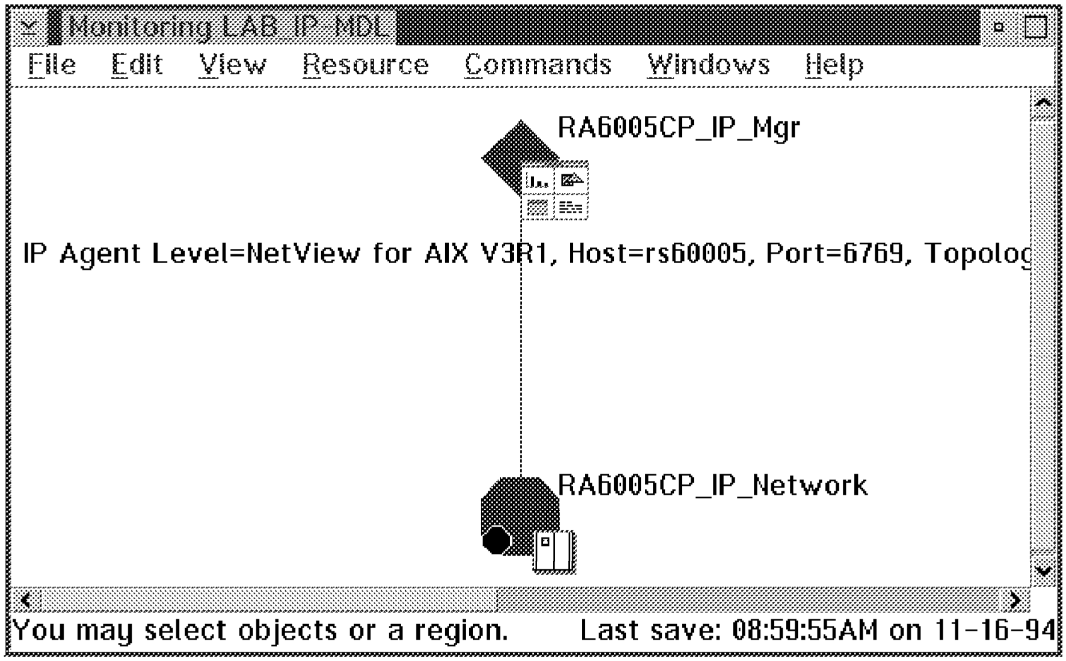
Objects have been selec

Objects have been selected

Objects have been selec

You may select objects or a region.

Figure 6. The MSM/IP Views at a Glance



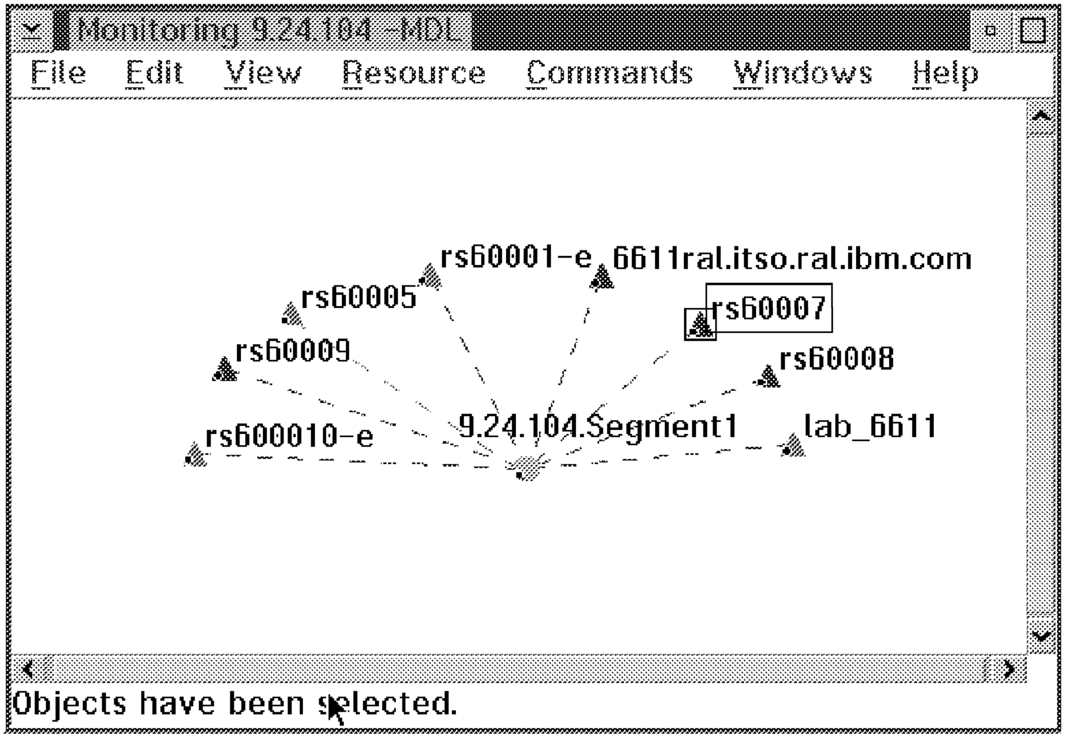
IP Agent Level=NetView for AIX V3R1, Host=rs60005, Port=6769, Topolog

You may select objects or a region.   Last save: 08:59:55AM on 11-16-94

Figure 7. Domain Manager and IP Network Aggregation Object

In this example the managed IP network has a service point called RA6005CP. This is the CP name of our service point machine and has to be used in the RUNCMD, as shown later, if LU 6.2 is used for transport. This view includes also the IP network aggregate object (RA6005CP_IP_Network) and some helpful information about the domain manager including its IP agent level, host name and topology level (so-called "other data"), which is optional.

By double clicking on the network aggregate 9.24.104, which is our local IP network, we get a view containing the network with all attached routers. This view hierarchy corresponds to the view hierarchy NetView for AIX V3 uses.



Objects have been selected.

Figure 8. Display of Segment

NetView for AIX V3-to-MultiSystem Manager Communication

MultiSystem Manager communicates with NetView for AIX V3 using the following products on an AIX® workstation:

- AIX SNA Server V2
- AIX NetView Service Point V1.2.1

  or

- AIX SNA Services V1.2
- AIX NetView Service Point V1.2

SNA Server/Services only provides a connection; the service point is a transport vehicle, moving data. The following applications that use the service point are provided in NetView for AIX V3:

- Trap-to-Alert Daemon (TRALERTD)
- Service-Point-Application Daemon (SPAPPLD)

The flow of information between NetView for AIX V3 and NetView for MVS (now referred to as Tivoli NetView for OS/390) is illustrated in Figure 9.

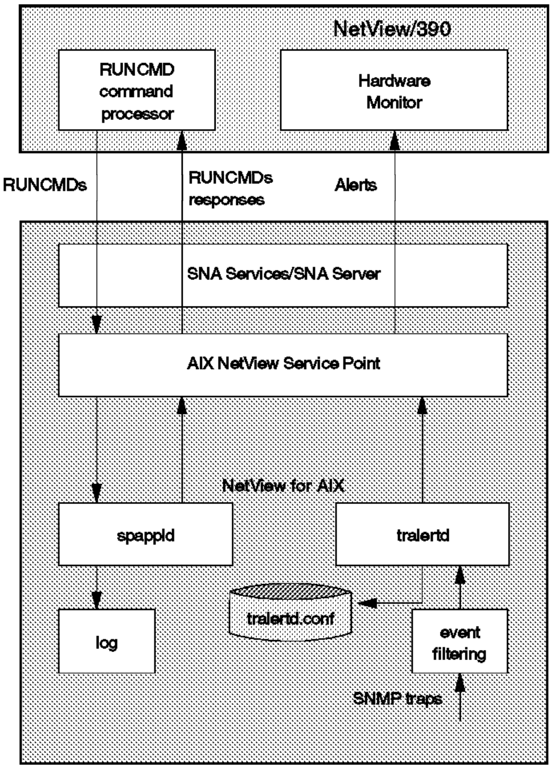


Figure 9. The Flow of Information between NetView for AIX V3 and NetView for MVS

Note: NetView for AIX V3 and Service Point have to run on the same physical machine to work with MSM.

The TRALERTD receives SNMP traps and converts them into NetView for MVS Alerts (NMVTs). There is a special filter function, that allows you to customize which traps are forwarded to NetView for MVS. The TRALERTD provides default trap-to-alert conversion rules and default filter. The conversion rules are stored in the TRALERTD.CONF file.

The service point application daemon SPAPPLD receives commands that are sent from NetView for MVS and sends RUNCMD responses. It also logs all activities in the NV390.LOG logfile.

NetView for MVS to AIX Service Point Communication

NetView for MVS communicates with service point using one of the following SNA connections:

- An SSCP-PU session
- MDS Transport using LU 6.2 session

Communication over an SSCP-PU Session: This is not supported for NetView/6000-MSM communication. We tried it and found that it worked, but you should consider using LU 6.2 for support and performance reasons. If your AIX service point and your NetView focal point VTAM are in different SNA networks, you will have to use an LU 6.2 session since because provides the required cross-domain support.

Communication over an MDS Transport LU 6.2 Session: An LU 6.2 connection is required when the service point node is not in the same SNA network or VTAM domain as NetView MSM. It is also required for APPN networks, where the role of the PU is taken over by the APPN control point.

When using the SNA server, the control point takes the place of the LU and is used to address the service point with the RUNCMD command. This facility has two advantages:

- Definition is much easier, because you do not have to define any LUs.
- It is possible to change the focal point NetView used by service point, which means you can share one service point machine between two instances of NetView for MVS (not at the same time). All you have to do is to send a NetView FOCALPT CHANGE command to the service point and the host partner LU is changed.

Note: If an LU 6.2 session is used with SNA services, the connection is dependent on the status of the partner LU, which in this case is NetView for MVS. The connection is reestablished by the first RUNCMD sent by NetView for MVS after the LU-LU session has become inactive. It is necessary to define an LU 6.2 logmode for this.

If you are using SNA server, there should be no problem if the host partner LU becomes inactive. SNA server tries to reestablish the session continuously and so the session becomes active shortly after the VTAM major node is activated. SNA server has to be restarted only when the connection has been down too long. The SNA server stops trying to reconnect after a maximum of 500 attempts.

The retry frequency and number of retries is controlled by fields in the SNA DLC profile. The default is 20 retries at one-minute intervals.

Note: When the VTAM-switched major node is inactivated and activated, sometimes it might also be necessary to restart the SNA subsystem in addition to the service point.

Performance Management

Except for “Reporting Service Processor and NNP CPU and Memory Use,” this section assumes you are familiar with NetView Performance Monitor (NPM). It describes NPM in a SNA subarea environment.

Reporting Service Processor and NNP CPU and Memory Use

The service processor and NNP CPU and memory use statistics can be displayed at the service processor. To do this, from the Service Processor menu:

1. Click **Performance Management**.
2. Run the **Perform SP/NNP statistics** function.

The SP/NNP(A/B) Performance Analysis window opens.

The statistics are dynamically updated.

The Need for Performance Monitoring

Performance monitoring consists of three basic tasks:

- Collecting data as the events being monitored are happening.
- Sending the data collected to a central point.
- Analyzing the data to give the required picture of present performance against either:
  - A past situation
  - An ideal attainable situation

The purpose of analysis depends on the requirement for monitoring. It could be:

- To offer the best throughput for the cost of the network
- Real-time traffic management
- Accounting and charging purposes

Whatever the purpose, performance monitoring is a combination of host and 3746 Network Node activities.

Present Performance Monitoring on SNA Networks

Referring to Figure 10 on page 20, the present mix of activities is:

1. Individual DLCs (SDLC, CDLC, Token-Ring 802.2, frame relay, X.25, and ISDN) collect data according to keywords chosen at NCP generation time. The DLCs have algorithms onboard to watch data flowing through them and to collect the required information. Only that information chosen at generation time can be collected.
2. Network Performance Application (NPA) task running in the same NCP to which the DLCs are connected, gathers data from the DLCs. This is running in an LU0-PU2.0 session.
3. The NPA in NCP is connected to the NPM running in the host through an LU-LU session. NPM receives the data from all the NPAs and displays or prints the required analysis.

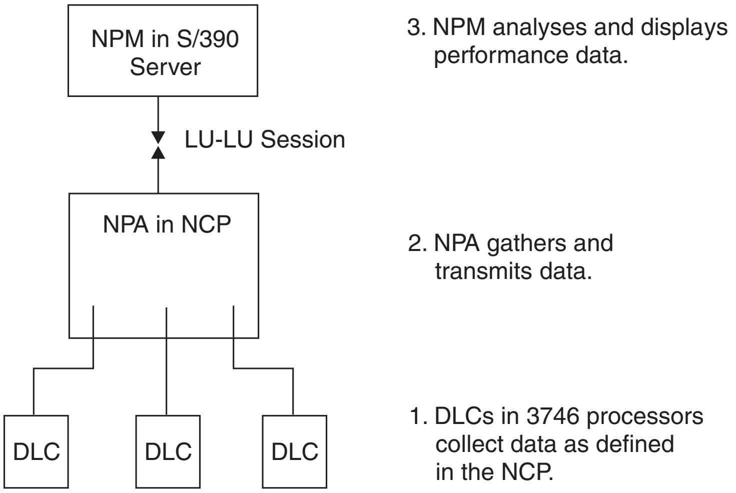

NPM in S/390 Server
LU-LU Session
NPA in NCP
DLC
DLC
DLC
3. NPM analyses and displays performance data.
2. NPA gathers and transmits data.
1. DLCs in 3746 processors collect data as defined in the NCP.

Figure 10. SNA (NCP) Performance Monitoring Activities (3745/3746-900)

NetView Performance Monitor Support Details

The NetView Performance Monitor (NPM) Version 2 Release 1 or Release 2, used in conjunction with NCP Version 7 Release 3 or Release 4, is required for performance monitoring of:

- X.25 lines connected to the 3746-900, supported by X.25 NPSI Version 3 Release 8 or by the X.25 ODLC function of NCP V7R4 requiring FC 5030 into the 3746-900. NPM must be installed with APAR number OW10583.
- TIC3 and 3746-900 processor (CLP, TRP, TRP2, ESCP, ESCP2, and CBSP or CBSP) utilization. NPM must be installed with APAR numbers OW08565 and OW10584.

Support for LAN counter data reporting for non-ERP traffic[4] over a TIC3 requires NCP V7 R4 and one of the following:

- NPM V1 R6 with APAR OW17878
- NPM V2 R1 with APAR OW17876

Support for the HPR LAN counter date reporting over a TIC3 requires NCP V7 R4 and NPM V2 R2 with APAR OW17876.

APPN Resource Management Using NetView RUNCMD

The Network Communication Control Facility (NCCF) RUNCMD allows you to manage your APPN network by sending commands to the service processor (and network node processor through the service processor) for the 3746 Network Node APPN resources.

After the Focal Point is configured using CCM for the service processor, it can respond to commands sent over SNA or APPN links from the VTAM specified as the Focal Point, see “Focal Points” on page 25. CM/2 in the service processor is the Service Point for the NetView Focal Point.

[4] The 3746-900, operating as an APPN composite network node (CNN) with NCP V7 R4, supports HPR/ANR traffic, which does not require error recovery procedures (ERPs) with the adjacent HPR node.

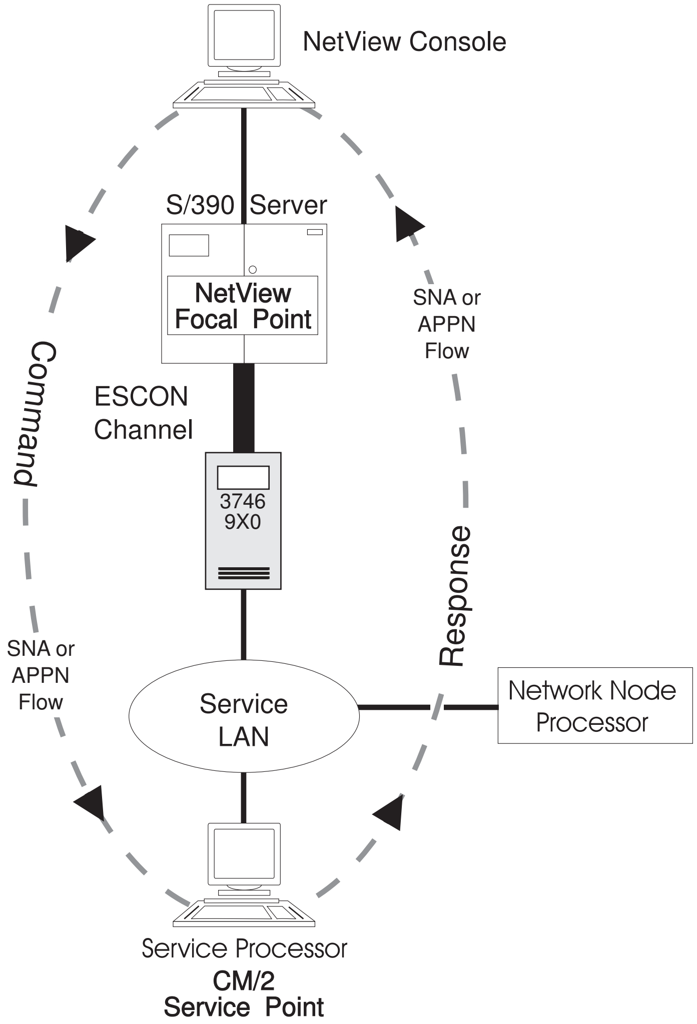


Figure 11. RUNCMD Path

Commands follow the path shown in Figure 11 between the service processor and the NetView console:

NetView console →
VTAM in the S/390 server →
ESCON channel to 3746 →
Service LAN to CM/2 in service processor (→)
(NNP, if necessary)

For information about all the available commands and how to configure the service processor, refer to the *3745 Models A and 3746 Models 900 and 950: NetView Console APPN Command Reference Guide*, GA33-0479.

NetView for AIX Management of IP Networks

The following describes NetView for AIX management of IP networks.

Managing Your IP Resources with SNMP

Your IP resources are managed with the Simple Network Management Protocol (SNMP), which is used to:

- Monitor and control network elements
- Communicate fault management information between the network management stations and agents in the network elements (hosts, gateways, and terminal servers)

Unsolicited messages (traps) inform network management stations of asynchronous events such as:

- Cold start
- Warm start
- Link down
- Link up
- Authentication failure
- Neighbor loss
- Enterprise specific

Managers and Agents

SNMP operates with *agents* that monitor network resources and report events to their *manager* on a network management station. The relationship between a manager and its collection of agents is called a *community*, and is defined by three properties:

- Name of the community.
- IP address of the manager within the community.
- Access mode of the manager (also called *privilege*). The 3746 Network Node implements Read access, which allows the manager to read information from a resource, but not to make changes to that information.

Traps

These are event notifications sent by agents to their managers. They consist of two parts:

- Name of the trap community
- IP address of the SNMP manager that is to receive the traps (alerts)

NetView for AIX Examples

The following figures show examples of NetView for AIX (NetView/6000) displays of IP networks. Figure 12 shows an example of an IP network; Figure 13 show an example of an Ethernet segment.

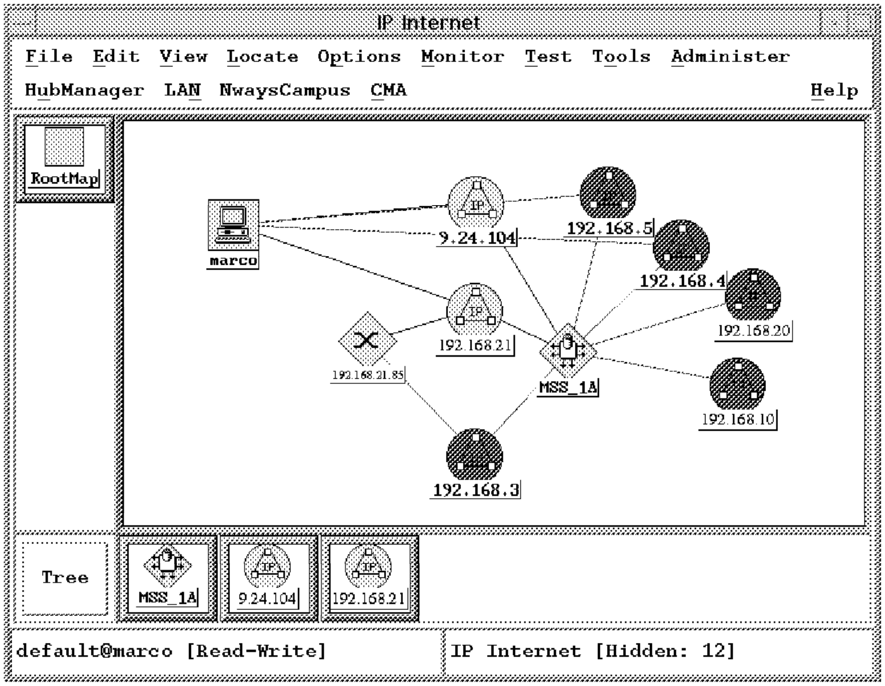


Figure 12. Example IP Network

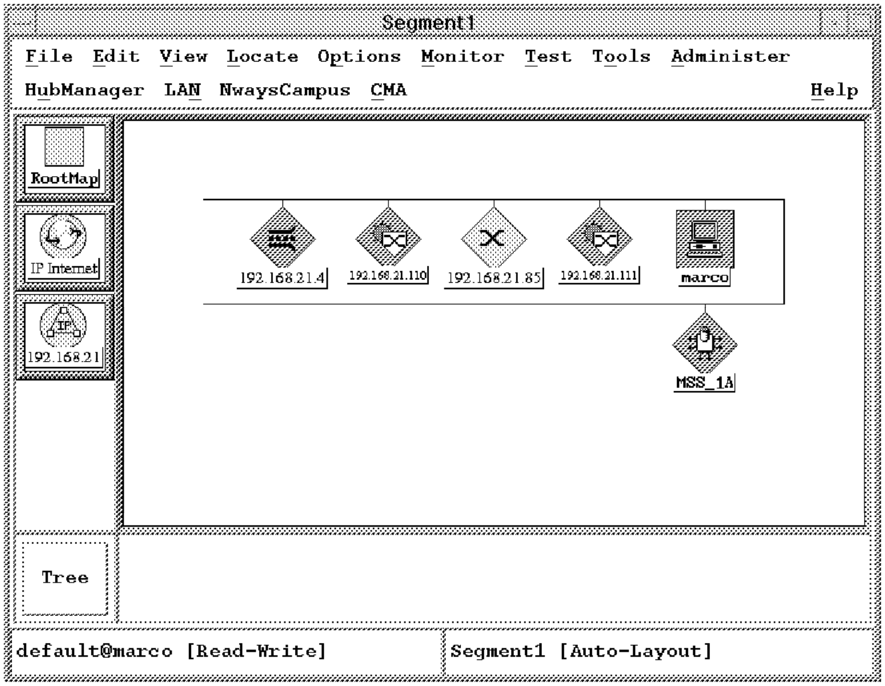


Figure 13. Example IP Segment

SNMP Management of APPN Networks

IBM Nways Campus Manager - LAN for AIX now includes the functions of IBM Router and Bridge Manager/6000 V1.2 (RABM). RABM is used to monitor the health and performance of bridges and routers in the campus network. In addition to support for other IBM and OEM devices through standard and enterprise-specific MIBs, it also supports APPN and DLSw MIBs. It also includes Alert Manager, which enables SNA alerts that are enveloped in SNMP traps to be displayed correctly on the NetView for AIX Event Desk. Although this function was provided specifically for IBM 3746 and AS/400® devices, it can be used by any SNMP agent.

With the APPN Topology feature, it is possible to view APPN networks end-to-end. APPN resources are discovered automatically and can be viewed with their status as color-coded icons. APPN protocol performance and error events (data and graphs) are also provided.

A single NN RABM client provides details of the complete APPN backbone. For local topology of NNs and ENs, the RABM client must be installed in each NN.

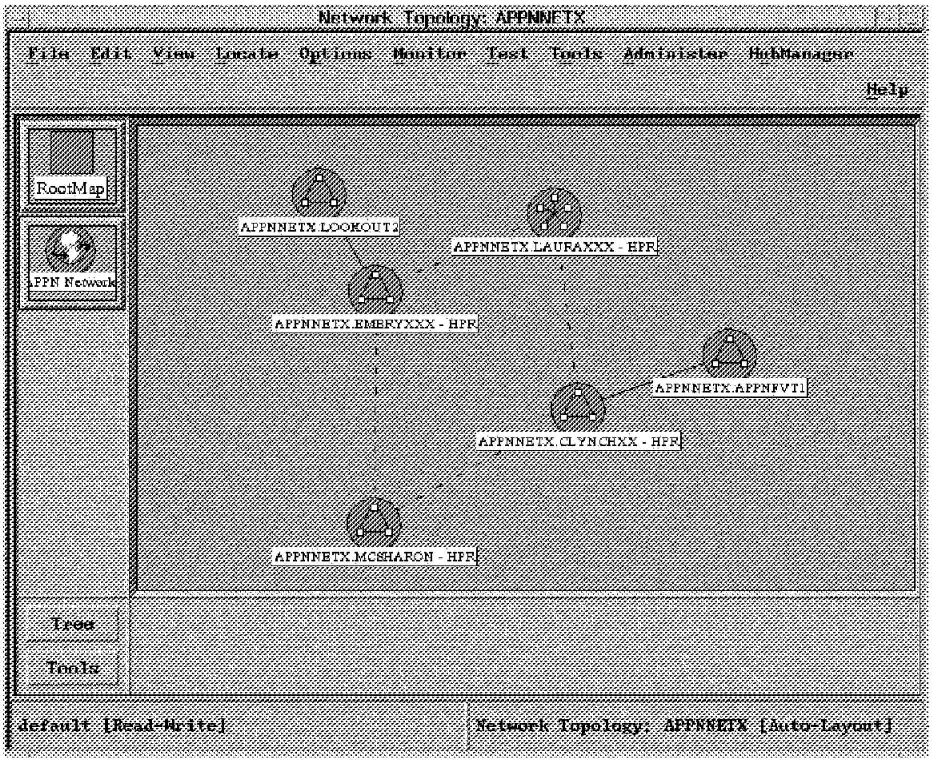


Figure 14. Example RABM Display

Figure 14 shows an example of an RABM display. It shows a network of six APPN nodes; the nodes with the suffix *-HPR* are HPR-capable. HPR links are shown as dotted lines, and APPN links are shown with solid lines.

NetView Alerts

If you are not going to use the NetView program, go to "Preventing MOSS-E Alerts Generation" on page 34.

External Box Errors

A network error detected by the network node processor is an external box error. It causes the network node processor to generate a network alert, which is sent to the NetView program through the session between the network node processor and the NetView program.

For external box errors, there is no MOSS-E intervention.

Internal Box Errors

An internal hardware or microcode problem in the 3746 Network Node (3746-900, 3746-950, network node processor, or service processor) is an internal box error. The 3746-900 or 3746-950 sends its hardware or microcode error data to the service processor (MOSS-E) and network node processor (control point) through the TIC3 on the CBSP. For MOSS-E microcode errors, the network node processor is not notified. The following happens after an internal box error has been detected:

- The network node processor generates a network alert for the 3746 Network Node resources that are affected by the internal box error. This alert is sent to the NetView program through the session between the network node processor and the NetView program.
- The MOSS-E:
  - Records a system reference code (SRC) on the service processor hard disk
  - Displays an alarm on the service processor
  - Generates a hardware alert that is sent to the NetView program through a session between the service processor and NetView
  - Automatically calls the IBM Remote Support Facility, if this function is enabled (see Chapter 6)

Note: To match the network alerts reported by the network node processor with the hardware alerts reported by the MOSS-E for the same problem, make sure that both the network node processor and the MOSS-E alerts are reported to the ***same*** NetView program (see "Path for Reporting Network Node Processor Alerts" on page 27 and "Paths for Reporting MOSS-E Alerts" on page 27).

Focal Points

Alerts are sent to a node's *focal point* (FP) NetView (defined in CCM). When this FP is unavailable, alerts can then be sent to a *backup focal point* NetView.

If the connection to the primary focal point cannot be established, or an existing connection becomes inactive, the 3746 will attempt the following if:

Backup focal point is defined
The 3746 attempts to connect to the backup focal point.

No backup focal point defined
The 3746 attempts to reconnect to the primary focal point.

If the connection attempt to a focal point is not successful, then a timer is set and a retry is made when the timer expires. For each subsequent failure, the retry time is doubled up to an interval of one day. After that a retry is attempted once a day.

Paths for Reporting Alerts to NetView

Figure 15 shows the paths for reporting network node processor and MOSS-E alerts to NetView over an APPN network.

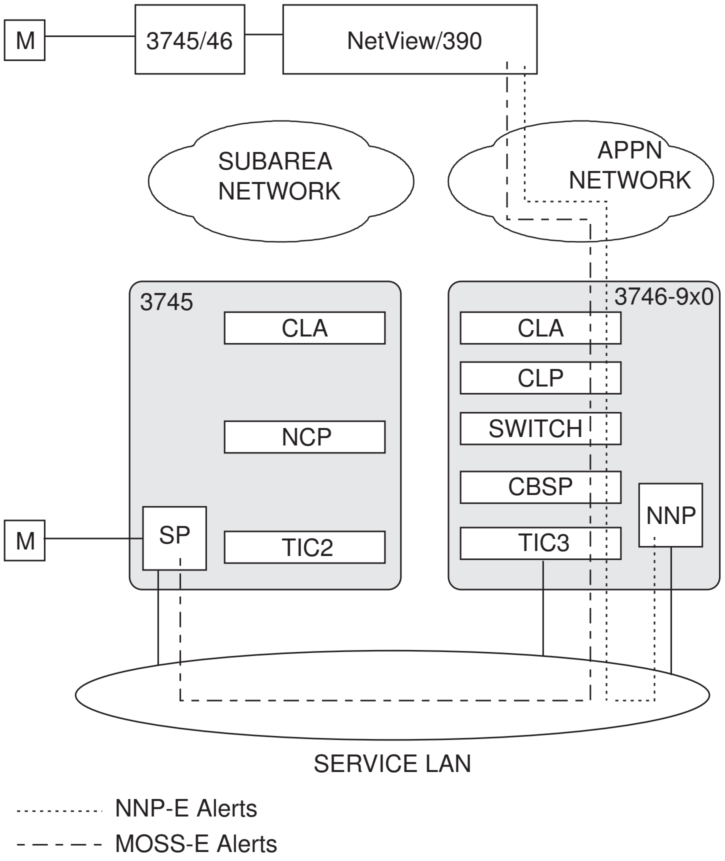


Figure 15. NetView Alert Paths over APPN

Figure 16 shows the paths for reporting network node processor and MOSS-E alerts to NetView over a subarea network.

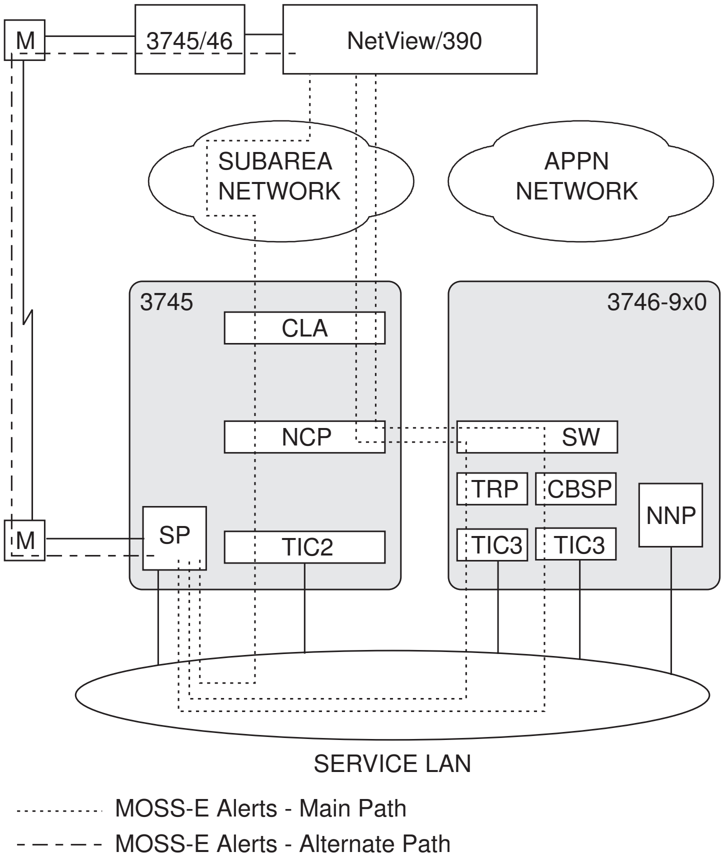


Figure 16. NetView Alert Paths over Subarea

Path for Reporting Network Node Processor Alerts

The network node processor reports the network alerts to NetView through the APPN/HPR network. The network alerts flow over from the NNP into the 3746 through the service LAN TIC3, and then over an APPN connection out of the 3746 to NetView (see Figure 15 on page 26).

Paths for Reporting MOSS-E Alerts

Two paths can be used by the service processor (MOSS-E) for sending the hardware alerts to NetView. These are:

- Mainstream path
- Alternate path

Mainstream Path: This is the normal path to the NetView program, generally flowing through the APPN/HPR network or, depending on the service LAN configuration, the SNA/subarea network. Either the APPN/HPR path or one of the SNA/subarea paths to NetView must be defined at installation time.

APPN/HPR Path: The MOSS-E alerts flow from the service processor to NetView over the same physical path (although using a different session) as the alerts reported by the network node processor. See Figure 15 on page 26.

The alerts flow from the service processor into the 3746 through the TIC3 connected to the service LAN, and from there through an APPN network to NetView.

Note: This path uses the DLUR support of the network node processor and requires a VTAM with the dependent LU server (DLUS) function at the other end of the DLUR pipe.

SNA/Subarea Path: The service processor can use an SNA/subarea path to NetView. This is through an NCP-controlled token-ring port operating as the gateway to the NetView program. One of the following 16-Mbps token-ring ports[5] connected to the service processor LAN is used to send the MOSS-E-generated hardware alerts to the NetView program (see Figure 16 on page 27):

- The TIC3 of the 3746-900 that provides the communication between the CBSP and the service processor
- A TIC3 port of another token-ring adapter in the 3746-900
- A TIC2 port of a token-ring adapter in a 3745

Note: If you select an SNA/subarea path, you can use any 3745 or 3746-900 that is connected to the service LAN.

Alternate Path: If the mainstream path is not available, the MOSS-E can be preconfigured to contact the NetView program host through the SDLC port on the service processor (see Figure 16 on page 27). This alternate path must be defined in the service processor. For more information, refer to the "MOSS-E Service Processor Customization Function" appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

Alerts are sent through the service processor SDLC port to the SP modem, through a public switched network to another modem that is connected to a 374X that provides a subarea path to NetView.

You must provide a 3745 or 3746 switched port at the host site. This port must be equipped with a switched line modem to receive the dial connection. The modem must be compatible with the service processor modem. For more information about the type of modem needed, refer to the "Controller and Service Processor Integration" chapter in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

Host procedures must include the activation of the switched port to answer the call.

Parameter Definitions for Reporting Alerts to NetView

This section presents the parameters that you must define in the service processor for the NetView path. These parameters allow alerts originating from problems detected in the 3746 Network Node and the network to be reported. Use the "Parameter Definitions for Reporting Alerts to NetView" on page 89 worksheets on page 89 to record the values you assign to the parameters described in this section.

[5] The token-ring port on the MOSS does not provide this path to the NetView program.

Network Node Processor Alerts

The network node processor reports network alerts to NetView according to the network management focal point defined using the *CCM User's Guide*, SH11-3081 (refer to the Network Node and DLUR Parameter worksheet in the *3745/3746 Planning Series: CCM Planning Worksheets*):

Network identifier

Identifies the APPN/HPR network to which the focal point node (running NetView) is connected.

IBM-registered network identifiers should have an 8-byte name with the structure *cceeeenn*, where:

- *cc* is the country code (according to ISO 3166).
- *eeee* is the enterprise code (unique within a country).
- *nn* is the network suffix code (unique within one enterprise).

Control point name

Identifies the focal point node (running the NetView program) that is to receive the alerts.

Note: Up to eight backup focal points (running other NetView programs) can be defined using the *CCM User’s Guide*. Use the Network Node Processor Alert worksheet in the “MOSS-E Worksheets for Controller Installation” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration* to record the values you assign to the parameters described in this section.

MOSS-E Alerts: Mainstream Path Definitions for APPN/HPR Path

Use the MOSS-E Alert: Mainstream Path worksheet in the “MOSS-E Worksheets for Controller Installation” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration* to record the values you assign to the parameters described in this section. This APPN/HPR path (see “APPN/HPR Path” on page 27) uses the TIC3 of the CBSP. If you want to use it as the mainstream path for the MOSS-E alerts, the following MOSS-E and VTAM definitions are needed:

MOSS-E Parameters

LAN destination address

This is the MAC address (locally administered address) of the TIC3 on the CBSP (token-ring adapter used as the gateway to the NetView program). See Figure 15 on page 26.

This address must be defined with the same value used for the **token-ring local address (MAC address)** parameter in the “Controller and Service Processor Integration” chapter in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

This address has 12 digits and must be unique among all other network addresses (LAAs) on the service LAN. Specify this address in the IBM Token-Ring Network format (your network administrator should be able to help you with this format). This address will be used by your service representative when customizing your service processor. For more information, refer to the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

CCM User's Guide Parameters: The APPN/HPR path uses the DLUR support of the 3746 Network Node, which requires a VTAM with the DLUS function to be defined using the *CCM User's Guide*. This allows you to define a primary DLUS and backup DLUSs.

Primary dependent LU server (DLUS)

Identifies the VTAM running the DLUS that you want to use.

Backup DLUS

Specifies whether there is a backup dependent LU server. If you select Yes, give the network identifier and the server name of the backup DLUSs.

Waiting Time Before Retry

Specifies the length of time, in tenths of a second, that the DLUR must wait before attempting to reestablish a broken path to the DLUS. The maximum value is 120 seconds.

The default value is -1, for no retry. Other values are:

0, for an immediate retry
1 second, for a short retry
3 seconds, for a long retry

VTAM Keywords: To report alerts to NetView, you must define the service processor as a switched major node (PU type 2.1) in VTAM with the following parameters:

CPNAME defined with the same value used for the MOSS-E **Local Node Name** parameter in the "Controller and Service Processor Integration" chapter in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

NETID defined with the same value used for the **Network ID** parameter in the "Controller and Service Processor Integration" chapter in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

```
*********************************************************************
*     MAJNODE FOR CONNECTION :  MOSS-E  <==> NETVIEW                *
*********************************************************************
NTVMOSSE VBUILD TYPE=SWNET,MAXGRP=1,MAXNO=1
*-------------------------------------------------------------------*
MOSSE    PU    ADDR=04,PUTYPE=2,                                    X
               NETID=Network ID,                                    X
               CPNAME=Local node name,                              X
               DISCNT=NO
```

Figure 17. Example of Switched Major Node Definition

Note: This PU definition can also be coded in the switched major node using the IDBLK and IDNUM parameters instead of NETID and CPNAME. Here, the service processor local node characteristics must be defined using the Communications Manager. Specifically, the two fields of the local node ID parameter are used:

- **IDBLK** has the value of first field (three digits).
- **IDNUM** has the value of second field (five digits).

MOSS-E Alerts: Mainstream Path Definitions for SNA/Subarea Path

If you use an NCP path for the MOSS-E alerts (see “SNA/Subarea Path” on page 28), the following MOSS-E, NCP, and VTAM definitions are needed:

MOSS-E Parameters

LAN destination address

This is the MAC address (locally administered address [LAA]) of the token-ring port used as the gateway to the NetView program (See Figure 15 on page 26).

This address must be defined with the same value used for the **token-ring local address (MAC address)** parameter in the “Controller and Service Processor Integration” chapter in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

This address has 12 digits and must be unique among all other network addresses (LAAs) on the service LAN. Specify this address in the IBM Token-Ring Network format (your network administrator should be able to help you with this format).

NCP Keywords: The following NCP definitions must be planned if you use an SNA/subarea for the mainstream path:

1. A **Physical line** and a **physical unit (PU)**. You must define **A** with the same value used for the MOSS-E **token-ring local address (MAC address)** parameter in the “Controller and Service Processor Integration” chapter in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

```
*---------------------------------------------------------------------* FFA30320
* TIC         PORT 2080 ATT TO SERVICE PROCESSOR - PHYSICAL          * FFA30330
*---------------------------------------------------------------------* FFA30340
GP50C2080 GROUP ECLTYPE=(PHYSICAL, ANY),                              *
                ADAPTER=TIC3
K50C2080 LINE ADDRESS=(2080,FULL),PORTADD=0,LOCADD= A                  *
               MAXTSL=16732,LSPRI=PU,PUTYPE=1,ANS=CONTINUE,            *
               ADAPTER=TIC3,TRSPEED=16,TRANSFR=254
S50C2080 PU ADDR=01,                                                   *
               INNPORT=NO
   .
   .
```

Figure 18. Example of NCP Generation for a Link to the Service LAN, Part 1. The link passes through a 3746-900 (TIC3 of the CBSP).

2. A Logical group with at least one Line/PU.

   These definitions apply to a TIC type 3 or 2.

```
*********************************************************************** FFA33180
*   TIC        GROUP L78G2080: LAN  LOGICAL  DEFINITIONS              * FFA33200
*********************************************************************** FFA33230
L50G2080 GROUP DIAL=YES,LNCTL=SDLC,TYPE=NCP,ECLTYPE=(LOGICAL,PER),     *
               CALL=INOUT,PHYSRSC=S50C2080,                            *
               LINEAUT=YES,                                            *
               MAXPU=1,                                                *
               NPACOLL=NO,                                             *
               PUTYPE=2,                                               *
               RETRIES=(6,0,0,6)
R50A0001 LINE
Z50A0001 PU
   .
   .
```

Figure 19. Example of NCP Generation for a Link to the Service LAN, Part 2. The link passes through a 3746-900 (TIC3 of the CBSP).

VTAM Keywords: To report alerts to NetView, you must define the service processor as a switched major node (PU type 2.1) in VTAM with the following parameters:

CPNAME defined with the same value used for the MOSS-E **Local Node Name** parameter in the “Controller and Service Processor Integration” chapter in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

NETID defined with the same value used for the MOSS-E **Network ID** parameter in the “Controller and Service Processor Integration” chapter in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

```
*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
*     MAJNODE FOR CONNECTION :  MOSS-E  <==> NETVIEW                  *
*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
NTVMOSSE VBUILD TYPE=SWNET,MAXGRP=1,MAXNO=1
*---------------------------------------------------------------------*
MOSSE    PU    ADDR=04,PUTYPE=2,                                      X
               NETID=Network ID,                                      X
               CPNAME=Local node name,                                X
               DISCNT=NO
```

Figure 20. Example of Switched Major Node Definition

Note: This PU definition can also be coded in the switched major node using the IDBLK and IDNUM parameters instead of NETID and CPNAME. In this case, the service processor local node characteristics must be defined using the MOSS-E Communications Manager. Specifically, the two fields of the local node ID parameter are used:

- **IDBLK** has the value of first field (three digits).
- **IDNUM** has the value of second field (five digits).

MOSS-E Alerts: Alternate Path Definition

MOSS-E Parameters: If you plan to use an alternate path along with the mainstream path, you must supply the following parameters:

Modem type

Select the type of the modem used and specify whether it is connected to an MPA card or a COM1 port. Refer to the "MOSS-E Service Processor Customization Function" appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

Telephone number for alert reporting on the switched SDLC link

This is the telephone number used by the service processor and its modem for automatic dialing to the SNA port providing access to the NetView program through the public switched network. For more information, see:

- "Alternate Path" on page 28
- Figure 15 on page 26
- The "MOSS-E Service Processor Customization Function" appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*

Note: The Link type is SDLC, the default value, because the alternate path to the NetView program uses an SDLC link through the public switched network.

NCP Keywords: In the 37xx controller providing channel access to the host running NetView, the following NCP definition must be taken into consideration for your alternate path:

Note: Make sure that NRZI is the same, either YES or NO, in the MOSS-E Communications Manager and in the NCP.

```
**********************************************************************
G23SIDES GROUP DIAL=YES,LNCTL=SDLC,TYPE=NCP,REPLYTO=3,XID=YES
K23C0004 LINE ADDRESS=(0004,FULL),DUPLEX=FULL,RING=YES,NEWSYNC=NO,    *
              V25BIS=(YES,DLSDLC),AUTO=YES,PAUSE=0.1,TRANSFR=71,      *
              NRZI=YES,CLOCKNG=EXT,RETRIES=(3,3,3),CALL=IN,ENABLTO=15
P23C0004 PU PUTYPE=2,ISTATUS=ACTIVE
**********************************************************************
```

Figure 21. Example of a NCP Generation for an SDLC Link to the NetView program

Note: Remember to change your network operator procedures or CLIST to enable the activation of the SNA port called by the service processor. Use the Service Processor Parameter worksheet (see Appendix A, "MOSS-E Worksheets for Controller Installation" on page 89) to record the values that you assign to the parameters described in this section.

Specifying Whether to Generate MOSS-E Alerts

Generating MOSS-E Alerts

If you use the NetView program, verify that the Configuration management parameter in the MOSS-E NetView/Link Operation function, Generate alerts, is checked (√) and customized. For more information, refer to the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

Preventing MOSS-E Alerts Generation

If you do not want to report alerts from the service processor to the NetView program, verify that the Configuration management parameter in the MOSS-E NetView/Link Operation function Generate alerts is ***not*** checked. If you are using the NetView program, but do not want MOSS-E alerts sent for a time, use this parameter to prevent alert generation and later to reenable the alerts.

Use the worksheet on page 89 to record values you assign to the parameters described in this section.

Locating the Generate Alerts Parameter

To locate this parameter:

1. Open the Service Processor menu.
2. Open the Configuration Management menu.
3. Run the SP Customization function.
4. Check (√) **NetView Link / Operations** and click **Next**.
5. Either check (√) **Generate Alerts** or remove the check mark next to **Generate Alerts**, as needed.
6. If you enabled **Generate Alerts**, customize the NetView Links / Identification / LAN address / and Dial Phone number as required.
7. Click **Next** and customize the 3270 Session Information if required.
8. Click **Next** to exit the panel.
9. Click **Close**.
10. Select **Yes** to validate the changes, or **No** to cancel the changes.
11. Wait for the following message to clear, which may take several minutes:

    ```
    Service Processor Customization in Progress
    ```

12. Click **OK** when the following message is displayed:

    ```
    Service Processor Customization Successful
    ```

NetView V2R4 Alert Code Point Customizing

The NetView Program, Version 3 Release 1, supports all the code points used by the service processor and network node processor in the alerts sent to the network operator.

NetView V2R4 does not support all the code points of the 3746 Network Node; new code points are used in the alerts related to APPN/HPR.

If you are using NetView V2R4, the code points listed in this section must be added to your NetView program with their messages. For the procedure to customize the code points, refer to the *NetView V2 R4: Customization Guide*, SC31-7091.

Generic Alert Data (X'92') Alert MS Subvector:

X'3122' APPN/HPR-DLUR PROTOCOL ERROR
Meaning: A product implementing the APPN/HPR dependent LU requester (DLUR) function has detected a protocol problem that may impact users.

X'800A' APPN/HPR-DLUR CONFIGURATION ERROR
Meaning: A product implementing the APPN/HPR dependent LU requester (DLUR) function has detected a configuration problem that may impact users.

Most Probable Cause (X'93') Alert MS Subvector:

X'2019' APPN/HPR COMMUNICATIONS
Meaning: Self-explanatory

Install Causes (X'95') Alert MS Subvector:

X'80B9' NODE WAS INCORRECTLY SPECIFIED AS DEPENDENT LU SERVER
Meaning: A network administrator has specified the name of a dependent LU requester instead of the name of a dependent LU server. The configuration must be corrected before the DLUR function can operate.

Failure Causes (X'96') Alert MS Subvector:

X'202C' APPN/HPR COMMUNICATIONS FAILURE
Meaning: Self-explanatory

Service Processor and Network Node Processor

The information in this section is useful for managing the service processor and network node processor (NNP).

Do Not Use Service LAN for User Stations

> **Attention:**
>
> Service LAN problems may disrupt 3746 Network Node operations.

Token-Ring LAN Bridges

If remote consoles are connected to your LAN, the communication with the service LAN must be done through a bridge:

1. The bridge ***must*** be configured with the proper ***filters*** to prevent unnecessary traffic, such as broadcast storms, from entering the service LAN. Such broadcast storms are usually produced by IP traffic.

   The bridge must forward only those frames that are explicitly addressed (no broadcast frames) to the service processors.

2. An incorrectly configured bridge on the service LAN can interfere with the operation of the network node processor and service processor. Among possible effects, such interference could:
   - Prevent the 3746 from completing its IML
   - Prevent the 3746 from performing the selective IML of a processor, for example, the IML of ESCON processors for which a host link (not a host link station) definition has been modified or deleted
   - Degrade the operation of the 3746 Network Node (as explained in "Unplugged Cables and Stations")
3. If a hub is used for communication between remote consoles and the service processors, the service processor access unit (the SPAU, that forms the service LAN inside the controller expansion) must be connected to the hub with the proper filter protection.

   Vital components of the 3746 Network Node (the CBSP2/TIC3, service processor, and network node processors) ***must never be directly*** connected to a hub because of the risk of accidental or unplanned disruption of the related cables. See "Unplugged Cables and Stations."

Unplugged Cables and Stations

Beaconing (resulting from removing a station or bridge) or unplugging the network node processor cable from the service LAN for a short time does not interfere with 3746 operations. The NN automatically reestablishes communications between the 3746 adapters and the network node processor. However, if these conditions last for more than about two minutes, the network node processor cannot reestablish contact with the 3746 adapters. While established user sessions are not disturbed, NN operations degrade (see "Controller Operations when the Network Node Processor Is Not Available" on page 39). To reestablish normal operation of the network node processor, it is necessary to re-IPL the network node processor. During the IPL, all traffic and sessions on the NN are halted.

Controller Operations when the Service Processor is Not Available

If you have a problem with your service processor, switch to your backup service processor, if you have one (see "Backing Up Your Service Processor" on page 37), and call the IBM service representative.

Normal operation of the 3746 Network Node requires the service processor, but once the controller is correctly configured and operating, it may not be necessary to use the service processor for extended periods of time.

This means that if the service processor fails, you may not notice any immediate degradation in controller operation. If the service processor is not operational, then:

- The Controller Configuration and Management functions are not available to the local and remote operators.
- No alerts are reported to NetView for the 3746 Network Node or the service processor.
- There are no calls to the RSF (RETAIN®).
- There is no remote access to the MOSS-E.
- The service processor operator cannot:

  - IPL or IML the 3746 Network Node from the service processor.
  - IML a specific adapter.
  - Power on or off the 3746 Network Node through the MOSS-E.

- NNP access is unavailable.

- Automatic IMLs of the 3746 adapters are unavailable.

- MAE access is unavailable.

However, the 3746 adapter dumps and error records are saved in the adapter. When the service processor is operational again, the MOSS-E automatically detects any dumps or error messages available in the adapters.

Recommendations for Customer Operations

IBM recommends regular scheduled use of the service processor to ensure that it is operating correctly and to keep network operators proficient with its advanced functions.

Save Configuration

Depending on the microcode level installed on your service processor, the procedure is different.

- Up to D46130 microcode level, an optical disk is used to back up the configuration data.

- From the F12380 microcode level, a diskette is used to back up the configuration data.

It is recommended to save the configuration data each time the configuration changes. For further information about backing up the configuration data, refer to the *3746 Nways MultiProtocol Controller Model 950: User's Guide*, SA33-0356, or the *3745 All Models and 3746-900 Basic Operations Guide*, SA33-0177.

Save Microcode

Note: The following applies to the LIC delivered on an optical disk, but only for ECs up to D46130.

The current level of the MOSS-E microcode in the MOSS-E ***must*** be saved after each of the following functions is used:

- Change Active Code
- Manage Microcode Changes
- Manage Microcode Fixes

To back up all the microcode, you must re-IPL the service processor. Refer to the *3746-950 User's Guide* or the *3745/3746-900 Basic Operations Guide*.

Backing Up Your Service Processor

Note: The following applies to the LIC delivered on an optical disk, but only for ECs up to D46130.

To provide a higher level of reliability, you can order a second service processor which will replace your active service processor if it fails.

During normal operations, the backup service processor ***is not connected*** to the service processor LAN and should remain powered off. Its hard disk will be a duplicate of the active service processor hard disk. If recovery is needed, the failing active service processor is disconnected from the LAN and replaced by the backup.

Backing up your service processor requires both:

- Ordering and setting up a backup service processor
- Saving either:
  - Configuration data of the active MOSS-E and copying it to the backup hard disk
  - All the microcode in the active service processor, including the configuration data, and copying it to the backup hard disk.

Ordering and Setting Up a Backup Service Processor

Note: The following applies to the LIC delivered on an optical disk, but only for EC up to D46130.

You can order a second service processor feature as a backup. It is delivered with the licensed internal code already loaded on the hard disk.

If the backup service processor is delivered after the first one, the microcode level of the backup might differ from the level of the first service processor[6].

If the code levels are different, you can use either the microcode level of your:

- Active service processor by copying it onto the hard disk of the backup service processor[6].
- Backup service processor by copying just the active configuration onto the hard disk of the backup service processor[6].

[6] For information on how to check the microcode levels, to back up the MOSS-E microcode and the configuration data, refer to the *3745/3746-900 Basic Operations Guide* or the *3746-950 User's Guide*.

Controller Operations when the Network Node Processor Is Not Available

APPN/HPR Network Node

The interruption of network node processor operations does not disturb the established user traffic (LU-LU sessions) until the network node processor comes up again and the control point is activated. However, the interruption of the 3746 control point results in a degradation of the following NN operations:

- Resources cannot be activated and deactivated.
- Sessions cannot be started or stopped.
- Network problems cannot be reported.
- Other NNs get no response from the network node processor. They then assume that the node has failed and remove it from their network topology map.

In order to recover from a failing situation and return to normal operations, you can either:

- Restart the APPN/HPR control point that runs in the network node processor.
- Shutdown and restart, that is re-IML the whole network processor.

In either case, *CCM User's Guide*, SH11-3081 provides the possibility to automatically activate the configuration by enabling the Automatic configuration activation option.

When this option is enabled, restarting the control point or re-IMLing the NN interrupts the 3746 operation, which results in the loss of data traffic flowing through the 3746 resources.

When this option is disabled, restarting the control point or re-IMLing the NN does not interrupt the 3746 operation and therefore preserves the traffic flowing through the 3746 resources, until you manually activate the configuration by clicking **Activate Configuration**.

IP Routing

The interruption of the network node processor does not disturb IP routing functions:

- IP datagrams are still forwarded based on the existing routing table and caches.
- OSPF/RIP/BGP are still able to exchange routing information, thus allowing datagrams for new destinations to be routed.

However, the interruption of the network node processor results in a degradation of the IP router operations:

- IP resources cannot be activated, deactivated, nor displayed.
- No Telnet operations to the NNP are possible.
- SNMP flows are no longer handled. This could lead to a router down image in the Tivoli NetView displays.

Restarting the network node processor resets and activates all the 3746 interfaces and flushes all caches and dynamic routing table entries (that is, those ***known*** by OSPF/RIP/BGP). For IP users, this could lead to longer response times; some IP packets are lost and retransmitted by the TCP end points during the restart of the interfaces. However, from the user's (end-to-end) point of view, the TCP connection is not disrupted.

Dual Network Node Processors

Each 3746 Network Node can have two network node processors:

- One is *active* and running the control point.
- The other is in *hot standby* and ready to take over in case the active network node processor should fail.

The first network node processor installed is identified as NNP-A, and the second is NNP-B. (Refer to the "Physical Planning Details" chapter in the *3745/3746 Planning Series: Physical Planning* for the physical location of the two network node processors.) Dual NN processor operation can be enabled or disabled depending on whether or not the operator has selected the Enable CP/NNP Backup option. Both network node processors are monitored by the service processor.

If the active network node processor fails, the service processor requests the standby network node processor to become active using the same configuration as the formerly active network node processor used. This can be done either automatically or manually:

- If the Enable CP/NNP Backup option is enabled, the standby NNP automatically takes over the failing active NNP.
- Otherwise, the operator manually starts or IMLs the standby NNP.

In either case, it is possible to automatically activate the configuration by enabling the Automatic configuration activation option (refer to the *CCM User's Guide* for details).

- When this option is enabled, data traffic flowing through the 3746 resources is lost, reset, and started.
- When this option is disabled, established traffic stays running but no new connections are possible until the operator manually activates the configuration by clicking **Activate Configuration**, which is disruptive for the 3746 operation.

Chapter 2. 3746 APPN/HPR Network Node Management

This chapter describes aspects of network management that are relevant to the operation of the 3746 Network Node. It deals only with the management of APPN Resources connected to the 3746 native enclosures, and visible through the NNP control point. For information about APPN resources controlled by the MAE control point, see the “MAE APPN/HPR Network Node Management” chapter in the *3745/3746 Planning Series: Multiaccess Enclosure Planning*. This chapter covers the following subjects:

- NetView APPN/HPR topology management
- Local 3746/APPN/HPR topology management from the service processor
- 3746 definitions for NetView Performance Monitor (NPM)

NetView APPN/HPR Topology Management

As explained in “NetView for OS/390 Management of APPN Networks Overview” on page 2, the Topology Manager of APPN/HPR is part of the NetView for MVS product, and allows you to graphically display and control APPN resources. The 3746 supports the SNATAM topology agent but does not support the Accounting Manager.

The Topology Manager of NetView and the Topology Agent of the 3746 Network Node exchange data over LU 6.2 sessions.

Topology Manager enables you to:

- Monitor APPN/HPR network topology to view the connectivity between APPN/HPR network nodes.
- Monitor APPN/HPR local topology to view a 3746 Network Node and its:
  - Transmission groups (TGs)
  - Ports
  - Logical links
  - Adjacent network nodes
  - End nodes
  - Low-end networks
- Control the status of ports and links, that is, to activate or deactivate them.
- Display views of:
  - An APPN/HPR network
  - APPN/HPR subnetworks
  - Particular domains of a network node
- Display information about resources such as control points, link names, TG numbers and so on.
- Automate operations using NetView Resource Object Data Manager (RODM) objects.

Note: The 3746 does not support the APPNTAM TOPOSNA RECYCLE.

Configuring APPN/HPR Topology Management

Host Definitions

To monitor the APPN topology of a network, declare the name of a network node to the NetView topology manager with the following command:

```
TOPOSNA MONITOR, NETWORK, NODE=Nodename
```

Where *Nodename* is the name of the network node.

To change the node monitoring the network, use the following commands:

```
TOPOSNA STOP, NETWORK, NODE=Nodename

TOPOSNA MONITOR, NETWORK, NODE=NewNodename
```

All APPN network nodes with a topology agent are capable of monitoring their local topology and sending the information to the NetView topology manager, including the 3746-9x0. To monitor local topology, use the following commands:

```
TOPOSNA STOP, LOCAL, NODE=Nodename

TOPOSNA MONITOR, NETWORK, NODE=NewNodename
```

It is not recommended that the 3746 NN be used as the agent for monitoring the network topology of a large APPN network due to the extra load this creates on the NNP.

CCM Definitions

The topology agent runs continuously on the 3746 NNP, and does not need to be explicitly started.

NetView Graphic Monitor Facility Topology Examples

NGMF topology presents a list of the topology displays available when the operator logs on to NGMF. The list of displays available depends upon the network being monitored and the number of agents that topology data is being collected from. Selecting one of these displays and navigating down through the data presented allows the operator to display a wealth of APPN information.

Figure 22 shows an example APPN network. Because APPN network nodes all have the same representation of a network's topology, network topology need not be collected from every network node in an APPN network. The view shown displays APPN network nodes and the transmission groups connecting them.

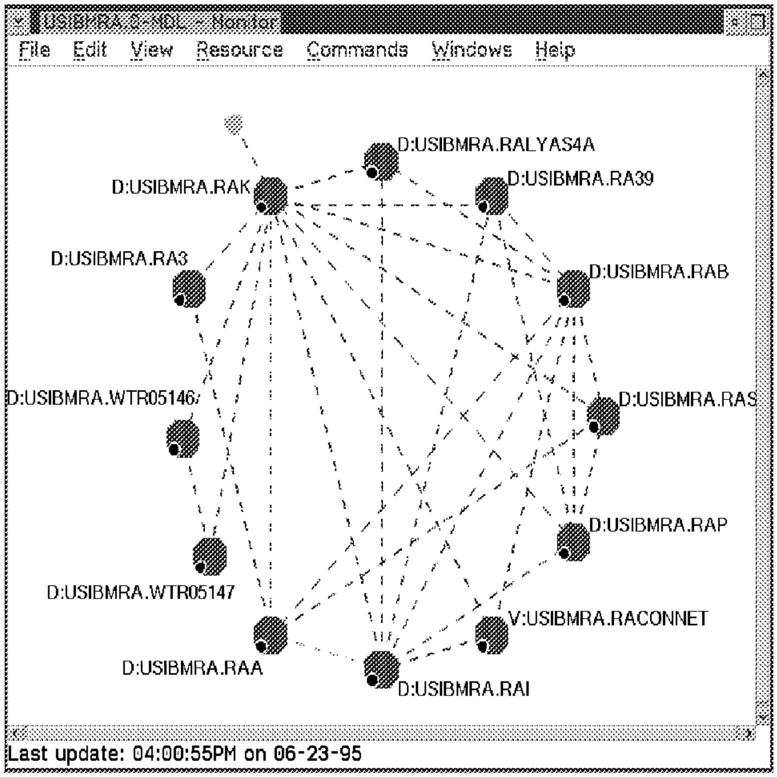
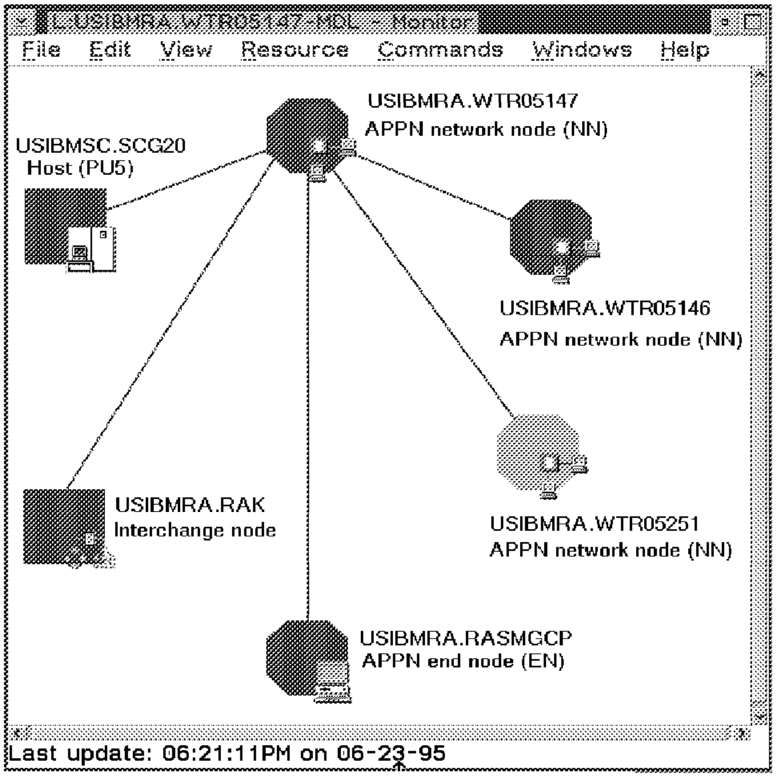


Figure 22. Single Network View

Selecting a more detailed view for node USIBMRA.WTR05147 brings up a more detailed logical view with information similar to that shown in Figure 23 on page 44.

In Figure 23, all nodes and TGs are shown that connect to USIBMRA.WTR05147. All resources shown can have commands issued against them.

When local topology is also connected for a 3746, then physical adapters and predefined or dynamic links can also be displayed.



Last update: 06:21:11PM on 06-23-95

Figure 23. More Detailed View of a Network Node

Local 3746 APPN/HPR Topology Management from the Service Processor

To display the local topology of the 3746 APPN network nodes, (adjacent nodes, including dependent PUs), use the functions that are described in the *CCM User's Guide.*

With DCAF running in the NGMF workstation (or an OS/2 workstation), the operator can remotely access 3746 Network Nodes and run the 3746 node configuration, local topology display, and network management functions of the CCM.

Local APPN Topology Examples

This section explains how to go to the windows where you can see details of the APPN resources running on the network, and activate or deactivate these resources.

Figure 24 shows the APPN-specific cascade menu.

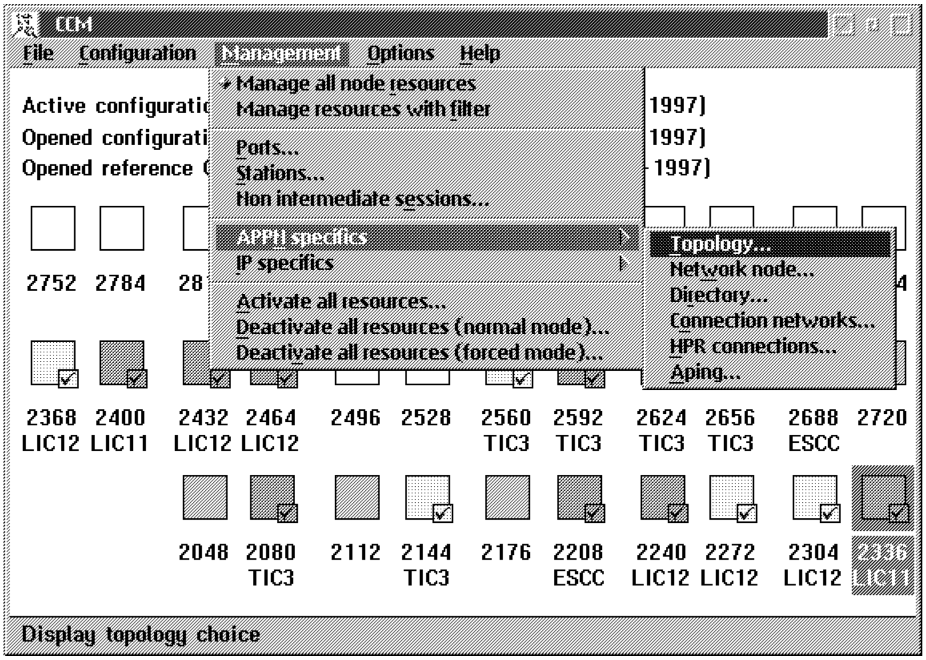


Figure 24. Example Management Window for APPN

Definitions for Performance Monitoring on APPN/HPR

For 3746-900 adapters running APPN that are not under NCP control, and 3746-950 adapters running APPN, the NPALU which runs in the NNP collects performance data.

If the 3746 is connected to the host NetView over an APPN network, then the NPALU session (LU type 0) must be transported over a DLUR/DLUS connection to the host. To support DLUS, the minimum level required for VTAM is Version 4, Release 2.

The following section explains how to activate NPM performance monitoring on the NNP, and then how to define a path to the host NetView for delivering the information collected to NPM over an APPN network.

In addition to these definitions, either at the port or station level, you must specify whether or not to collect NPM information for your resources.

Note: By default, ***all*** resources are defined with NPA eligible set to No. This means that if you want to collect data from a particular resource you should set NPA eligibility to Yes. In addition, setting NPA eligible to Yes for a port will enable data collection for all dynamically defined stations on that port.

Figure 25 shows the machine configuration that the definition steps refer to in the following section.

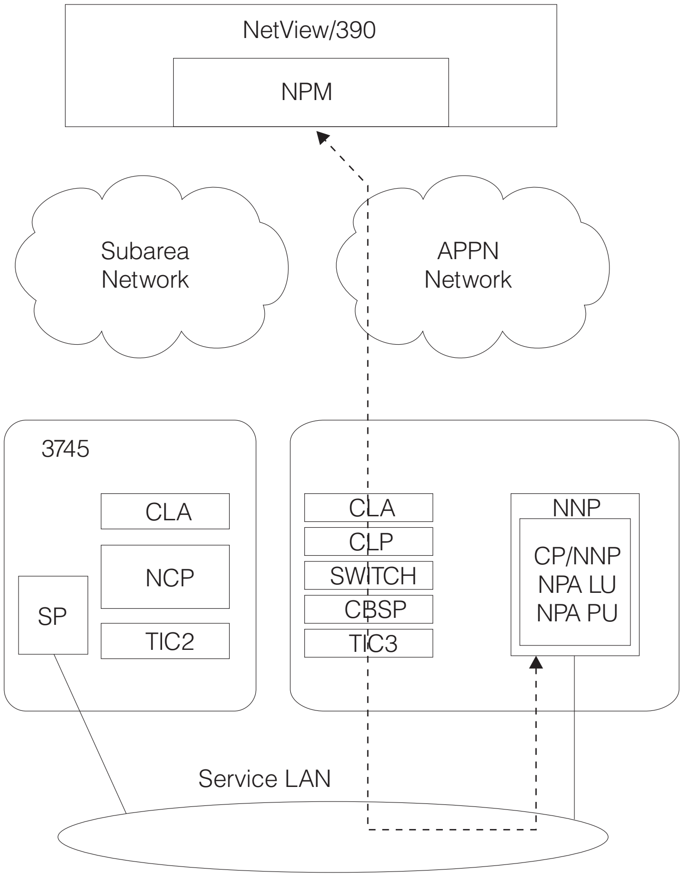


Figure 25. NPM Configuration

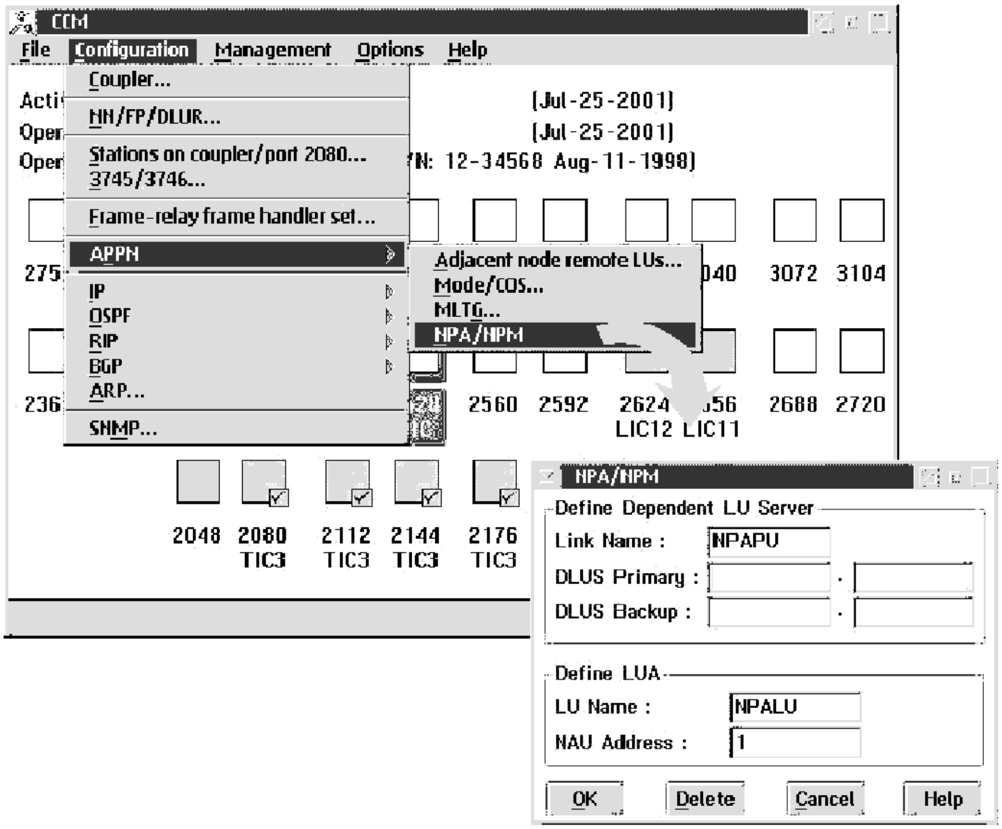
3746 Definitions for NetView Performance Monitor

To create definitions for NPM on the 3746:

1. Use CCM to specify the primary and backup DLUSs for the internal PU (NPA PU) associated with the NPA LU.
2. Create the host VTAM and NPM definitions.

CCM Configuration for NPM

These CCM definitions allow the NPALU on the NNP to communicate with VTAM. The link station for the NPALU must be manually defined.



Link Name : NPAPU

DLUS Primary :

DLUS Backup :

LU Name : NPALU

NAU Address : 1

Figure 26. CCM Window for NPM Configuration

Only the DLUS_PRIMARY and DLUS_BACKUP parameters can be changed.

The PU and LU names are fixed to “NPAPU’ and “NPALU.” You do not need to make these parameters match with the PU and LU definitions done in Switch Major Node.

The NAU_ADDRESS is fixed to 1 and should be the same as the LOCADDR specified in the Switched Major Node.

Host VTAM and NPM Definitions

To support NPM, the following host definitions must be made:

1. **Switched major node**, refer to the example given in Figure 27.
2. **Resource resolution table**, refer to the example given in Figure 28.

In these tables, the CP name must be identical to the CP name defined for the NNP:

- CPNAME = Local node name of the NNP

```
ERS4NPM VBUILD TYPE=SWNET,MAXGRP=1,MAXNO=1
*---------------------------------------------------------------------*
* ERS4 : PU NNP *                                                     *
*---------------------------------------------------------------------*
ERS4NPP PU ADDR=04,PUTYPE=2,CPNAME=ERS4
ERS4NPLU LU LOCADDR=1
```

Note: CPNAME=ERS4 is the CP Name of the NNP.

Figure 27. Example of Switched Major Node

```
***********************************************************************
*  DESCRIPTIVE NAME : 3746 MODEL 900 VTAMLST DEFINITION               *
***********************************************************************
*     BUILD STATEMENT - CONTROLLER INFO                               *
***********************************************************************
*
ERS4NPP BUILD MODEL=3746-900,X
NETID=SYSTSTAP,X
NEWNAME=ERS4,X
NPA=(YES,DR),X
VERSION=N/A
*
***********************************************************************
*     NPM VIRTUAL RESOURCES                                           *
***********************************************************************
M900NPA  GROUP LNCTL=SDLC,X
NPARSC=YES,X
VIRTUAL=YES,X
NPACOLL=YES,X
ISTATUS=ACTIVE
TESTNODL LINE
ERS4NPP  PU
ERS4NPLU  LU
*
***********************************************************************
*     END OF GEN SOURCE                                               *
***********************************************************************
*
GENEND   GENEND
         END
```

Figure 28. Example of Resource Resolution Table

Chapter 3. MAE APPN/HPR Network Node Management

You can manage the MAE network node as an APPN entry point, which forwards APPN-related alerts to an APPN focal point, or as an SNMP-managed node.

APPN/HPR Alerts

The MAE network node can serve as an APPN entry point for alerts related to APPN. As an entry point, the router is responsible for forwarding APPN and LU 6.2 generic alerts about itself and the resources in its domain to a *focal point* for centralized processing. A focal point is an entry point that provides centralized management and control for other entry points for one or more network management categories.

Note: If the focal point node is not available to receive an alert from the router network node, the alert is "held" (stored) by CPMS. APPN on the router can hold up to 10 alerts.

Entry points, such as the MAE, that communicate with a focal point make up that focal point's *sphere of control*. If a focal point explicitly defines the entry points in its sphere of control and initiates communication with those entry points, it is an *explicit focal point*. If a focal point is designated by its entry points, which initiate communication with the focal point, the focal point is an *implicit focal point*. The focal point for the router is an explicit focal point.

An explicit focal point must define the router entry point node as being within its sphere of control and initiate a session, or *focal-point-to-entry-point relationship*, with the router. When this relationship is established, the focal point becomes the *primary focal point* for the router. The focal point also informs the router entry point about the existence of a *backup focal point*, if one has been designated.

If the session between the router entry point and its primary focal point fails, the router can initiate a session with a designated backup focal point, provided it has been informed by the primary focal point of the backup focal points it is to use. Before initiating a session with a backup focal point, the router entry point attempts to reestablish communication with its primary focal point. If that attempt fails, the router switches to the backup focal point. The primary focal point is then responsible for reestablishing the focal point to entry-point relationship with the router.

The router entry point communicates with the focal point through an LU 6.2 session. Multiple-domain support (MDS) is the mechanism that controls the transport of management services requests and data between these nodes. The router network node does ***not*** support SSCP-PU sessions with focal points.

Management processes within the router's control point are handled by its control point management services (CPMS) component. The CPMS component within the router network node collects unsolicited problem-management data from resources within the router's domain and forwards this data to the appropriate focal point.

Supported Message Units

The MAE network node uses the following message units for sending and receiving management services data, including alert messages from domain ENs:

Message unit	Description
CP-MSU	Control point management services unit. This message unit is generated by CPMS and contains alert information forwarded by the router entry point. CPMS passes CP-MSU message units to MDS.
MDS-MU	Multiple-domain support message unit. This message unit is generated by MDS. It encapsulates the CP-MSU for transport between nodes.

Logging of APPN Alerts on the Router

The MAE network node logs all APPN and LU 6.2 generic alerts using the Event Logging System (ELS). You can access these alerts by using the MAE error logging facility.

Managing the Network Node Functions from an SNMP Manager

The router network node can function as an SNMP-managed node. An operator or application at an SNMP network management station can query objects in the APPN MIBs (using the SNMP GET AND GET NEXT commands) to retrieve APPN status information and node statistics. A subset of APPN MIB objects can be modified using the SNMP SET command.

As an SNMP-managed node, the router can send unsolicited status and error information, in the form of `traps` to an SNMP manager.

MIBs Provided by APPN

The MIB support provided by APPN in MAS V1R1.0 on the MAE is:

- Support of GET, GET_NEXT, SET, AND TRAP
- APPN MIB
- APPN HPR MIB
- APPN DLUR MIB
- RPC 1666 - SNA NAU MIB

The MIB support provided by APPN in the multiaccess enclosure is:

- Support of GET, GET_NEXT, SET, AND TRAP
- IETF Standard APPC MIB - RFC 2051
- IETF Standard APPN MIB
- IETF Standard APPN HPR MIB
- IETF Standard APPN DLUR MIB
- RPC 1666 - SNA NAU MIB
- Portions of the previously available private APPN MIB
  - DLC Trace, Memory, and Accounting
- Portions of the previously available private APPN HPR MIB
  - HPR NCL and Route Test

Note that MIB information is also available for the underlying interfaces and protocols that APPN uses. APPN is just a logical protocol that sits above and uses the interfaces.

Providing Topology Information to the SNA Topology Manager

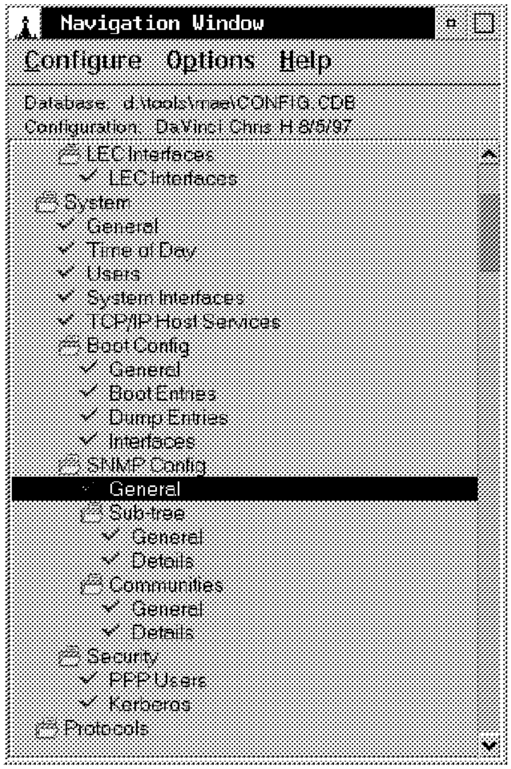
The SNA Topology Manager (SNATM) components of TME 10 NetView for OS/390 and NetView for MVS/ESA™ V3R1 provide object-oriented management and control of SNA subarea and APPN networks. SNATM uses CMIP protocols over SNA transport to communicate with agents, which provide it with topology information. CMIP-based agents are provided for such products as VTAM V4R3, Communications Manager/2 and Communications Server/2, the 2217, and the 3746-9X0 Network Node Processor.

The MAE APPN implementation does not provide a CMIP over SNA agent, so its APPN topology cannot be managed directly, in a transparent way, from the mainframe NetView. The TME 10 NetView for OS/390 APPN Topology Integrator allows the MAE APPN topology to be managed by NetView.

MAE (FC 3000) SNMP Configuration

This section shows how to make SNMP definitions for the MAE (FC 300)[7] using the MAE Configuration Program:

1. From the Navigation Window, select **General**, under the SNMP Config folder.

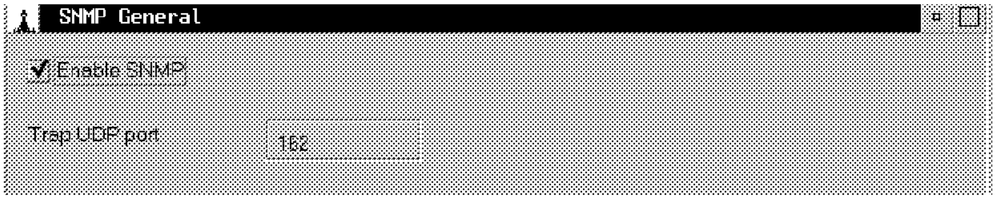


Database: d:\tools\mae\CONFIG.CDB
Configuration: DaVinci Chris H 8/5/97

Figure 29. Navigation Window

[7] For the MAE (FC 3001), the SNMP definitions are made through the CCM.

2. On the SNMP General window, you can enable and specify the UPD port for traps.



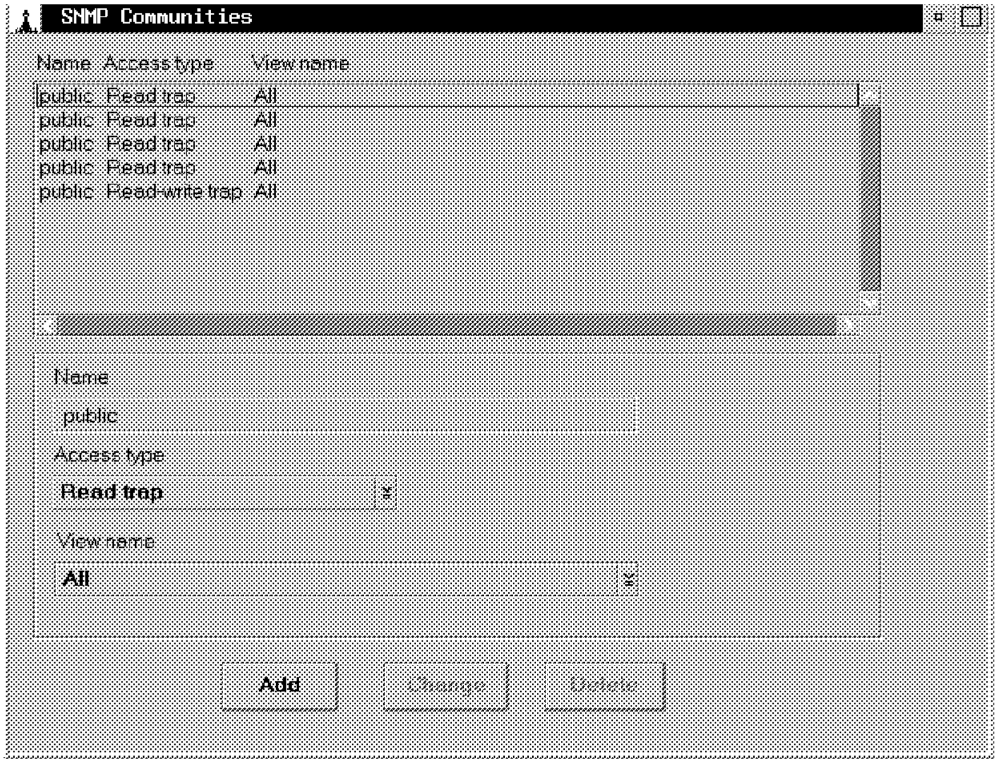
SNMP General

☑ Enable SNMP

Trap UDP port: 162

Figure 30. SNMP General Window

3. From the Navigation Window, select **General**, under the Communities folder. On the SNMP Communities panel, you can define the names of SNMP communities, the type of access the community has to the MIB variables, and the view of the MIB that the community is presented.



SNMP Communities

Name	Access type	View name
public	Read trap	All
public	Read trap	All
public	Read trap	All
public	Read trap	All
public	Read-write trap	All

Name: public

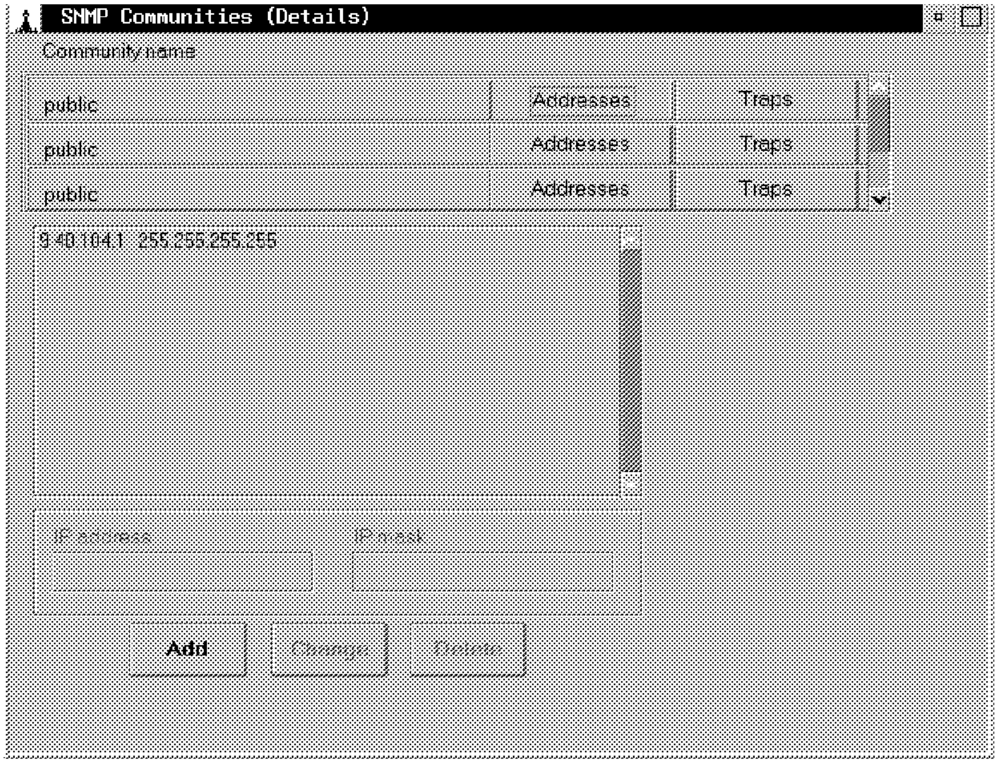
Access type: Read trap

View name: All

Figure 31. SNMP Communities Panel

4. From the Navigation window, select **Details** under the Communities folder. On the SNMP Communities (Details) panel, the names of SNMP communities defined on the Communities panel are listed, select **Addresses**. This gives you the possibility to define the IP addresses and subnet masks of members of the community.

   The members will receive traps from the 3746 Multiaccess Enclosure, and can access the MIB variables allowed for their community.



SNMP Communities (Details)

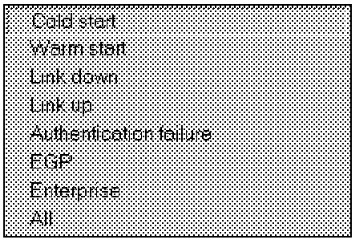
Community name

public	Addresses	Traps
public	Addresses	Traps
public	Addresses	Traps

9.40.104.1 255.255.255.255

Figure 32. SNMP Communities (Details)

5. Select **Traps**. This allows you to define the types of traps that are sent to the members of the community. In this case, **All** was selected.



Cold start
Warm start
Link down
Link up
Authentication failure
EGP
Enterprise
All

Figure 33. Types of Traps

Chapter 4. Performance Management with NetView Performance Monitor

This chapter describes the 3746 support of the NetView Performance Monitor (NPM) and the migration of performance monitoring using NPM from an SNA environment to an APPN/HPR environment. It assumes you are familiar with the NPM.

Note: If you have a 3746 Model 900 or 950 with NetView Performance Monitor (NPM), the installation of any one of the following requires at a ***minimum*** NPM V2R4 with APAR OW37743:

- 3746 and MAE Extended Functions 4 (FC 5810 or 5811)
- 3746 Extended Functions 2 (FC 5802)

The Need for Performance Monitoring

Performance monitoring consists of three basic tasks:

- Collecting data as the events being monitored are happening.
- Sending the data collected to a central point
- Analyzing the data to give the required picture of present performance against either:
  - A past situation
  - An ideal attainable situation

The purpose of analysis depends on the requirement for monitoring. It could be:

- To offer the best throughput for the cost of the network
- Real-time traffic management
- Accounting and charging purposes

Whatever the purpose, performance monitoring is a combination of host and 3746 Network Node activities.

Current Performance Monitoring on SNA Networks

The Network Performance Application (NPA) in the NCP collects performance and accounting data from the 3745 and 3746 adapters that are under NCP control. Referring to Figure 34 on page 56, the present mix of activities is:

1. Individual DLCs (SDLC, channel CDLC, token-ring 802.2, frame relay, X.25, and ISDN) collect data according to keywords chosen at NCP generation time. The DLCs have algorithms onboard to watch data flowing through them and to collect the required information. Only that information chosen at generation time can be collected.

2. The task running in the NCP that controls the DLCs, NPA (Network Performance Application) gathers data from the DLCs.

3. The NPA in NCP has a LU0 logical unit called the NPALU. This is connected to the NPM running in the host through an LU-LU session.

   The NPALU is connected either over a subarea path or over an APPN path to the host NPM through a DLUR/DLUS connection.

   Figure 35 on page 57 shows these paths.

4. NPM receives the data from all the NPAs and displays or prints the required analysis.

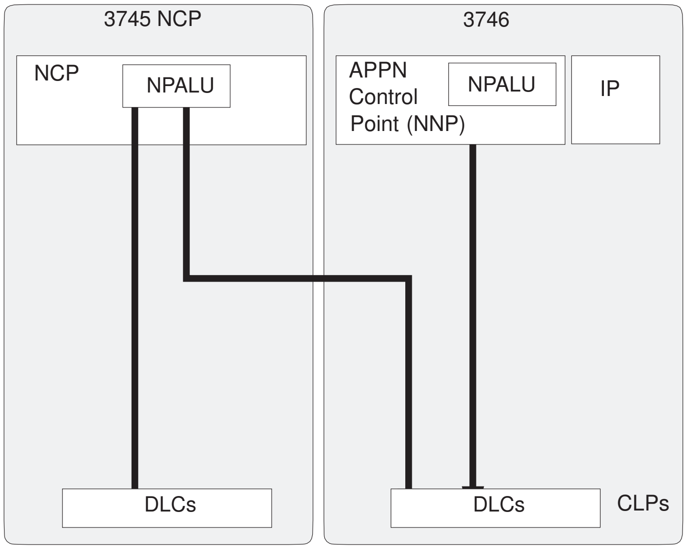


Figure 34. NPM Data Collection

Migrating to APPN/HPR Performance Monitoring

Under APPN/HPR there is a more dynamic situation, which allows you to perform the following actions:

- Define the data you want to collect using the CCM. The definitions are held in the Network Definition File (NDF).
- Establish a DLUR/DLUS connection to a VTAM that has subarea connectivity to the NPM that will collect the data (this VTAM must be V4R2 or later). The DLUR/DLUS session is needed to transport the LU0 session between the NPALU and NPM over the APPN network.

See "Definitions for Performance Monitoring on APPN/HPR" on page 45 for details of the definitions needed in the CCM and VTAM.

Once you have set up the collection environment, you can collect and analyze performance data:

1. Individual DLCs (SDLC, ESCON, CDLC, 802.2, frame relay, and X.25) collect data according to keywords defined in the CCM. Only that information defined in the NDF by the CCM can be collected.
2. All the 3746 adapters and the NNP collect memory and processor statistical data.
3. NPA, running under the 3746 APPN/HPR control point, gathers data from the DLCs.
4. NPA transfers the data to NPM through the NPALU (LU0).
5. NPM receives the data from all the NPAs and displays or prints the required analysis.

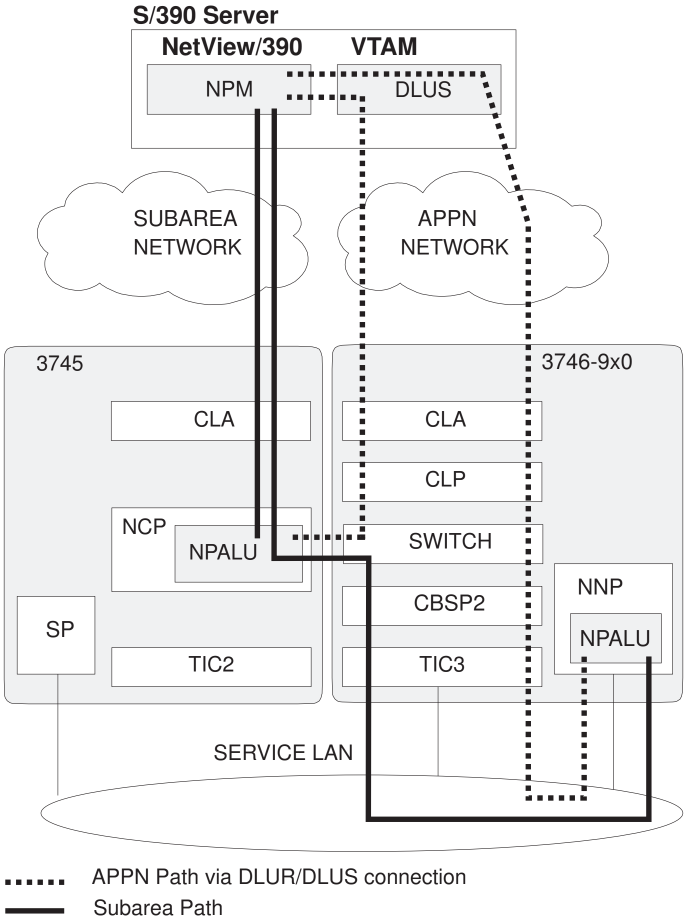


Figure 35. APPN/HPR Performance Monitoring Activities (3746 Network Node)

Note: Figure 35 shows NPM data being transmitted from the NNP over the service LAN to the 3746 or 3745. Although it is recommended that no stations use the service LAN for user data, using a path over the service LAN and Port 2080 for NPM data is acceptable.

Data Collected for the NetView Performance Monitor

No data is collected and sent to the NetView Performance Monitor (NPM) for an MAE resource.

Performance Monitoring Data

The 3746-900 and 3746-950 provide the NetView Performance Monitor (NPM) with many performance monitoring records, no matter how they are reported (through a 3746-900 through the NCP or NNP or through a 3746-950 and the NNP). The contents of these records depend on which resource is monitored.

Note: For a given resource, a 3746-900 equipped with an NNP can forward the reports using both the NCP and the NNP if the resource is shared by both control points, and defined as NPA-eligible in both configurations.

Some examples of the performance data are given below. For the complete list and details of the performance data available, refer to the NPM documentation.

- Processor utilization

  The following data is provided for each processor of the 3746-9x0:

  – Processor type:

    x'50' CBSP: Controller Bus and Service Processor

    x'51' NNP: Network Node Processor

    x'52' CLP: Communication Line Processor

    x'53' ESCP: ESCON Processor

    x'54' TRP: Token-Ring Processor

    For each 3746 processor, the collected data are:

  – Processor utilization (in percentage from 0 to 100)
  – Buffer storage utilization , that is, percentage of buffer storage in use
  – Program storage utilization, that is, percentage of program storage in use

  For the NNP, the collected data are:

  1. Processor utilization (in percentage of the NNP microprocessor utilization)

  2. APPN buffer storage utilization (in percentage of the current APPN buffer utilization)

  3. APPN memory utilization (in percentage of the current APPN memory utilization

  For a 3746-900, NCP adds information about the 3745 CCU and buffer utilization to the above-mentioned data. Of course, the corresponding fields are meaningless on a 3746-950 without NNP.

  Because a resource name is required to reference the processor utilization record, the NCP name is used for a 3746-900 and the network node name for a 3746-950.

  Note: Monitoring of processor utilization requires the engineering change D46130I for a 3746-950.

- ESCON physical link

  The following counters are provided to the NPM:

  – I-frames sent
  – I-frames received
  – Bytes sent
  – Bytes received
  – Retransmitted I-frames
  – Retransmitted bytes
  – Total error count
  – Outbound queue length
  – Total poll count
  – Positive poll count
  – When one or more ESCON stations work in HPR mode, the following counters are also provided for the global HPR traffic flowing over the optical link:

    - HPR frames sent
    - HPR frames received

  - HPR bytes sent
  - HPR bytes received
  - HPR bytes queued for transmission
  - Transmit HPR frames discarded for exceeding the transmit queue threshold
  - Received HPR frames discarded due to congestion in this node

- ESCON station
- SDLC station
- Token-ring physical link
- Token-ring external user
- Token-ring station

  Note: All the token-ring counters apply also to the service processor LAN attached to the CBSP.

- Frame-relay physical line
- Frame-relay FRTE
- Frame-relay FRFH
- Frame-relay LMI PU
- X.25 physical line
- X.25 physical PU
- X.25 Virtual Channel
- Point-to-Point Protocol

  There is no NPM performance monitoring for a line or station running the Point-to-Point Protocol (PPP).

- ISDN

  There is no performance monitoring for an ISDN D-channel of LIC16, because traffic on this channel is not high enough to require performance monitoring.

  For an ISDN B-channel line, the same performance monitoring counters as for a physical frame-relay line are reported to the NPM, because this channel runs the frame-relay protocol.

  For a logical ISDN line, the same performance monitoring counters as for a logical frame-relay line (FRTE) are reported to the NPM, because this channel runs the frame-relay protocol.

  Note: ISDN performance monitoring requires the FC 5800.

Accounting Data

Accounting reports can be used:

- To check the network charges

  In this case, remember that the way the network performs billing may be slightly different from the way the 3746-9x0 builds the accounting reports. So the checking can only be rough. The 3746-9x0 accounting reports can never be considered as a reference.

- To get detailed statistics data for each call

As an example, accounting allows computing the percentage of calls abnormally cleared by the network or remote equipment.

Accounting data is reported to the NPM only for X.25 and ISDN protocols. The latter does not apply to a 3746-950, because ISDN (LIC16) can flow only NCP traffic. X.25 accounting applies to a 3746-900 and 3746-950.

For the complete list and details of the accounting data available, refer to the NPM documentation.

Notes:

1. X.25 accounting requires the engineering change D46130I for a 3746-950. ISDN accounting requires the FC 5800.
2. Accounting data is reported on behalf of an X.25 physical line or ISDN D-channel (PU) resource.
3. For ISDN accounting, there are only three types of accounting report for ISDN. The intermediate accounting report does not exist because this type of report would normally be sent:
   - When an accounting counter overflows (unsolicited report). But there is no accounting counter for ISDN, because ISDN charges are not based on data volume.
   - When solicited by the NPM operator. But in this case, the report would be empty (only the time stamp) because there is no counter in the report.
4. Accounting data for X.25 is put within the control vector 81 (CV81).
5. Accounting data for ISDN is put within the control vector 83 (CV83).
6. There is no accounting report when the X.25 virtual circuit flows IP traffic.

Chapter 5. Remote Customer Consoles

PS/2® workstations (or equivalent) can be used to access the service processor remotely. These workstations access the service processor MOSS-E and functions described in the *CCM User's Guide*, using:

- Distributed Console Access Facility (DCAF), an IBM licensed program
- Java Console
- Telnet

They allow the operator at a remote workstation to control the keyboard and mouse input and monitor the display output of the service processor or network node processor. For details on setting up your workstations for DCAF or the Java Console, refer to the *3746 Nways Multiprotocol Controller Model 950: User's Guide*, SA33-0356, or the *3745 Communication Controller All Models, 3746 Nways Multiprotocol Controller Model 900: Console Setup Guide*, SA33-0158.

Using TME 10 Remote Control (DCAF)

With DCAF, the remote PS/2 workstation operates as a *DCAF controlling workstation* and the service processor as a *DCAF target workstation*.

Once a connection is established between a workstation and the service processor or network node processor, the remote operator can perform MOSS-E and *CCM User's Guide* functions as if seated in front of the service processor.

Remotely controlling a service processor with DCAF blocks the operation of its keyboard and mouse except for the DCAF hot keys.

Notes:

1. Before concluding that the service processor is not working, make sure that it is not under the control of a DCAF remote console. Try the DCAF hot keys (the default keys are **Alt+T**). Refer to the *3746 Nways Multiprotocol Controller Model 950: User's Guide*, the *3745 and 3746 Model 900 Console Setup Guide*, or the DCAF documentation for hot key information.
2. Using DCAF, only one remote workstation can control the service processor at a time.
3. A remote workstation can be configured to have access to more than one service processor.
4. The service processor is shipped preconfigured as a DCAF target workstation.
5. DCAF is a separate product from the 3746 Network Node. Installation of DCAF on a PS/2 (or equivalent) workstation is a customer responsibility.

Using Java Console

Starting with microcode level F12720, you can access the service processor or network node processor to use the remote keyboard, mouse, and display like a DCAF connection, except that:

- In addition to the service processor, using the Java Console, you can connect directly to the network node processor.
- Java Console does not block the keyboard and mouse on the service processor and network node processor.

Customer Consoles

Figure 36 shows the types of console (PS/2 workstation) connections to the service processor.

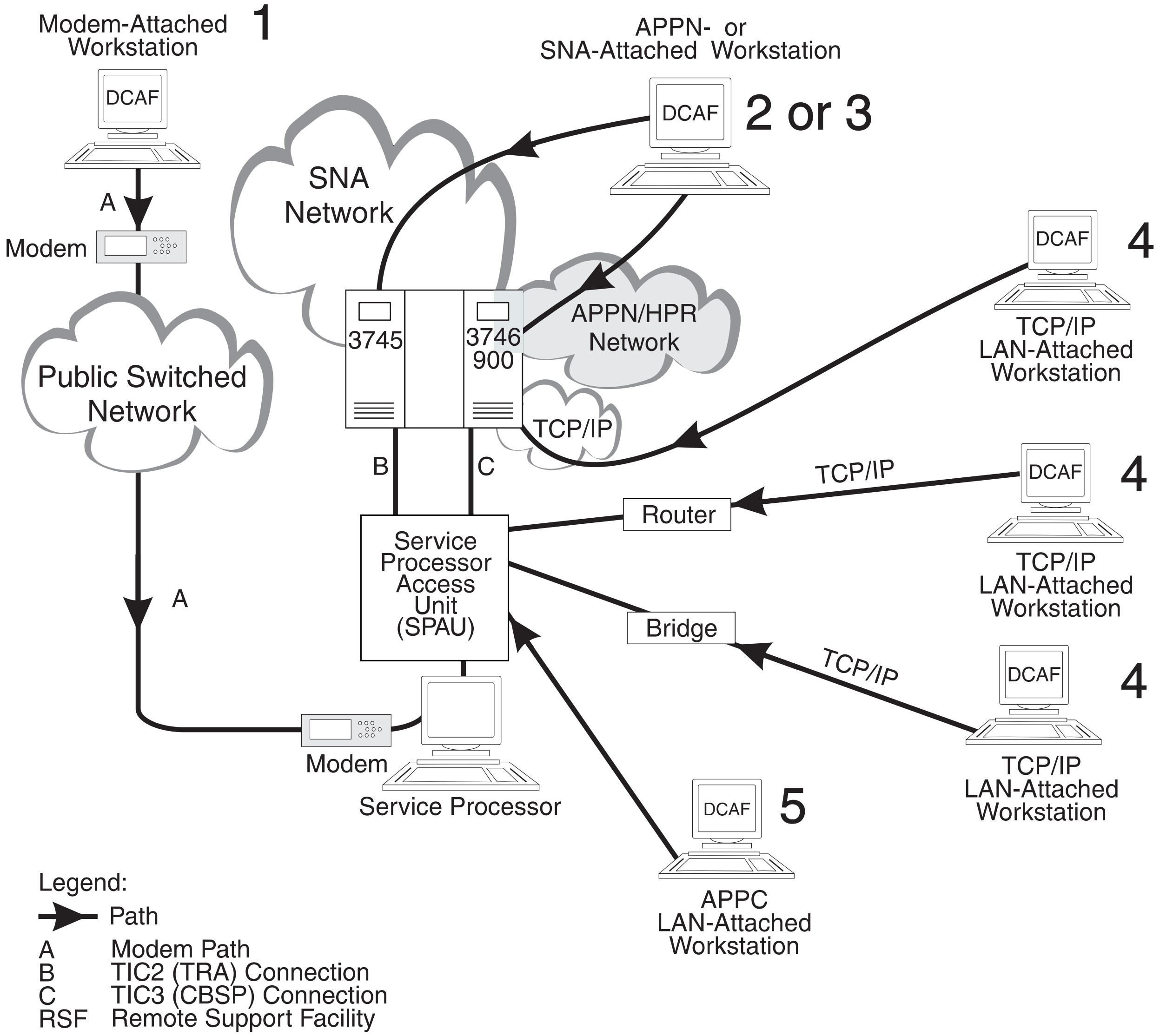

Modem-Attached Workstation
1
DCAF
A
Modem
Public Switched Network
A
Modem
Service Processor
APPN- or SNA-Attached Workstation
DCAF
2 or 3
SNA Network
3745
3746 900
APPN/HPR Network
TCP/IP
B
C
Service Processor Access Unit (SPAU)
DCAF
4
TCP/IP LAN-Attached Workstation
TCP/IP
Router
DCAF
4
TCP/IP LAN-Attached Workstation
Bridge
TCP/IP
DCAF
4
TCP/IP LAN-Attached Workstation
DCAF
5
APPC LAN-Attached Workstation
Legend:
Path
A Modem Path
B TIC2 (TRA) Connection
C TIC3 (CBSP) Connection
RSF Remote Support Facility

Figure 36. Console Attachments

The types of consoles are:

1. **Modem-attached**, which use the analog switched telephone network to access the service processor through its SDLC port and modem. The service processor modem is also used for RSF and RETAIN connections.

   If the APPN/HPR or SNA path for the remote console is not available, a modem attached to the switched network would allow the remote console to access the service processor.

2. **APPN/HPR-attached**, which communicate with the service processor through an SNA LU 6.2 session over your APPN/HPR backbone.

3. **SNA-attached**, which communicate with the service processor through an SNA LU 6.2 session over your SNA backbone.

4. **TCP/IP LAN-attached**, which attach:

   - Directly to the same token-ring LAN as the service processor
   - Indirectly through LAN bridges or routers, with appropriate filtering, to the service processor LAN

   Communications Manager/2 or TCP/IP communications can be used.

   Note: Service LAN Problems may disrupt 3746 Network Node operations. See page 35 for important information about token-ring LAN bridges and unplugged cables and stations on the service LAN.

5. **APPC LAN-attached**, which is attached directly to the Service Processor Access Unit (SPAU) or indirectly through a token-ring LAN bridge.

Sending an alert to NetView through the service processor SDLC port[8] or calling RSF[9] has a higher priority for the MOSS-E than remote console sessions using the SDLC port of the service processor. This means that if either of these needs arises during a DCAF session, the remote workstation operator using a modem-attached console may be asked to end the remote session to free the service processor SDLC port. See Chapter 6, “Connecting to the IBM Remote Support Facility.”

A remote console can be configured for all types of access. This way, a single console at a central control site could be LAN-attached to a local service processor while providing SNA, APPN/HPR, and modem access to other (remote) service processors.

The NetView Graphic Monitor Facility (NGMF) workstation (or any workstation running DCAF) can also use the public switched network to access the service processor if the path through the user network is not available.

[8] See “Alternate Path” on page 28.

[9] See Chapter 6, “Connecting to the IBM Remote Support Facility” on page 73.

Minimum Workstation Configuration

This section gives an overview of the system requirements for remote workstations. For more complete information, refer to *3745 and 3746 Model 900 Console Setup Guide*.

DCAF Consoles

You need the following minimum program levels in your workstations to remotely access the service processor in the:

Communications Manager environment:

- IBM OS/2, Version 2.1 operating system
- Communications Manager/2, Version 1.11 or Communication Server/2
- LAN Adapter Protocol Support (LAPS), Version 2.2 or later

TCP/IP environment (for LAN-attached consoles):

- IBM OS/2, Version 2.1 operating system
- TCI/IP for OS/2, Version 2.0 and the corrective service diskette (CSD)

Common to both environments:

- TME 10 Remote Control 1.0 (Distributed Console Access Facility, Version 1.3 with CSD 1.3.1)
- TME 10 Remote Control 2.0 (Distributed Console Access Facility, Version 1.3 with CSD 1.3.3)

Notes:

1. Later releases of the above programs can be used unless otherwise stated.
2. Network Transport Services/2 (NTS/2) should be installed for LAN-attached consoles and SNA-attached consoles connected to an SNA network through a LAN.
3. Accessing the service processor through an SNA or APPN/HPR network backbone requires the following:
   - TME 10 Remote Control remote workstations and gateway workstations configured as physical units type 2.1 (PU 2.1). If the TME workstation is downstream from a 3174 control unit, the 3174 must have either of the following support:
     - Configuration Support B plus 8Q0800 Programming Request for Price Quotation (PRPQ).
     - Configuration Support C (APPN feature).
   - When using 3725 Communication Controllers in the network backbone, the controllers must be loaded with NCP V4 R3 and operate under VTAM V3 R2 or later.
   - When using 3720 and 3745 communication controllers in the network backbone, the controllers must be loaded with NCP V5 R2 or later and operate under VTAM V3 R2 or later.

DCAF Hardware Requirements

The remote consoles must be IBM PS/2 workstations (with an 80386 microprocessor or better) or the equivalent. A hard disk of at least 80 MB and at least 10 MB of storage (RAM) is recommended. If you have other applications besides OS/2 and DCAF, you may need more hard disk space and storage. For input/output, the console must have:

- A VGA display such as an IBM 8515 color display or equivalent.
- A mouse.
- A QWERTY keyboard. If this keyboard is not available, then the QWERTY equivalent keys must be used. For example, on an AZERTY keyboard you must use the "q" key when you want to type an "a."

  To find the equivalent keys on an IBM non-QWERTY keyboard, refer to your OS/2 documentation for keyboard layouts or codes.
- For a LAN-attached console, an IBM Token-Ring Network Adapter/A operating at 16 Mbps.
- For a modem-attached console, a synchronous modem (compatible with the service processor modem, such as the IBM 7855 or 7857 modem) and a serial port (compatible with the synchronous modem).

  To dial the service processor, the modem must either provide dialing capability (like the IBM 7855 and 7857) or be complemented with a telephone set.

  For information about the characteristics of the service processor modem, refer to “Controller and Service Processor Integration” in the *3745/3746 Planning Series: Overview, Installation, and Integration*.
- For an APPN/HPR- or SNA-attached console, an IBM Token-Ring Network Adapter or a serial port with a synchronous modem.

Java Console

The controlling workstation can be operated on any of the following platforms:

- OS/2, OS/2 Warp
- Windows® 95, Windows 98, and Windows NT®
- AIX, UNIX®

The minimum program levels required on your workstation to remotely access the service processor is a Web browser (for example, Internet Explorer 4.0, or Netscape 4.0) with Java 1.1 or later enabled.

Telnet Access

To remotely access NNP functions, make sure that your remote workstation runs an operating system that supports TCP/IP, including the Telnet Client program.

Service Processor Parameters

The following MOSS-E parameters should be supplied to the IBM service representative for installation of the service processor and are used when customizing the service processor (see Appendix B, “MOSS-E Service Processor Customization Function” on page 93).

For DCAF

This information about the service processor is necessary to enable the DCAF controlling workstations to find the service processor in your network. This information should be available at installation time even if you do not plan to use DCAF to remotely access the service processor. Having these parameters already defined in the service processor will save a service representative visit and possible interruption of MOSS-E if you decide in the future to use DCAF.

For DCAF Consoles Using Communications Manager/2

For CM/2 consoles, supply the following parameters:

Local LU name

The DCAF target running in the service processor must be defined in the service processor as a local LU. One LU name is required for each type of remote console that you plan to use:

- LAN-attached
- APPN/HPR- or SNA/subarea-attached
- Modem-attached

See “Customer Consoles” on page 62.

The LU names must be defined in the MOSS-E and be unique in the APPN/HPR or SNA/subarea network that contains the service processor. Enter the value of this parameter in the “Service Processor Parameters for DCAF using CM/2” worksheet on page 90 for each type of remote console used. Your service representative will use this parameter when configuring your service processor (refer to the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*, GA27-4234).

In the DCAF controlling workstations, this LU name is used in the definitions of the partner LU. The LU name value is 1 to 8 characters long and can include:

- Uppercase letters (A - Z)
- Digits (0 - 9), but it cannot start with a digit
- Dollar sign ($)
- At sign (@)
- Number sign (#)

Destination address

This address is used only for SNA and APPN consoles attached. See Figure 36 on page 62, if the alert path to NetView is:

- **Not defined or through SNA**:
  - The DCAF SNA can be set for path: 1, 2, 3, or 4
  - The DCAF APPN can be set for path: 4
- **Defined through APPN**:
  - The DCAF SNA can be set for path: 1, 2, 3, or 4 with RSAP different than the TIC3 RSAP defined for the NetView link (refer to the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*).

- The DCAF APPN can be set for path: 4 with the same RSAP defined for the NetView link (refer to the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*).

Enter the value of this parameter in the “Service Processor Parameters for DCAF using CM/2” worksheet on page 90 for SNA and APPN remote consoles. Your service representative will use this parameter when configuring your service processor (refer to the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*). The remaining values in this section have been already defined elsewhere.

Network ID

This identifies the APPN/HPR or SNA network to which the service processor node is connected. Refer to information about the **Network ID** parameter in the “Controller and Service Processor Integration” chapter and the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

Local node name

This identifies the service processor in the network. Refer to information about the **Local Node Name** parameter in the “Controller and Service Processor Integration” chapter and the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

Network adapter address

This is the locally administered address (LAA) of the service processor token-ring adapter. Refer to information about the **Network Adapter Address** parameter in the “Controller and Service Processor Integration” chapter and the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

There are definitions required in VTAM and NCP for SNA/subarea-attached consoles. There are no VTAM or NCP definitions for LAN-attached and modem-attached consoles.

APPN/HPR-attached consoles must not be defined in VTAM or NCP.

For detailed information about DCAF definitions in the CM/2 of the controlling workstation, refer to the *3746 Nways Multiprotocol Controller Model 950: User's Guide* or the *3745 and 3746 Model 900 Console Setup Guide*.

For DCAF Consoles Using TCP/IP

If your workstation running DCAF uses the TCP/IP protocols to communicate with the target service processor over the service LAN, or your IP network, you need to define the IP address and subnet mask of the service processor (defined through the MOSS-E) in your remote consoles.

For detailed information about the IP address of the service processor, refer to the “Controller and Service Processor Integration” chapter and the “MOSS-E Service Processor Customization Function” appendix in the *3745/3746 Planning Series: Overview, Installation, and Integration*.

For detailed information about DCAF definitions in TCP/IP of the controlling workstation, refer to the *3746 Nways Multiprotocol Controller Model 950: User's Guide* or the *3745 and 3746 Model 900 Console Setup Guide*.

For Java Console

The target service processor runs the Java Console server and runs the Point-to-Point Protocol (PPP) server over COM 1 that is connected the asynchronous modem. This allows the remote controlling workstation to reach the service processor through the PPP server using a switched line.

Security for the Java Console includes passwords necessary to:

- Establish the PPP connection. The PPP link uses of Challenge Handshake Authentication Protocol (CHAP).
- Run Java Console.
- Log on to the MOSS-E, if the MOSS-E operator is not currently logged on.

The PPP configuration parameters are:

Accept incoming calls on SP?
Authorizes incoming calls from the remote Java Console workstation. The default is Yes.

Local phone number
The number of the modem connected to the service processor.

PPP Server IP address
This is the address of the PPP server, which is run by the service processor. This IP address is different from the service processor IP address used for communication over the service LAN. It is reserved for the PPP connection between the remote PPP client controlling workstation and the service processor PPP server.

The PPP server address uses the same subnet network as the service processor service LAN subnet.

PPP Client IP address
This is the IP address assigned by the service processor PPP server to the remote calling workstation during the establishment of the server-workstation link. Any calling workstation is given this IP address by the PPP server.

The PPP client address uses the same subnet network as the service processor service LAN subnet.

DTE Speed
This is the speed of COM 1.

For the 7857 modem, set the DTE speed to 19200.

For the 7858 modem, keep the default value of 115200.

If you have a problem with your PPP connection, try a lower speed.

MRU Size
This is the size of the maximum request/reply unit (MRU) sent and received between the service processor PPP server and the workstation PPP client. The default is 1500.

Customer Password

This is the password you must use when remotely connecting to the service processor through the PPP server using a switched line.

The default password is **IBM3745C**.

IBM service password

This is the password the service representative uses when remotely connecting to the service processor through the PPP server using a switched line.

The default password is **IBM3745I**.

If you use the Java Console, enter these parameter values on page 91.

Remote Access Program Installation and Configuration

The two methods to remotely access the service processor (and network node processor) are mutually exclusive. If you want to use remote access, you must choose either:

- TME 10 Remote Control (DCAF)
- Java Console

Enter your choice on the service representative worksheet on page 91.

TME 10 Remote Control (DCAF) Installation and Configuration

In the *3746 Nways Multiprotocol Controller Model 950: User's Guide* and *3745 and 3746 Model 900 Console Setup Guide*, there are procedures for:

- Installing TME 10 Remote Control and starting a controlling session with a service processor
- Installing Communications Manager/2 or TCP/IP, or both
- Configuring customer consoles as one or more of the DCAF controlling workstations:
  - LAN-attached (APPC type)
  - LAN-attached (TCP/IP type)
  - APPN/HPR-attached
  - SNA-attached
  - Modem-attached

The diskette supplied with the *3746 Nways Multiprotocol Controller Model 950: User's Guide* and *3745 and 3746 Model 900 Console Setup Guide* contains an example for each type of remote console attachment.

DCAF Remote Access Security

To log on to a service processor using a remote DCAF workstation, you must first establish a DCAF link between the remote workstation and the service processor. This link requires certain parameters that are unique to each service processor.

Refer to the “Remote Customer Consoles” chapter in the *3745/3746 Planning Series: Management Planning Guide* for planning information about these parameters.

There are two types of DCAF connection to the service processor:

- Secure
- Non-secure

DCAF Secure

If you select **Allow the target to be a secure target**,[10] very secure links[11] are setup between the controlling remote workstations and target service processors. Refer to the DCAF documentation for details about using DCAF Secure in your workstations.

Fill out the worksheet “Remote Access Security” on page 91 if you want the IBM service representative to set the service processor as DCAF Secure.

DCAF Non-secure

A non-secure DCAF link uses only a series of passwords to provide access security:

DCAF password

As part of the process of establishing the link between the remote workstation and the service processor, you are asked for the service processor DCAF password before you can have access to the service processor. This password can be unique for each service processor.

Once you enter the DCAF password and the link is established, you can monitor the display of the service processor.

To define or change this password, use the Customize DCAF Target Settings function, which is in the MOSS-E Service Processor menu. The two parameters that you have to plan for are:

Enable DCAF password

Yes or no. The default is yes.

Password

1 to 8 alphanumeric characters.

Use the worksheet “Remote Access Security” on page 91 to record these parameters.

Note: There is no factory default password. If no password has been defined, the remote operator just presses **Enter** when asked for the password.

MOSS-E password

To remotely control the service processor, you must enter the MOSS-E password to log onto the MOSS-E. These passwords are explained in the “Controller and Service Processor Integration” chapter of the *3745/3746 Planning Series: Overview, Installation, and Integration*.

[10] Once you specify a service processor as a secure target, the only way to make the service processor non-secure again is to reinstall the MOSS-E microcode.

[11] Using encryption, long passwords, and authentication.

Disabling of Incoming Calls

The service processor modem can be set not to accept any incoming calls. This is mainly used to isolate the service processor from remote modem-attached consoles (DCAF controlling and RSF console). The procedure is different depending on the type of modem used:

Integrated modem

Use the MOSS-E Disable incoming calls function and record this parameter on the worksheet “Disable Incoming Calls (for Service Processor)” on page 92.

This type of modem is no longer available from IBM.

External modem

Manually, using the modem buttons. Refer to the manual for your modem for this procedure.

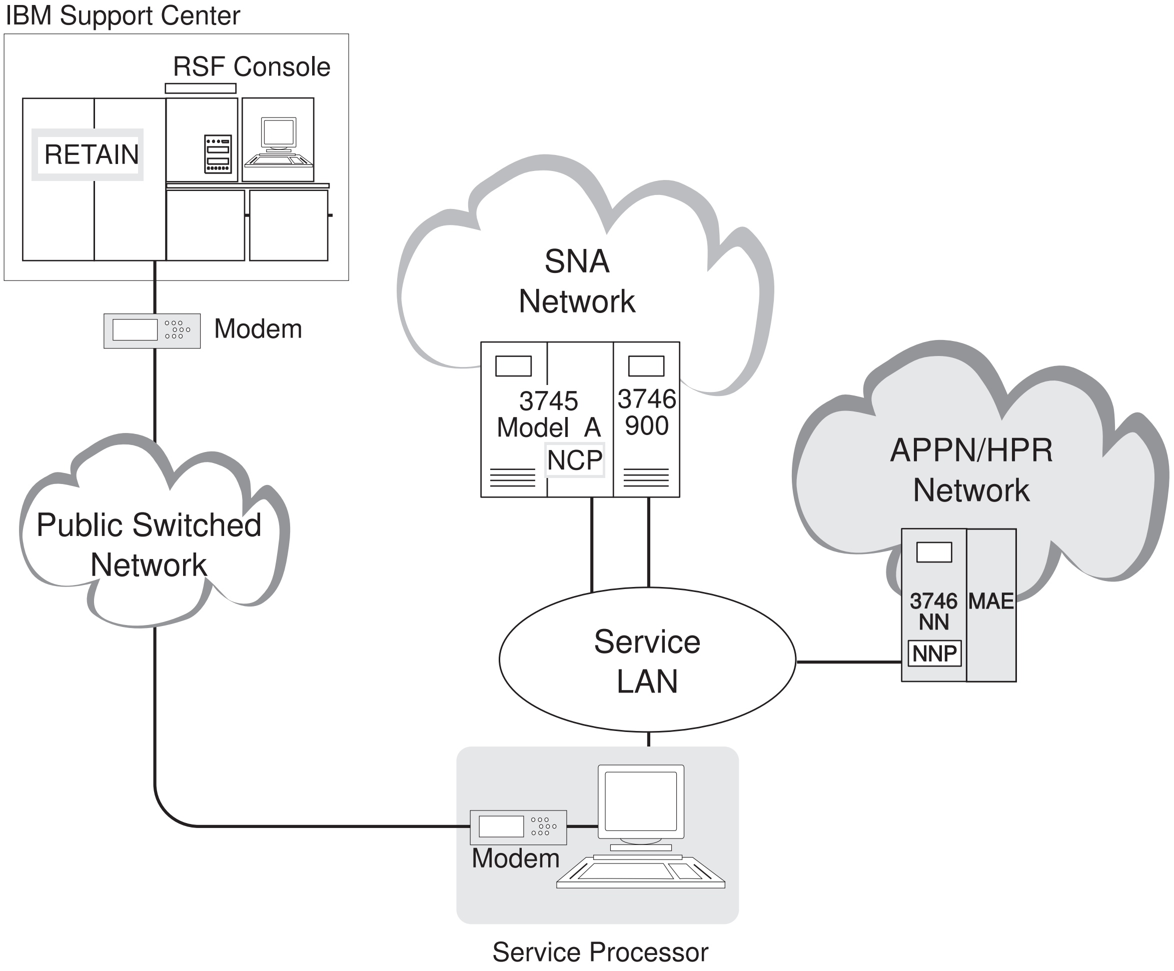
Java Console Installation and Configuration

In the *3746 Nways Multiprotocol Controller Model 950: User's Guide* and *3745 and 3746 Model 900 Console Setup Guide*, there are procedures for:

- Configuring Java Console on the service processor
- Installing Java Console as a program on the remote workstation
- Configuring Java Console on the remote workstation
- Connecting to the service processor and network node processor
- Downloading and uploading files to the service processor

Chapter 6. Connecting to the IBM Remote Support Facility

The 3746 Network Node service support is based on automatic problem reporting to and problem resolution from IBM RETAIN databases through the remote support facility (RSF).



Legend:

3746 NN	A 3745/3746-900 with an NNP or a 3746-950
NNP	Network Node Processor
MAE	Multiaccess Enclosure

Figure 37. RSF Connections

When a critical problem is detected in the 3746 Network Node (3746-900, 3746-950, network node processor, or service processor):

1. The system reference code (SRC) of the problem is recorded in a MOSS-E event log.
2. An alarm is displayed at the service processor.

3. If you are using the IBM RSF and its authorization has been enabled:

   a. An alert is sent to the NetView program informing the operator that the IBM RSF is being called.

   b. Problem and error data are automatically reported to RETAIN.

   c. A second alert is sent to the NetView program informing the NetView operator of the results of the call to RSF.

   d. If there are any microcode changes, they will be downloaded from RETAIN to the service processor hard disk. The new level of microcode might solve the problem.

   e. If further investigation is needed, the IBM support center can access the service processor from a remote console. If a hardware failure is suspected, an IBM service representative will come to your site with replacement parts.

The same sequence applies to problems detected in any 3745 or 3746-900 sharing the service processor with the 3746 Network Node. The MOSS event log is used to store information about 3745 problems.

Note: If you have a 3746-900 attached to a 3745 Model A, confirm with your service representative that the 3746-900 has been registered separately on the RETAIN database. If it is not, then a call from such a 3746-900 will fail.

If you have a problem that is not detected by the MOSS-E, you can manually report the problem to RETAIN using the MOSS-E Report Problem Using Remote Support Facility function in the Problem Management menu.

Automatic Microcode Download

The microcode in the controller and the service processor can be updated by downloading microcode through the RSF link from the IBM RETAIN database. The microcode change levels (MCLs) are saved on the service processor hard disk in a temporary file and must be installed and activated before being operational.

If you are an RSF user, it is recommended that you select the automatic MCL download option to periodically receive the latest MCLs. The MOSS-E will automatically define the date and time of the download and will initiate the RSF connection when the day and time occur. For details of this procedure, refer to the *IBM 3745/3746-900 Connection and Integration Guide* or the *IBM 3746-950 User's Guide*.

If you do not use RSF, you will (at your request) receive MCLs on an optical disk. This may mean delays in the correct operation of your network, if MCLs are needed to solve microcode problems. Therefore, IBM strongly recommends the use of RSF to minimize any such delays.

Note: Automatic microcode download is available only if the RSF authorization has been enabled.

Parameter Definitions for RSF

Record the parameters described in this section on the RSF Parameter worksheets in on page 92. These parameters are stored in the service processor for use by your IBM service representative.

Customer Information

This information is used by IBM RSF and RETAIN to call you if there is a controller problem.

Company name
The name of your organization (up to 35 characters in length).

Address
The address of your organization. You can use up to three lines of up to 35 characters each.

System location
The physical location of the 3746 Network Node. You can use up to 35 characters in each line and up to two lines.

Contact person
The name of the person to contact at your central site responsible for activating and deactivating systems, and monitoring system problems. Enter up to 30 characters.

The following two telephone numbers can be up to 34 characters long. Include your area code in the telephone number that you specify.

Company telephone number for voice communications
The telephone number that you want IBM to use in normal situations. Use a telephone number other than the service processor modem telephone number.

Company service telephone number for RSF modem communications
The telephone number of the modem attached to the service processor SDLC port.

RSF Authorization

Remote support facility authorization

Enable This is necessary to allow automatic RSF calls by the MOSS-E.

Disable Default value. This prevents the 3746 Network Node from calling RSF; the operator must call IBM to report any problems detected by the 3746 Network Node.

Automatic/Microcode Download Option

This option is available only if the preceding RSF authorization value is set to ENABLE.

Set Automatic Microcode Download Option

Yes This allows periodic downloading from RETAIN via the RSF of any new MCLs that might be available from RETAIN.

No Default value. This prevents automatic MCL downloads.

RSF Modem

The modem attached to the service processor is used primarily to provide the RSF connection to the IBM support center, but it is also used for:

- Remote console access
- Sending alerts to the NetView program (alternate path)

For the characteristics of the modem used for RSF (and RETAIN), refer to “Physical Planning Details” in the *3745/3746 Planning Series: Physical Planning*, GA27-4238.

Chapter 7. 3746 IP Router Management

This chapter describes how to manage the IP resources controlled by the 3746 IP Router. These are the IP functions running on the 3746 native adapters (referred to in this book as the 3746 IP Router). For information about how to manage MAE-controlled IP resources, refer to the “MAE IP Router Management” chapter in the *3745/3746 Planning Series: Multiaccess Enclosure Planning*.

The 3746 provides the function of an SNMP agent and can communicate, using IP datagrams, with an SNMP manager such as Tivoli NetView. The Router and Bridge Management (RABM) application (which is available with the IBM Nways Enterprise Manager, program number 5777-AAK) is needed to display the following information:

- Alert and fault management information
- ESCON MIB information

The relationship between these elements is shown in Figure 38. The SNMP agent is supplied as part of the IP routing feature (FC 5033), which runs on the 3746 NNP feature (FC 5022).

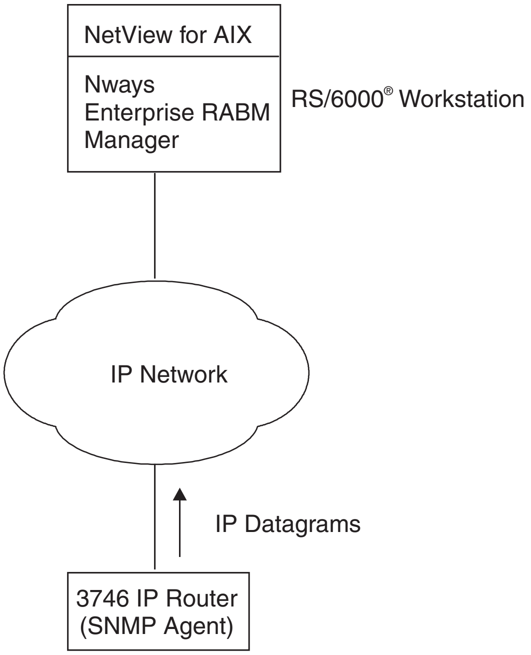


Figure 38. Managing IP Resources with SNMP (3746)

If you want to manage your IP resources centrally from a DCAF station, see “Managing IP Resources through DCAF” on page 83 for further information.

3746-9x0 SNMP Functions

Management Information Base (MIB) Support for 3746 IP Router

A *Management Information Base (MIB)* defines which aspects of network communications are managed by SNMP. These are standard objects, and the following MIBs are supported by the 3746 Network Node:

- MIB 2 (standard MIB, RFC 1213)
- OSPF MIB (standard MIB, RFC 1253)
- Token-ring MIB (standard MIB, RFC 1231)
- Frame-relay MIB (standard MIB, RFC 1315)
- PPP MIB (standard MIB, RFC 1471)
- ESCON MIB (see Appendix C, "ESCON MIB" on page 99)
- X.25 MIB (Standard MIBs, RFC 1381, RFC 1382)

Problems detected in the 3746 Network Node are reported to Tivoli NetView as SNA alerts or CMIP alarms encapsulated in traps. Those traps are received by RABM, which translates them into a local trap to send them to the event desk of Tivoli NetView.

3746-9x0 SNMP Agent Functions

The 3746 IP router provides SNMP V1 agent support. The SNMP **GET**, **GET_NEXT**, and **TRAP** commands are supported. The SNMP **SET** command is not supported. Every SNMP network management station equipped with the appropriate MIB support can retrieve this information.

To configure the 3746 IP SNMP configuration (community names, TRAP receivers, and so on) requires CCM configuration. SNMP configuration via the Telnet configuration interface is not available.

3746-9x0 SNMP Relay

Figure 39 depicts the 3746 IP SNMP implementation. Two main components can be identified:

- SNMP relay code residing on the 3746-9x0
- SNMP agent code residing on the NNP

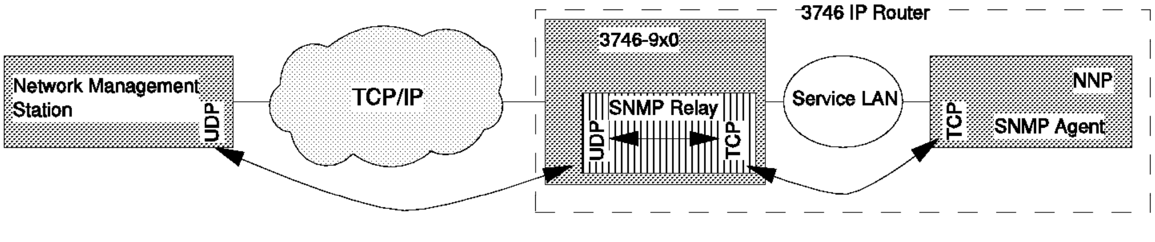


Figure 39. 3746-9x0 IP SNMP Implementation

The *SNMP relay* function on the 3746-9x0 enables an SNMP network management station to send its SNMP requests to any of the IP ports of the 3746-9x0 IP router. By relaying SNMP traffic, rather than forcing network stations to contact the NNP, the location of the SNMP agent is transparent to the network management station.

IP connectivity is required between the network management station and the 3746 IP router. The service LAN is used for the traffic between the 3746-9x0 and the NNP. Both 3746 IP and NNP must be operational to enable SNMP access. Note that the SNMP traffic between 3746-9x0 and network management station uses UDP (port 161), while the SNMP relay function uses TCP transport.

Distributed Agents

The NNP SNMP agent uses the distributed programming interface (DPI V2) described in RFC 1592. To retrieve the information that SNMP network management stations are soliciting, the SNMP agent interfaces with a number of subagents. As most of the SNMP MIB information required is maintained on the 3746-9x0, the subagents themselves interact with processes running on the 3746-9x0 processors.

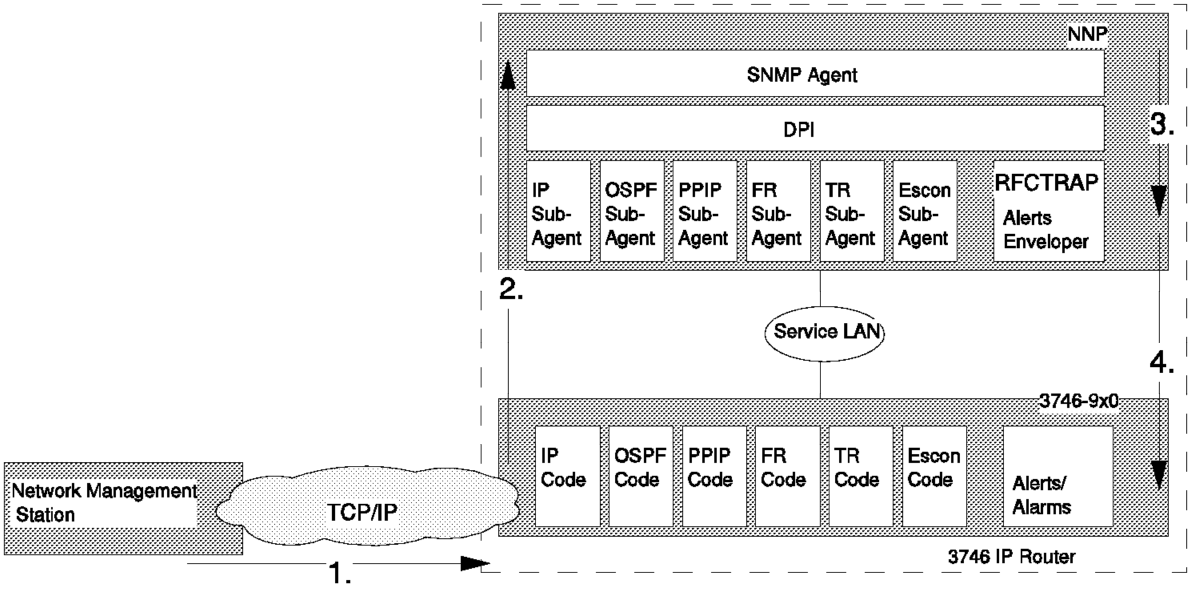


Figure 40. Distributed SNMP Agents

Figure 40 details the subagents concept. Network management stations soliciting SNMP information access (1) the 3746-9x0 which relays (2) the requests to the NNP. The NNP accepts the SNMP request and forwards it (3) to its appropriate subagent. The subagent decodes the ASN.1 format and interfaces (4) with its counterpart in the 3746-9x0.

Note: For performance reasons, the subagents retrieve whole tables that are cached to respond to successive SNMP requests.

The 3746 IP agent supports solicited and unsolicited SNMP traffic. Solicited data is sent in response to an SNMP query received from a network management station. Soliciting data requires read SNMP access on the 3746-9x0 IP routers. Figure 43 on page 82 depicts how the IP addresses and community names are set to enable read access. Unsolicited data is sent after errors have been detected. Unsolicited data is sent as TRAPs.

Figure 44 on page 83 depicts how the IP addresses and community names are set for network management stations that must receive TRAPs.

SNMP Traps

Errors detected by the 3746-9x0 are categorized as external or internal errors. 3746-9x0 external errors are due to protocol violations, cabling problems, and so on. 3746-9x0 internal errors are due to microcode and hardware problems.

Figure 41 on page 81 depicts how the 3746-9x0 IP router generates TRAPs.

- External error

  When an external error is detected, the 3746-9x0 generates an alert to the NNP control point (CP). The NNP CP decides if the error is IP related and invokes its RFCTRAP code. RFCTRAP generates the SNMP trap and hands it over to the SNMP agent. The latter forwards it to all SNMP network management stations that are configured to receive TRAPs.

- Internal error

  When an internal error is detected, the 3746-9x0 generates an alert to both NNP and service processor. The processing of the alert sent to the NNP is equivalent to an external error, and results in SNMPs being sent. For the alert received by the service processor, configuration information is added before invoking RFCTRAP on the NNP and generating (a second) TRAP.

To handle the TRAPs on your network management station requires IBM's Router and Bridge Manager (RABM) available with the Nways Enterprise Manager. The Alert Manager within RABM is able to understand and convert the CMIP data that is contained within some of the TRAPs. For details on the information contained in the TRAPs, refer to the *3745/3746 Alert Reference Guide*.

Definitions for SNMP Management

The SNMP manager must be reachable on the IP network by the 3746 it manages. A 3746 IP Router can be managed by more than one SNMP manager, and can also report problems to more than one SNMP manager. The SNMP agent in the 3746 IP Router uses a simple authentication to determine which SNMP manager can access its MIB variables. This authentication scheme includes the specification of a *community name* that must be defined on both sides:

- 3746 SNMP agent
- SNMP manager

This relationship is shown in Figure 42 on page 81.

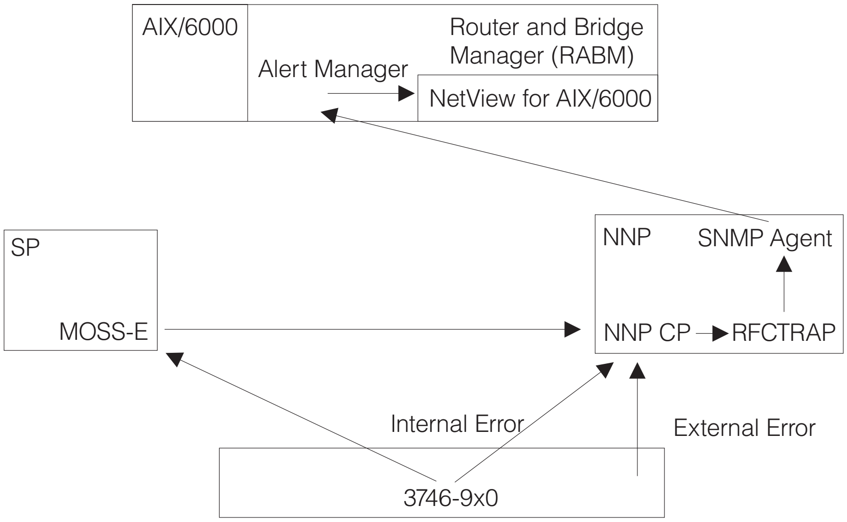


Figure 41. 3746-9x0 IP SNMP TRAPs

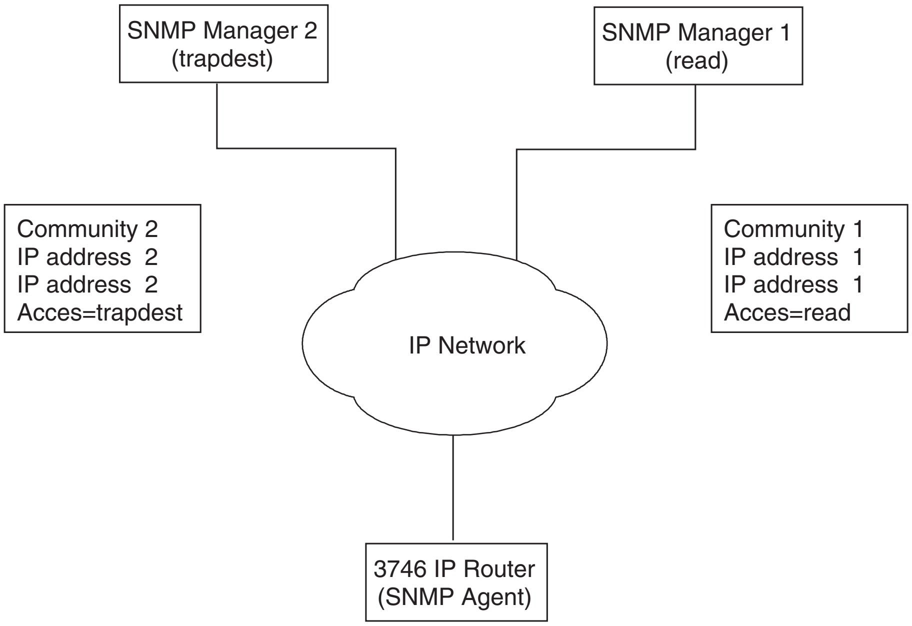


Figure 42. Two SNMP Managers for One 3746 IP Router

You create SNMP management definitions using CCM. Use one SNMP Configuration worksheet for ***each*** SNMP manager that you define, including:

- IP address of the SNMP manager.
- IP subnet mask of the SNMP manager.
- Community name that will be used. This must be the same community name defined for the SNMP manager.

- Access mode:
  - **Read** - allows SNMP manager to read 3746 MIB variables but not to change them.
  - **Trapdest** - allows SNMP manager to receive problem reports (traps) from the 3746 IP Router.

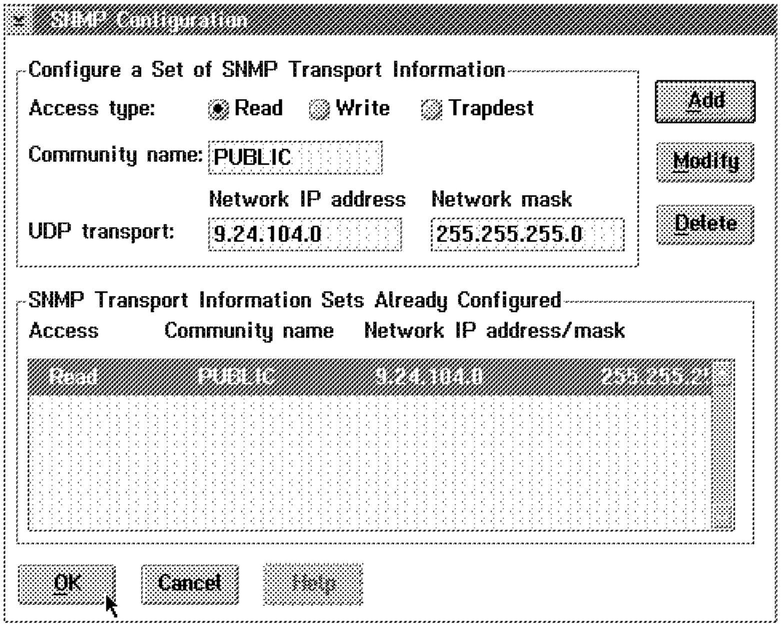
The CCM SNMP planning worksheet is in the *3745/3746 Planning Series: CCM Planning Worksheets* at:

```
www.ibm.com/networking/did/3746bks.html#Customer
```

Note: For information about the access control parameters that you must define in order for SNMP manager to access the SNMP agent, refer to “Internet Protocol (IP) Overview” in the *3745/3746 Planning Series: ProtocolDescriptions*.

Setting the SNMP Information from CCM

Figure 43 shows how to allow all network management stations on network 9.24.104, using community name *PUBLIC*, to have read access to the 3746 SNMP IP variables.



SNMP Configuration

Configure a Set of SNMP Transport Information

Access type: ● Read ○ Write ○ Trapdest

Community name: PUBLIC

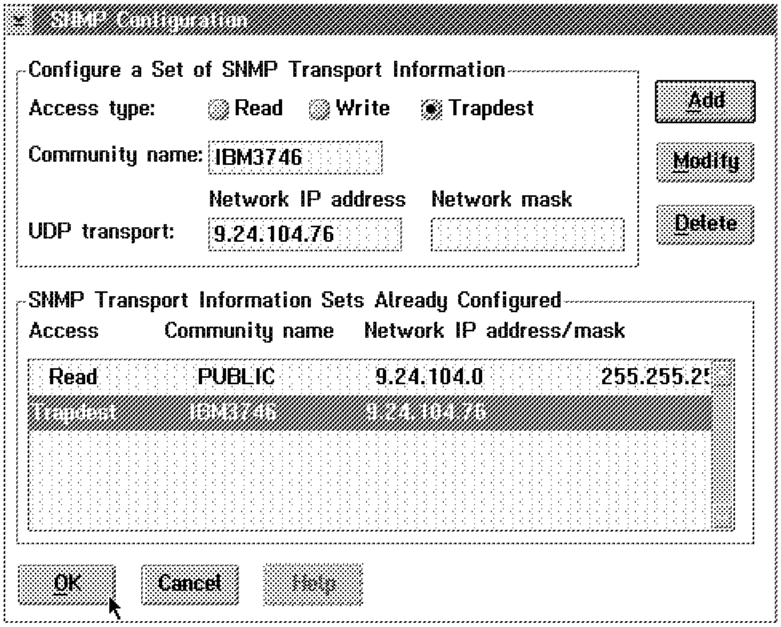
UDP transport: Network IP address 9.24.104.0 Network mask 255.255.255.0

SNMP Transport Information Sets Already Configured

Access	Community name	Network IP address/mask	
Read	PUBLIC	9.24.104.0	255.255.2

Figure 43. SNMP Read Access

Figure 44 shows how to configure the 3746 IP router to send its SNMP traps, using community name *IBM3746*, to the network management station 9.24.104.76.



SNMP Configuration

Configure a Set of SNMP Transport Information

Access type: ○ Read ○ Write ● Trapdest

Community name: IBM3746

UDP transport: Network IP address: 9.24.104.76 Network mask:

SNMP Transport Information Sets Already Configured

Access	Community name	Network IP address/mask	
Read	PUBLIC	9.24.104.0	255.255.2!
Trapdest	IBM3746	9.24.104.76	

Figure 44. SNMP Traps

Managing IP Resources through DCAF

If you want to manage your 3746 Network Node IP resources centrally through the DCAF (see Chapter 5, “Remote Customer Consoles” on page 61), you will need:

- An OS/2 station running DCAF, with an SNA, APPN/HPR, or IP path to the service processor
- An RS/6000® server running Tivoli NetView, for IP topology display and IP performance reporting, with an IP path to the service LAN of the 3746

Local IP Resource Management from the Service Processor

You can manage IP network resources by issuing commands from either:

- The CCM IP Specifics menu

  If information is generated as the result of a CCM command being issued, it is displayed by CCM in the CCM IP Results Display window.

- The Telnet console

  If you are using Telnet, refer to the publication *3746 Nways Multiprotocol Controller Model 950: User's Guide*.

Supported RFCs

The 3746 IP router supports the following RFCs:

RFC 768	UDP
RFC 791	IP
RFC 792	ICMP
RFC 793	TCP
RFC 826/1042	ARP
RFC 919/922	Broadcast including
RFC 925	ARP Subnet Routing
RFC 950	Subnetting
RFC 951/1542	BOOTP Relay Agents
RFC 1009	Internet Gateways
RFC 1027	Proxy ARP(Subnet Routing)
RFC 1058	RIP V1
RFC 1112	IP Multicast
RFC 1122	Requirements for Internet Hosts – Communication Layers
RFC 1144	TCP/IP header compression
RFC 1155	Structure of Management Information
RFC 1157	SNMP v2
RFC 1441 to 1450	SNMP v2
RFC 1452	SNMP v2
RFC 1191	Path MTU Discovery
RFC 1213	MIB-II for TCP/IP-based Internet
RFC 1231	Token-ring MIB
RFC 1253	OSPF V2 MIB
RFC 1315	Frame-relay MIB
RFC 1331/1332	PPP
RFC 1471	PPP IP MIB Support
RFC 1490	Frame relay
RFC 1583/1584	OSPF V2 and Multicast Extensions to OSPF
RFC 1592	DPI
RFC 1654	BGP V4
RFC 1716	Towards Requirements for IP Routers.

CDLC Protocol

For CDLC protocol used by the 3746, the buffer size used in the DEVICE statement must be at least 4 bytes larger than that used in the GATEWAY or BSDROUTINGPARMS statements. For example:

```
;    device_name CDLC base_dev_addr r_bufs w_bufs read_size write_size
DEVICE DEVXA8C   CDLC  967          200    200       4096     4096


GATEWAY
;net_number  first_hop     link  packet_size subnet_mask subnet_value
  193.9.200       =        LINK1   4092   0
  128.84     193.9.200.2   LINK1   4092   0.0.255.0   0.0.1.0


BSDROUTINGPARMS false
;   link    mtu     metric  subnet_mask     dest_addr
    LINK1   4092      0     255.255.255.0      0
    LINK2   .......
    LINK3   .......
ENDBSDROUTINGPARMS
```

Chapter 8. X.25 Network Management

Fault Management

Network Management Vector Transport (NMVT) alerts are sent to NetView/390 or Tivoli NetView, depending on which control point (NCP, 3746 APPN/HPR, or 3746 IP) activated the X.25 line. If activated by:

- NCP, the alerts are sent to NetView/390 through the NCP.
- 3746 APPN/HPR control point, the alerts are sent to NetView/390 through the APPN control point.
- 3746 IP control point, the alerts are sent to NetView for AIX[12] through the IP control point. In that case the NMVT alerts are enveloped within an SNMP trap.

If the line is shared between multiple control points, each activating control point sends its own alerts to NetView or NetView for AIX.[3] Therefore, the same problem might be reported by up to three alerts.

Accounting and Performance Monitoring through NPM

A 3746 Network Node can transfer accounting and performance monitoring data to the Network Performance Monitor (NPM) for:

- Data Link level (LAP-B) performance monitoring
- Packet level (PLP) performance monitoring
- Virtual circuit level accounting

When and only when the X.25 line is activated by the 3746 APPN/HPR control point or NCP, the performance monitoring counters count the overall/traffic, including the IP traffic. When the X.25 line is activated by the 3746 IP control point only, there is no performance monitoring through the NPM.

Performance counters for IP are also reported to NetView for AIX.[3] See “SNMP”

There is no virtual circuit accounting for IP traffic, even if the X.25 line has been activated by the APPN/NCP control point or NCP.

SNMP

Configuration parameters and performance counters can be displayed through SNMP, using the MIB Version II (described in RFC 1213). The 3746 IP router implements the SNMP MIBs described in the following RFC:

- RFC 1381 (MIB for LAP-B)
- RFC 1382 (MIB for PLP)

Each MIB element can be read only.

[12] . After NetView for AIX V4R0, the product is named Tivoli NetView.

For more information about SNMP, see “3746-9x0 SNMP Functions” on page 78.

Appendix A. MOSS-E Worksheets for Controller Installation

Complete these sheets and give them to:

- The IBM service representative (the MOSS-E parameters are needed during controller installation)
- The person doing additional controller configuration using the *IBM 3745 Communication Controller All Models, IBM 3746 Nways Multiprotocol Controller Connection and Integration Guide*.

When applicable, default parameter values are included (in parentheses) in the tables of this appendix.

Parameter Definitions for Reporting Alerts to NetView

Network Node Processor Alerts

The following parameters are discussed in on page 28.

Network identifier	(SYSTSTAP)
Control point name	

MOSS-E Alerts: Mainstream Path Definition

LAN destination address parameters are discussed on pages LAN destination address on page 29 and LAN destination address on page 31.

APPN/HPR Network

LAN destination address	

SNA/Subarea Network

LAN destination address	

MOSS-E Alerts: Alternate Path Definition

The following parameter is discussed on page 33.

Telephone number for alert reporting on the switched SDLC link	

Generate MOSS-E Alerts

The following parameter is discussed on page 34.

Problem management	(Generate alerts)

Performance Management CM/2 Parameters (NPM)

The following parameters are discussed on page 55.

NPM **netid**	
PU name for CM/2	
NPA LU name	

Service Processor Parameters for DCAF using CM/2

These parameters are defined in “For DCAF Consoles Using Communications Manager/2” on page 66.

For LAN-Attached Consoles

LU name	(DCAFLAN)

For SNA-Attached Consoles

LU name	(DCAFSNA)
Destination address	(400000502080)

For APPN/HPR-Attached Consoles

LU name	(DCAFAPPN)
Destination address	(400000502080)

For IP-Attached Consoles

Service Processor IP Address	(192.9.200.1)

For Modem-Attached Consoles

LU name	(DCAFSDLC)

Service Processor Parameters for Java Console

The following parameters are discussed on page 68.

Access incoming calls on SP?	(Yes)
Local phone number	

Table 4. For the PPP Server (Service Processor)

IP address	(192.9.200.7)
Subnet mask	(255.255.255.240)

Table 5. For the PPP Client (Remote Station)

IP address	(192.9.200.8)
Subnet mask	(255.255.255.240)

DTE Speed	(115200)
MRU Size	(1500)
Customer password	(IBM3745C)
IBM service password	(IBM3745I)

Choice of Remote Access

This parameter is discussed on page 69.

Table 6. Either DCAF or Java Console

Enable DCAF Link/Operations	
Enable Console Link/Operations for Java	

Remote Access Security

The following parameters are discussed in "DCAF Remote Access Security" on page 69.

DCAF Security Choice

Allow the target to be a secure target	(No)

DCAF Non-Secure Remote Logon Password

Enable password	(Yes)
Password	

Disable Incoming Calls (to Service Processor)

The following parameter is discussed on page 71.

Enable/Disable Service Processor Incoming Calls	(Enable)

Parameter Definitions for RSF

The following parameters are discussed in “Parameter Definitions for RSF” on page 75.

Customer Information

Company Name	
Address	
System location	
Contact person	
Company telephone number for voice communications	
Company telephone number for modem communications	

Remote Support Facility Authorization

The following parameters are discussed in “For Java Console” on page 68.

Enable/Disable Remote Support Facility	(Disable)

Set Automatic Microcode Download Option

Yes/No	(No)

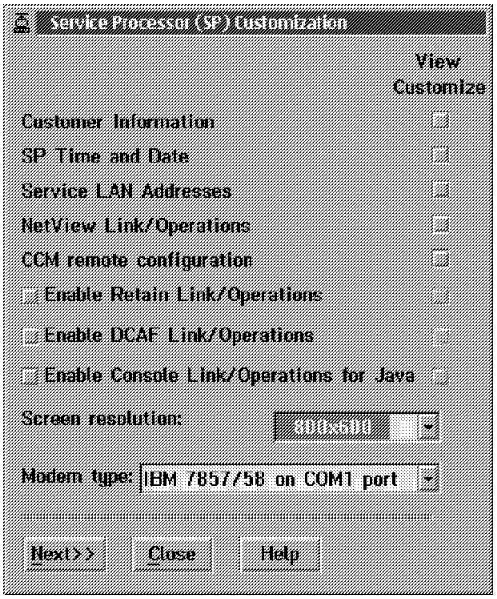
Appendix B. MOSS-E Service Processor Customization Function

When installing your service processor, the service representative will use the service processor customization function to set up your service processor according to your configuration. In addition, you can use this function to add or modify existing parameters.

To access the function:

1. On the MOSS-E view primary window, double-click the **Service Processor** object icon.
2. Click **Configuration Management**.
3. Double-click **SP customization**.
4. If this is the first time that you invoke SP Customization, all the items are selected. If you want to select only one item, click on the corresponding check box to deselect the items that you do not want to modify the parameters, and then click **Next>>** and follow the prompts.

The MOSS-E panels in Figure 45 to Figure 56 on page 98 appear during service processor customization.



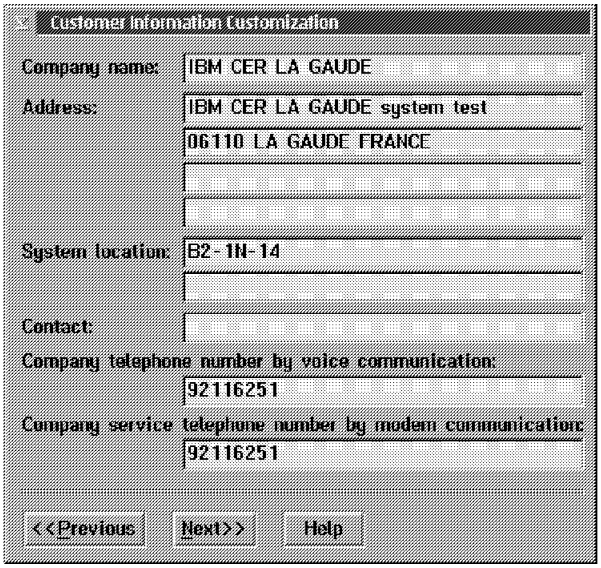
Service Processor (SP) Customization

	View Customize
Customer Information	□
SP Time and Date	□
Service LAN Addresses	□
NetView Link/Operations	□
CCM remote configuration	□
□ Enable Retain Link/Operations	□
□ Enable DCAF Link/Operations	□
□ Enable Console Link/Operations for Java	□

Screen resolution: 800x600

Modem type: IBM 7857/58 on COM1 port

Figure 45. Service Processor Customization



Customer Information Customization

Company name: IBM CER LA GAUDE

Address: IBM CER LA GAUDE system test
06110 LA GAUDE FRANCE

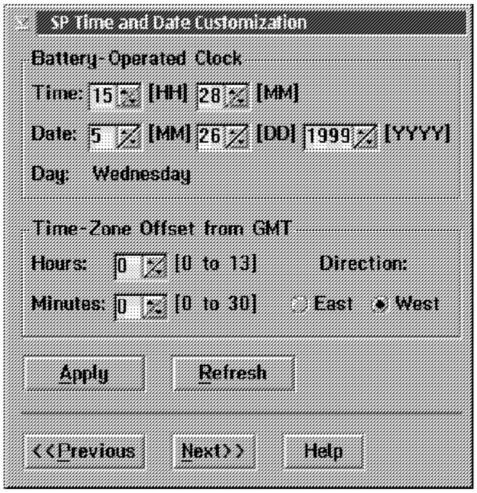
System location: B2-1N-14

Contact:

Company telephone number by voice communication:
92116251

Company service telephone number by modem communicatior
92116251

Figure 46. Customer Information Customization



SP Time and Date Customization

Battery-Operated Clock

Time: 15 [HH] 28 [MM]

Date: 5 [MM] 26 [DD] 1999 [YYYY]

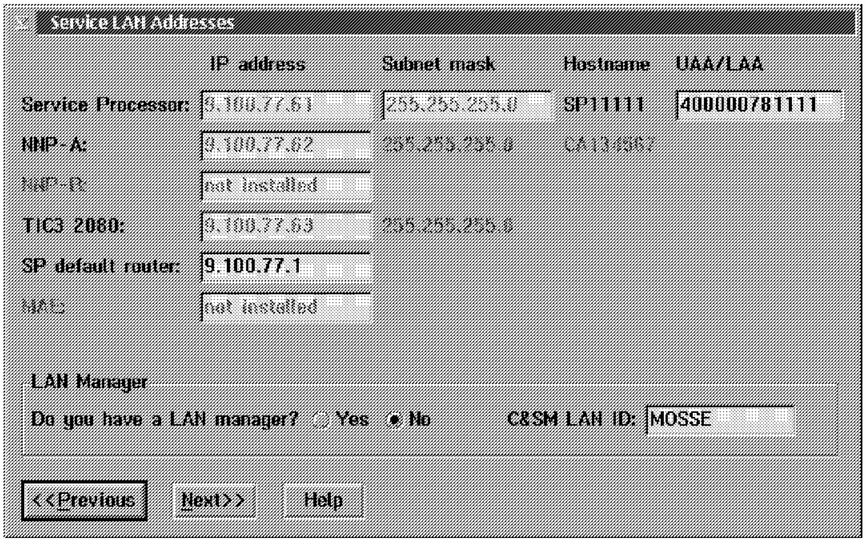
Day: Wednesday

Time-Zone Offset from GMT

Hours: 0 [0 to 13] Direction:

Minutes: 0 [0 to 30] ○ East ● West

Figure 47. SP Time and Date Customization

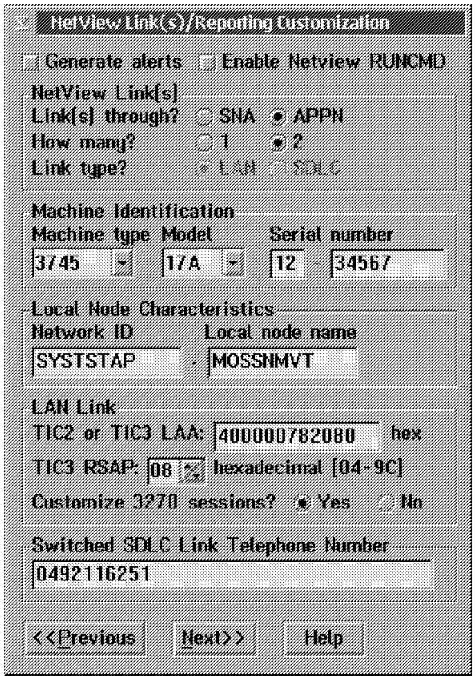


	IP address	Subnet mask	Hostname	UAA/LAA
Service Processor:	9.100.77.61	255.255.255.0	SP11111	400000781111
NNP-A:	9.100.77.62	255.255.255.0	CA134567	
NNP-B:	not installed			
TIC3 2080:	9.100.77.63	255.255.255.0		
SP default router:	9.100.77.1			
NAS:	not installed			

LAN Manager

Do you have a LAN manager? ○ Yes ● No C&SM LAN ID: MOSSE

Figure 48. Service LAN Addresses



□ Generate alerts □ Enable Netview RUNCMD

NetView Link[s]

Link[s] through? ○ SNA ● APPN

How many? ○ 1 ● 2

Link type? ● LAN ○ SDLC

Machine Identification

Machine type: 3745 Model: 17A Serial number: 12 - 34567

Local Node Characteristics

Network ID: SYSTSTAP . Local node name: MOSSNMVT

LAN Link

TIC2 or TIC3 LAA: 400000782080 hex

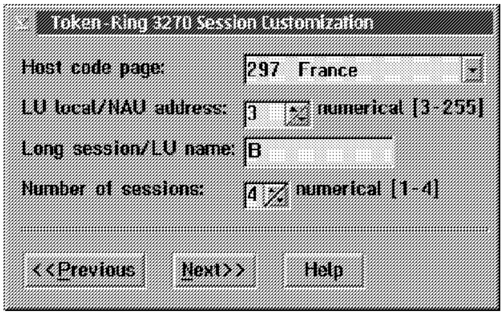
TIC3 RSAP: 08 hexadecimal [04-9C]

Customize 3270 sessions? ● Yes ○ No

Switched SDLC Link Telephone Number

0492116251

Figure 49. NetView Link(s)/Reporting Customization



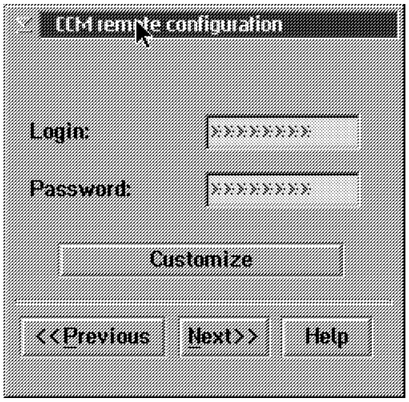
Host code page: 297 France

LU local/NAU address: 3 numerical [3-255]

Long session/LU name: B

Number of sessions: 4 numerical [1-4]

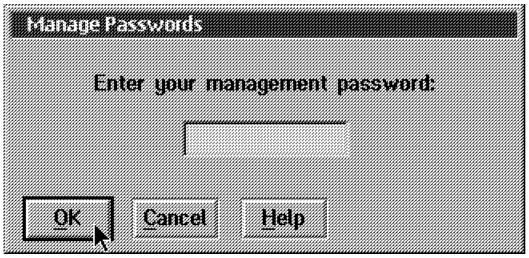
Figure 50. Token-Ring 3270 Session Customization



Login:

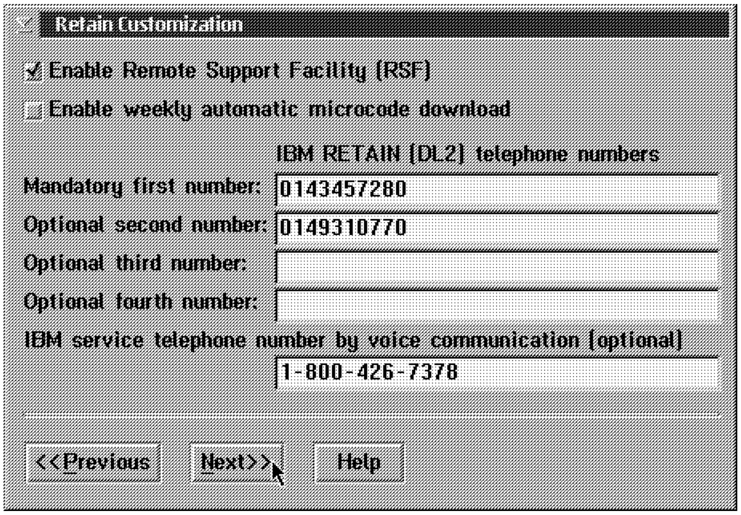
Password:

Figure 51. CCM Remote Configuration



Enter your management password:

Figure 52. Manage Passwords



☑ Enable Remote Support Facility (RSF)

☐ Enable weekly automatic microcode download

IBM RETAIN (DL2) telephone numbers

Mandatory first number: 0143457280

Optional second number: 0149310770

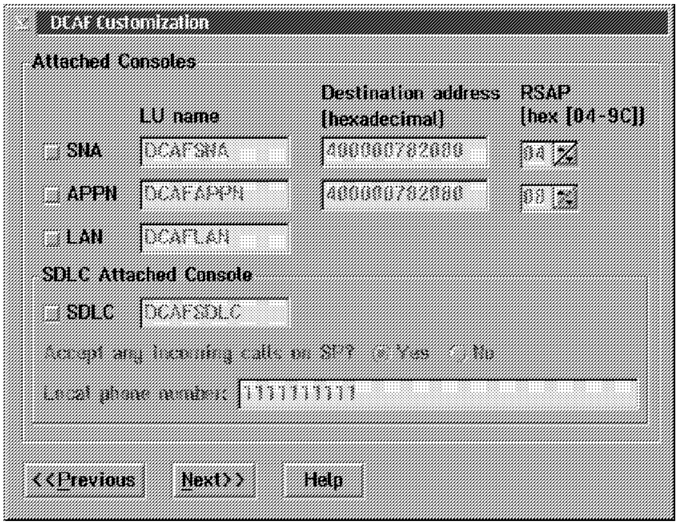
Optional third number:

Optional fourth number:

IBM service telephone number by voice communication (optional)

1-800-426-7378

Figure 53. Retain Customization



DCAF Customization

Attached Consoles

	LU name	Destination address (hexadecimal)	RSAP (hex [04-9C])
□ SNA	DCAFSNA	400000782080	04
□ APPN	DCAFAPPN	400000782080	08
□ LAN	DCAFLAN		

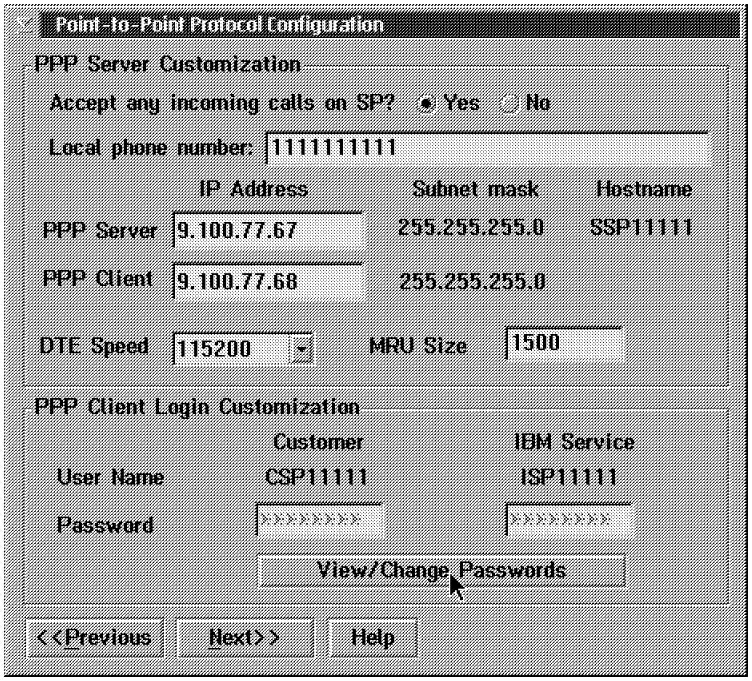
SDLC Attached Console

□ SDLC DCAFSDLC

Accept any incoming calls on SP? ● Yes ○ No

Local phone number: 1111111111

Figure 54. DCAF Customization



Point-to-Point Protocol Configuration

PPP Server Customization

Accept any incoming calls on SP? ● Yes ○ No

Local phone number: 1111111111

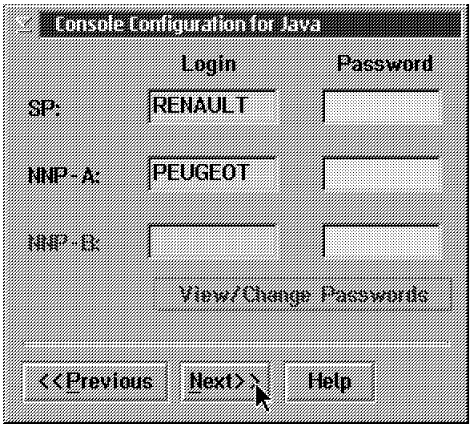
	IP Address	Subnet mask	Hostname
PPP Server	9.100.77.67	255.255.255.0	SSP11111
PPP Client	9.100.77.68	255.255.255.0	

DTE Speed 115200 MRU Size 1500

PPP Client Login Customization

	Customer	IBM Service
User Name	CSP11111	ISP11111
Password	********	********

Figure 55. Point-to-Point Protocol Configuration



Console Configuration for Java

	Login	Password
SP:	RENAULT	
NNP-A:	PEUGEOT	
NNP-B:		

Figure 56. Console Configuration for Java

Appendix C. ESCON MIB

```
IBMESCON-MIB DEFINITIONS ::= BEGIN

IMPORTS
      MODULE-IDENTITY, enterprises, Counter32, OBJECT-TYPE
            FROM SNMPv2-SMI
      OBJECT-GROUP, MODULE-COMPLIANCE
            FROM SNMPv2-CONF
      ifIndex
            FROM RFC1213-MIB;

ibmESCON MODULE-IDENTITY
      LAST-UPDATED "9604150000Z"
      ORGANIZATION "IBM"
      CONTACT-INFO "Bob Moore (remoore @ ralvm6)
                    IBM Corporation
                    800 Park Offices Drive
                    CNMA/664
                    P.O. Box 12195
                    Research Triangle Park, NC 27709, USA
                    Tel:    1 919 254 4436
                    E-mail: remoore@ralvm6.vnet.ibm.com

                    John Rooney (rooney @ yktvmv)

                    Valerie Zoccola (zoccolav @ lgeprofs)"

      DESCRIPTION
          "MIB for managing activity on an ESCON channel from its
          secondary end.

          'ESCON' is a trademark of the IBM Corporation."

      ::= {ibmArchitecture 17 }

ibm              OBJECT IDENTIFIER ::= { enterprises 2 }
ibmArchitecture  OBJECT IDENTIFIER ::= { ibm 5 }

esconPortData    OBJECT IDENTIFIER ::= { ibmESCON 1 }
esconLinkData    OBJECT IDENTIFIER ::= { ibmESCON 2 }
esconStationData OBJECT IDENTIFIER ::= { ibmESCON 3 }
esconConformance OBJECT IDENTIFIER ::= { ibmESCON 4 }

-- This MIB contains three tables, for managing an ESCON configuration
-- as shown here:
--
--         Host 1                                  Host 2
--         --------------------------              ---------------
--         .d-1..d-y       d1...d-y.               .             .
--         .                       .               .             .
--         .  PN-1    ...     PN-xx .              .             .
--         --------------------------              ---------------
--               HLA-1 .                          HLA-2 .
--                     .                                .
--                  ----------------------------------------
--                  .            ESCON Director            .
--                  .                                      .
--                  ----------------------------------------
--               CULA-1.                          CULA-2.
--                     .                                .
--            -----------------------------------------------------
--            .    -----------                    ------------    .
--            .    .  ESCON  .                    .  ESCON   .    .
--            .    .  port 1 .                    .  port 2  .    .
--            .    -----------                    ------------    .
--            .                                                   .
--            .             Device supporting this MIB            .
--            -----------------------------------------------------
```

```
--
--     - ESCON port table represents an ESCON physical port.  As shown,
--       a device may support more than one ESCON port.  This table
--       is indexed by ifIndex from MIB-II.  The entry for this port in
--       ifTable uses the ifType value 73 (ESCON).
--
--       Note that the Control Unit Link Address (CULA), identifying the
--       port on the ESCON Director to which an ESCON port is optically
--       connected, is a non-index object in this table.
--
--     - ESCON link table represents a link between an ESCON device
--       and a "logical host" within an actual host.  This table has
--       a three-part index:
--
--          - ifIndex from MIB-II, identifying the ESCON port
--            supporting the link
--          - esconLinkHostLinkAddress (HLA), identifying the actual
--            host for the link.
--          - esconLinkPartitionNumber (PN), identifying the "logical
--            host" for the link, within the actual host identified
--            by esconLinkHostLinkAddress.
--
--     - ESCON station table represents a link station in an ESCON
--       device.  This table has a four-part index:
--
--          - ifIndex from MIB-II, identifying the ESCON port
--            supporting the link
--          - esconStationHostLinkAddress (HLA), identifying the actual
--            host for the link.
--          - esconStationPartitionNumber (PN), identifying the "logical
--            host" for the link, within the actual host identified
--            by esconLinkHostLinkAddress.
--          - esconStationDeviceAddress (d-n in the figure), identifying
--            the device address by which the host knows the station.
--

-- *****************************************************************
-- IBM ESCON port table
-- *****************************************************************

esconPortTable OBJECT-TYPE
      SYNTAX SEQUENCE OF EsconPortEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Table of objects that describe an ESCON channel port."

      ::= { esconPortData 1 }

esconPortEntry OBJECT-TYPE
      SYNTAX EsconPortEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Table of objects that describe an ESCON channel port.  This
          table is indexed by ifIndex from MIB-II."

      INDEX { ifIndex }

      ::= { esconPortTable 1 }

EsconPortEntry ::= SEQUENCE
      {
      esconPortControlUnitLinkAddress OCTET STRING,
      esconPortInFiberStatus INTEGER,
      esconPortOutFiberStatus INTEGER
      }

esconPortControlUnitLinkAddress OBJECT-TYPE
      SYNTAX OCTET STRING (SIZE(2))
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "This address identifies the ESCON Director port to which the
          optical fiber from the ESCON device is attached."

      ::= { esconPortEntry 1 }

esconPortInFiberStatus OBJECT-TYPE
      SYNTAX INTEGER {
                     inLoff(1),
                     inOls(2),
                     inIdle(3),
                     inUnknown(4)
                     }
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Status of the fiber into this device from the host:

                 inLoff       = the light is off on the fiber into
                                this device from the host
                 inOls        = the fiber into this device from the
                                host is in an intermediate state between
                                light-off and light-on
                 inIdle       = the fiber into this device from the
                                host is in the light-on state, and is
                                ready to transfer data from the host to
                                this device
                 inUnknown    = the agent cannot determine the status of
                                the fiber into this device from the host"

      ::= { esconPortEntry 2 }

esconPortOutFiberStatus OBJECT-TYPE
      SYNTAX INTEGER {
                     outDisableReq(1),
                     outDisableForced(2),
                     outLoffForced(3),
                     outOls(4),
                     outOlsForced(5),
                     outEnable(6),
                     outError(7)
                    }
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Status of the fiber out of this device to the host:

                 outDisableReq    = out disable obtained; the fiber
                                    out of this device into the host
                                    is not in the light-on state
                 outDisableForced = out ESCON emits OLS; the fiber
                                    out of this device into the host
                                    is not in the light-on state
                 outLoffForced    = out ESCON forced light-off; the fiber
                                    out of this device into the host
                                    is not in the light-on state
                 outOls           = the fiber out of this device into the
                                    host is in an intermediate state
                                    between light-off and light-on
                 outOlsforced     = out ESCON forced OLS; the fiber
                                    out of this device into the host
                                    is not in the light-on state
                 outEnable        = the fiber out of this device into the
                                    host is in the light-on state, and is
                                    ready to transfer data from this
                                    device to the host
                 outError         = the status of the fiber out of this
                                    device to the host is none of those
                                    listed above.  This is a state that
                                    should not occur"

      ::= { esconPortEntry 3 }
```

```
-- ******************************************************************
-- IBM ESCON link table
-- ******************************************************************

esconLinkTable OBJECT-TYPE
      SYNTAX SEQUENCE OF EsconLinkEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Table of objects that describe an ESCON channel link."

      ::= { esconLinkData 1 }

esconLinkEntry OBJECT-TYPE
      SYNTAX EsconLinkEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Table of objects that describe an ESCON channel link.  This
          table is indexed by ifIndex from MIB-II, by host link address,
          and by (host) partition number."

      INDEX { ifIndex,
              esconLinkHostLinkAddress,
              esconLinkPartitionNumber }

      ::= { esconLinkTable 1 }

EsconLinkEntry ::= SEQUENCE
      {
      esconLinkHostLinkAddress OCTET STRING,
      esconLinkPartitionNumber OCTET STRING,
      esconLinkStatus INTEGER
      }

esconLinkHostLinkAddress OBJECT-TYPE
      SYNTAX OCTET STRING (SIZE(1))
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "This address identifies the ESCON Director port to which the
          optical fiber between the ESCON Director and the host is
          attached."

      ::= { esconLinkEntry 1 }

esconLinkPartitionNumber OBJECT-TYPE
      SYNTAX OCTET STRING (SIZE(1))
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "A number identifying a logical host within an actual host."

      ::= { esconLinkEntry 2 }

esconLinkStatus OBJECT-TYPE
      SYNTAX INTEGER {
                     hlpNotEstab(1),
                     hlpEstab(2),
                     hlpError(3)
                     }
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Gives the status of the link:

                 hlpNotEstab = Host Logical Path not established
                 hlpEstab = Host Logical Path established
                 hlpError = Host Logical Path error"
      ::= { esconLinkEntry 3 }


-- *******************************************************************
-- IBM ESCON station table
-- *******************************************************************


esconStationTable OBJECT-TYPE
      SYNTAX SEQUENCE OF EsconStationEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Table of objects that describe an ESCON channel station."

      ::= { esconStationData 1 }

esconStationEntry OBJECT-TYPE
      SYNTAX EsconStationEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Table of objects that describe an ESCON channel station.  This
          table is indexed by ifIndex from MIB-II, by host link address,
          by (host) partition number, and by ESCON device address."

      INDEX { ifIndex,
              esconStationHostLinkAddress,
              esconStationPartitionNumber,
              esconStationDeviceAddress }

      ::= { esconStationTable 1 }

EsconStationEntry ::= SEQUENCE
      {
      esconStationHostLinkAddress OCTET STRING,
      esconStationPartitionNumber OCTET STRING,
      esconStationDeviceAddress OCTET STRING,
      esconStationState INTEGER,
      esconStationAttentionDelay INTEGER,
      esconStationAttentionTimeOut INTEGER,
      esconStationMaxBfru INTEGER,
      esconStationUnitSize INTEGER,
      esconStationMaxMsgSizeReceived INTEGER,
      esconStationMaxMsgSizeSent INTEGER,
      esconStationDataPacketsOkReceived Counter32,
      esconStationDataPacketsKoReceived Counter32,
      esconStationDataPacketsSent Counter32,
      esconStationTotalFramesSent Counter32,
      esconStationDataPacketsRetransmitted Counter32,
      esconStationPositiveAckDataPackets Counter32,
      esconStationSecondChanceAttentions Counter32,
      esconStationCommandsRetried Counter32
      }

esconStationHostLinkAddress OBJECT-TYPE
      SYNTAX OCTET STRING (SIZE(1))
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "This address identifies the ESCON Director port to which the
          optical fiber between the ESCON Director and the host is
          attached."

      ::= { esconStationEntry 1 }

esconStationPartitionNumber OBJECT-TYPE
      SYNTAX OCTET STRING (SIZE(1))
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "A number identifying a logical host within an actual host."
      ::= { esconStationEntry 2 }

esconStationDeviceAddress OBJECT-TYPE
      SYNTAX OCTET STRING (SIZE(1))
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "A unique hexadecimal number allocated to each station on the
          same host link."

      ::= { esconStationEntry 3 }

esconStationState OBJECT-TYPE
      SYNTAX INTEGER {
                     idle(1),
                     cpDefined(2),
                     cpReset (3),
                     cpActive(4),
                     cpDelete(5),
                     cpAbend(6),
                     cldpWait(7),
                     cldpDefinedl(8),
                     cldpError(9),
                     cldpLoad(10),
                     cldpDump(11),
                     deletePending(12),
                     deleted(13),
                     cpXidExpected(14)
                     }
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The current state of the station."

      ::= { esconStationEntry 4 }

esconStationAttentionDelay OBJECT-TYPE
      SYNTAX INTEGER (0 .. 420)
      UNITS "seconds"
      MAX-ACCESS read-write
      STATUS current
      DESCRIPTION
          "Specifies the amount of time in seconds that elapses
          from the receipt of a packet at an ESCON station (when
          no other packets are queued) before that station sends
          buffered data to the Host.

          An update to this object takes effect the next time the station
          establishes communications with the host."

      ::= { esconStationEntry 5 }

esconStationAttentionTimeOut OBJECT-TYPE
      SYNTAX INTEGER (10 .. 840)
      UNITS "seconds"
      MAX-ACCESS read-write
      STATUS current
      DESCRIPTION
          "Specifies the amount of time in seconds that the station is to
          wait for a response to an attention signal it sent to the host
          before initiating channel disconnect.

          An update to this object takes effect the next time the station
          establishes communications with the host."

      ::= { esconStationEntry 6 }

esconStationMaxBfru OBJECT-TYPE
      SYNTAX INTEGER (1 .. 65535)
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Number of buffers in the host buffer pool for receiving data
          from this station."

      ::= { esconStationEntry 7 }

esconStationUnitSize OBJECT-TYPE
      SYNTAX INTEGER (64 .. 4000)
      UNITS "bytes"
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "Maximum size of a buffer, in bytes, that the host can receive
          from this station."

      ::= { esconStationEntry 8 }

esconStationMaxMsgSizeReceived OBJECT-TYPE
      SYNTAX INTEGER (0 .. 65535)
      MAX-ACCESS read-write
      STATUS current
      DESCRIPTION
          "The maximum length of a message that can be received on this
          station.

          An update to this object takes effect the next time the station
          establishes communications with the host."

      ::= { esconStationEntry 9 }

esconStationMaxMsgSizeSent OBJECT-TYPE
      SYNTAX INTEGER (0 .. 65535)
      MAX-ACCESS read-write
      STATUS current
      DESCRIPTION
          "The maximum length of a message that can be sent from this
          station to the host.

          An update to this object takes effect the next time the station
          establishes communications with the host."

      ::= { esconStationEntry 10 }

esconStationDataPacketsOkReceived OBJECT-TYPE
      SYNTAX Counter32
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The number of data packets received from the host by this
            station without Data Check."

      ::= { esconStationEntry 11 }

esconStationDataPacketsKoReceived OBJECT-TYPE
      SYNTAX Counter32
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The number of data packets received from the host by this station
          with Data Check."

      ::= { esconStationEntry 12 }

esconStationDataPacketsSent OBJECT-TYPE
      SYNTAX Counter32
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The number of data packets sent to the host by this station."

      ::= { esconStationEntry 13 }
```

```
esconStationTotalFramesSent OBJECT-TYPE
      SYNTAX Counter32
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The number of data packets and control packets sent to the host
          by this station."

      ::= { esconStationEntry 14 }

esconStationDataPacketsRetransmitted OBJECT-TYPE
      SYNTAX Counter32
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The number of data packets retransmitted by this station"

      ::= { esconStationEntry 15 }

esconStationPositiveAckDataPackets OBJECT-TYPE
      SYNTAX Counter32
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The number of data packets sent by this station to the host that
          the host has positively acknowledged.  When the host sends a
          positive acknowledgement for a group of n data packets, this
          counter is incremented by n."

      ::= { esconStationEntry 16 }

esconStationSecondChanceAttentions OBJECT-TYPE
      SYNTAX Counter32
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The number of times this station has sent a Second Chance
          Attention signal to the host."

      ::= { esconStationEntry 17 }

esconStationCommandsRetried OBJECT-TYPE
      SYNTAX Counter32
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
          "The number of times a command has been retried on this
          station"

      ::= { esconStationEntry 18 }


-- ******************************************************************
-- IBM ESCON conformance
-- ******************************************************************

esconMibCompliances OBJECT IDENTIFIER ::= {esconConformance 1 }

esconMibGroups OBJECT IDENTIFIER ::= {esconConformance 2 }

esconPortGroup OBJECT-GROUP
      OBJECTS {
              esconPortControlUnitLinkAddress,
              esconPortInFiberStatus,
              esconPortOutFiberStatus
              }
      STATUS current
      DESCRIPTION
          "Objects that describe an ESCON channel port."

      ::= { esconMibGroups 1 }
```

```
esconLinkGroup OBJECT-GROUP
      OBJECTS {
              esconLinkStatus
              }
      STATUS current
      DESCRIPTION
          "Objects that describe an ESCON channel link."

      ::= { esconMibGroups 2 }

esconStationGroup  OBJECT-GROUP
      OBJECTS {
              esconStationState,
              esconStationAttentionDelay,
              esconStationAttentionTimeOut,
              esconStationMaxBfru,
              esconStationUnitSize,
              esconStationMaxMsgSizeReceived,
              esconStationMaxMsgSizeSent,
              esconStationDataPacketsOkReceived,
              esconStationDataPacketsKoReceived,
              esconStationDataPacketsSent,
              esconStationTotalFramesSent,
              esconStationDataPacketsRetransmitted,
              esconStationPositiveAckDataPackets,
              esconStationSecondChanceAttentions,
              esconStationCommandsRetried
              }
      STATUS current
      DESCRIPTION
          "Objects that describe an ESCON channel station."

      ::= { esconMibGroups 3 }

esconMibCompliance MODULE-COMPLIANCE
      STATUS current
      DESCRIPTION
          "The compliance statement for the SNMPv2 entities that
          implement the IBM ESCON MIB."

      MODULE -- this module
          MANDATORY-GROUPS {
                           esconPortGroup,
                           esconLinkGroup,
                           esconStationGroup
                           }

          OBJECT esconStationAttentionDelay
          MIN-ACCESS read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT esconStationAttentionTimeOut
          MIN-ACCESS read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT esconStationMaxMsgSizeReceived
          MIN-ACCESS read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT esconStationMaxMsgSizeSent
          MIN-ACCESS read-only
          DESCRIPTION
              "Write access is not required."

      ::= { esconMibCompliances 1 }

END
```

List of Abbreviations

ac	alternating current
ACF	Advanced Communications Function
AIS	alarm indication signal
AIW	APPN Implementers Workshop
AIX	Advanced Interactive Executive
AMI	alternate mark inversion
ANR	automatic network routing
ANR	automatic network routing
ANSI	American National Standards Institute
APAR	authorized program analysis report
APPC	advanced program-to-program communication
APPN	advanced peer-to-peer networking
APPNTAA	APPN Topology and Accounting Agent (NetView)
ARB	adaptive rate-based
ARC	active remote connector
AS	autonomous system
ASM	address space manager
ATM	asynchronous transfer mode
BACP	Bandwidth Allocation Control Protocol
BAN	boundary access node
BAP	Bandwidth Allocation Protocol
BECN	backward explicit congestion notification
BGP	Border Gateway Protocol
BNC	bayonet Niell-Concelman
BNN	boundary network node
bps	bits per second
Bps	bytes per second
BPV	bipolar violation
BRI	basic rate interface
BrNN	Branch Extender Network Node
BRS	bandwidth reservation system
B8ZS	bipolar with 8 zero substitution
CAS	circuit-associated signaling
CBC	(1) cipher block chaining (2) controller bus coupler
CBSP	Controller Bus and Service Processor
CCITT	Comité Consultatif International Télégraphique et Téléphonique. (The international telegraph and telephone consultative committee, now ITU-T.)
CCM	Controller Configuration and Management
CCU	central control unit
CD	collision detection
CDF-E	Configuration Data File - Extended
CDLC	channel data link control
CHAP	Cryptographic Handshake Authentication Protocol
CIR	committed information rate
CLA	communication line adapter
CLLM	consolidated link layer management
CLP	communication line processor
CMC	Communication Management Configuration
CMIP	Common Management Information Protocol
CNN	composite network node
COS	class of service
CP	control point
CRC	cyclic redundancy check
CS	configuration services
CSMA	carrier sense multiple access
CSU	channel service unit
DAS	dual attach station
dc	direct current
DCAF	Distributed Console Access Facility
DCE	data circuit-terminating equipment
DCI	direct current interlock
DES	data encryption standard
DLC	data link control
DLCI	data link connection identifier
DLSw	data link switching
DLU	dependent logical unit
DLUR	dependent logical unit requester
DLUS	dependent logical unit server
DMA	direct memory access
DOS	disk operating system

DRAM	dynamic random access memory
DS	directory serviecs
DSX	digital system x-connect
DS0	digital system level 0
DTE	data terminal equipment
EBN	extended border node
ECP	Encryption Control Protocol
EGA	ESCON Generation Assistant
EGP	Exterior Gateway Protocol
EIA	Electronic Industries Alliance
EMIF	ESCON Multiple Image Facility
EN	end node
EP	emulation program
EPO	emergency power off
ERP	error recovery procedures
ES	Enterprise Systems
ESA	Enterprise Systems Architecture
ESCA	ESCON Channel Adapter, also called *ESCON Adapter*
ESCC	ESCON Channel Coupler, also called *ESCON Coupler*
ESCD	ESCON Director
ESCON	Enterprise Systems Connection
ESCP	ESCON Channel Processor, also called *ESCON Processor*
ESF	extended superframe
ETA	Enhanced Tape Attachment
FAS	frame-alignment signal
FDDI	Fiber Distributed Data Interface
FDL	facility data link
FDX	full duplex
FECN	forward explicit congestion notification
FR	frame relay
FRAD	frame-relay access device
FRFH	frame-relay frame handler
FRSE	frame-relay switching equipment
FRTE	frame-relay terminating equipment
FTP	File Transfer Protocol
HDX	half duplex
HPDT	high-performance data transfer
HPR	High-Performance Routing
HSSI	high-speed serial interface
HTTP	Hypertext Transfer Protocol
Hz	Hertz
I/O	input/output
ICMP	Internet Control Message Protocol
ICN	interchange node
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
INN	intermediate network node
IOC	input/output control
IP	Internet Protocol
IPSec	Internet Protocol Security
IPX	Internetwork Packet eXchange
ISA	industry standard architecture
ISDN	integrated services digital network
ISO	International Organization for Standardization
ISP	Internet Service Provider
ISR	intermediate session routing
ITU-T	International Telecommunication Union - Telecommunication (formerly CCITT)
kbps	kilobits per second
km	kilometer (0.62 miles)
LAA	locally administered address
LAC	L2TP Access Concentrator
LAN	local area network
LAPB	Link Access Protocol - Balanced
LAPS	LAN adapter and protocol support
LCB	line connection box
LCBB	line connection box base
LCBE	line connection box expansion
LCS	LAN channel station
LEN	low-entry networking
LFSID	local form session identifier
LIC	(1) licensed internal code (2) line interface coupler
LLC	logical link control
LNS	L2TP network server
LP	logical partition
LPAR	logically partitioned (mode)

LPDA2	Link Problem Determination Aid-2
LSA	Link Services Architecture
LSS	low-speed scanner
LU	logical unit
L2F	Layer 2 Forwarding
L2TP	Layer 2 Tunneling Protocol
m	meter (39.37 inches)
MAC	medium access control
MB	megabyte
Mbps	megabits per second
MBps	megabytes per second
MCL	microcode change level
MHz	megahertz
MIB	Management Information Base
MLTG	multilink transmission group
MMF	multimode fiber
MNPS	multinode persistent session
MOSS-E	Maintenance and Operator Subsystem - Extended
MPA	multiprotocol adapter
MPC	multi-path channel
MS	Management Services
MSAU	multistation access unit
MSS	Multiprotocol Switch Services
MVS	Multiple Virtual Storage
NAPT	network address and port translation
NAT	network address translation
NAU	network-addressable unit
NCE	network connection endpoint
NCP	network control program
NCTE	network communication terminal equipment
NFS	network file system
NGMF	NetView Graphic Monitor Facility
NHRP	Next Hop Routing Protocol
NIC	network interface card
NLP	network layer packet
nm	nanometer
NN	network node
NNP	Network Node Processor
NOF	node operator facility
NPI	numbering plan identification
NPM	NetView Performance Monitor
NPSI	NCP packet switching interface
NRF	Network Routing Facility
NRZ	non-return-to-zero
NRZI	non-return-to-zero inverted
NTO	Network Terminal Option
NTS	network transmission subsystem
NTT	Nippon Telegraph and Telephone
NVT	Network Virtual Terminal
OSI	open systems interconnection
OSPF	open shortest path first
PBN	peripheral border node
PC	path control
PCI	Programming Communication Interface
PCMCIA	Personal Computer Memory Card International Association
PEP	Partitioned Emulation Programming
PLP	Packet Layer Protocol
PPP	Point-to-Point Protocol
pps	packets per second
PPTP	Point-to-Point Tunneling Protocol
PRI	primary rate interface
PRPQ	programming request for price quotation
PTF	program temporary fix
PU	physical unit
PVC	permanent virtual circuit
QLLC	qualified logical link control
QoS	quality of service
RABM	Router and Bridge Manager
RADIUS	Remote Authentication Dial-In User Service
RETAIN	Remote Technical Assistance Information Network
RFC	Request for Comments
RIP	Routing Information Protocol
RODM	Resource Object Data Manager (NetView)
RSF	remote support facility
RSS	route selection services
RTP	Rapid Transport Protocol
SAP	service access point
SAR	segmentation and reassembly

SAS	single-attach station
SATF	shared access transport facility
SC	session control
SCM	session connection manager
SCSP	Server Cache Synchronization Protocol
SDLC	Synchronous Data Link Control
SDRAM	static DRAM
SF	selectable framing
SIE	switch interface extension (card)
SLC	subscriber loop carrier
SLIP	Serial Line Interface Protocol
SMF	single-mode fiber
SNA	Systems Network Architecture
SNATAM	SNA Terminal Access Method
SNI	SNA network interconnection
SNMP	Simple Network Management Protocol
SONET	synchronous optical network
SPAU	Service Processor Access Unit
SRC	system reference code
SS	session services
SSCP	system services control point
SSCP	system services control point (VTAM)
SSE	Session Services Extensions
SSL	Secure Sockets Layer
SSP	System Support Programs
STP	shielded twisted pair
SVC	switched virtual circuit
TACACS	Terminal Access Control System
TAM	Topology and Accounting Management
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
TG	transmission group
TIA	Telecommunications Industries Association
TIC	Token-ring interface coupler
TME	Tivoli Management Environment
TOA	type of address
TPF	Transaction Processing Facility
TRA	token-ring adapter
TRP	token-ring processor
TRS	Topology and Routing Services
UDP	User Datagram Protocol
UFC	Universal Feature Card
URL	Uniform Resource Locator
UTP	unshielded twisted pair
VC	virtual circuit
VM	virtual machine
VPN	virtual private network
VRN	virtual routing node
VRRP	Virtual Router Redundancy Protocol
VSE	Virtual Storage Extended
VTAM	Virtual Telecommunications Access Method
WAN	wide area network
XCA	external communications adapter

Glossary

This glossary defines new terms used in this manual.

adaptive rate-based flow and congestion control (ARB). A function of High Performance Routing (HPR) that regulates the flow of data over an RTP connection by adaptively changing the sender's rate based on feedback on the receiver's rate. It allows high link utilization and prevents congestion before it occurs, rather than recovering after congestion has occurred.

advanced communication function (ACF). A group of IBM licensed programs. principally VTAM programs. TCAM, NCP, and SSP, that use the concepts of Systems Network Architecture (SNA), including distribution of function and resource sharing.

advanced communications function for the virtual telecommunications access method (ACF/VTAM). An IBM licensed program that controls communication and the flow of data in an SNA network. It provides single-domain, multiple-domain, and interconnected network capability.

advanced peer-to-peer networking (APPN). Data communications support that routes data in a network between two or more advanced program-to-program communications (APPC) systems that do not need to be adjacent.

automatic network routing. A function of High Performance Routing (HPR) that is provides a low-level routing mechanism that requires no intermediate storage.

channel adapter (CA). A communication controller hardware unit used to attach the controller to a host processor.

communication controller. A device that directs the transmission of data over the data links of a network; its operation may be controlled by a program executed in a processor to which the controller is connected or it may be controlled by a program executed within the device. For example, the IBM 3745 and 3746 Network Nodes.

communications manager. A function of the OS/2 Extended Edition program that lets a workstation connect to a host computer and use the host resources as well as the resources of the other personal computers to which the workstation is attached, either directly or through a host system. The communications manager provides application programming interfaces (APIs) so that users and develop their own applications.

configuration data file - extended (CDF-E). A 3746 Network Node MOSS-E file that contains a description of all the hardware features (presence, type, address, and characteristics).

communications management configuration host node. The type 5 host processor in a communications management configuration that does all network-control functions in the network except for the control of devices channel-attached to a data host nodes. Synonymous with communications management host. See also data host node.

control panel. A panel that contains switches and indicators for the customer's operator and service personnel.

control program. A computer program designed to schedule and to supervise the execution of programs of the controller.

control subsystem. The part of the controller that stores and executes the control program, and monitors the data transfers over the channel and transmission interfaces.

customer engineer. See IBM service representative

data circuit-terminating equipment (DCE). The equipment installed at the user's premises that provides all the functions required to establish, maintain, and terminate a connection, and the signal conversion between the data terminal equipment (DTE) and the line. For example, a modem is a DCE.

Note: The DCE may be a stand-alone equipment or integrated in the 3745.

data terminal equipment (DTE). That part of a data station that serves as a data source, data link, or both, and provides for the data communication control function according to protocols. For example, the 3174 and PS/2s are DTEs.

data host node. In a communication management configuration, a type 5 host node that is dedicated to processing applications and does not control network resources, except for its channel adapter-attached or communication adapter-attached devices. Synonymous with data host. See also communications management configuration host node.

direct attachment. The attachment of a DTE to another DTE without a DCE.

ESCON channel. A channel having an Enterprise System Connection* channel-to-control-unit I/O interface that uses optical cables as a transmission medium.

ESCON channel adapter (ESCA). A communication controller hardware unit used to attach the controller to a host via ESCON fiber optics. An ESCA consists of an ESCON channel processor (ESCP) and an ESCON channel coupler (ESCC).

ESCON channel coupler (ESCC). A communication controller hardware unit which is the interface between the ESCON channel processor and the ESCON fiber optic cable.

ESCON channel processor (ESCP). A communication controller hardware unit which provides the channel data link control for the ESCON channel adapter.

distributed console access facility. (1) This program product provides a remote console function that allows a user at one programmable workstation (PS/2) to remotely control the keyboard input and monitor the display of output of another programmable workstation. The DCAF program does not affect the application programs that are running on the workstation that is being controlled. (2) An icon that represents the Distributed Console Access Facility.

enterprise systems chhnection (ESCON). A set of IBM products and services that provides a dynamically connected environment within an enterprise.

Host. See host processor

host processor. (1) A processor that controls all or part of a user application network. (2) In a network, the processing unit where the access method for the network resides. (3) In an SNA network, the processing unit that contains a system services control point (SSCP). (4) A processing unit that executes the access method for attached communication controllers.

High performance routing (HPR). An extension of APPN that provides faster traffic throughput, lower delays, and lower storage overheads.

IBM service representative. An individual in IBM who does maintenance services for IBM products or systems. Also called the IBM *Customer Engineer*.

initial microcode load (IML). The process of loading the microcode into an adapter, the MOSS, or the service processor.

internet. (1) A wide area network connecting disparate networks using the internetwork protocol (IP) (2) A public domain wide area network connecting thousands of disparate networks in industry, education, government and research. The Internet uses TCP/IP as the standard for transmitting information.

internet address. The numbering system used in IP internetwork communications to specify a particular network, or a particular host on that network with which to communicate.

internet control message protocol (ICMP). A protocol used by a gateway to communicate with a source host, for example, to report an error in a datagram. It is an integral part of the Internetwork Protocol (IP).

internetwork protocol. A protocol that routes data from its source to its destination in an internet environment. It is also called the *Internet Protocol*.

internetwork. Any wide area network connecting more than one network.

initial program load (IPL). The initialization procedure that causes the 3745 control program (NCP) to begin operation.

LAN-attached console. A PS/2 attached to the token-ring LAN that has the service processor attached. It is used to operate remotely the MOSS and MOSS-E functions.

IP router. A device that enables an Internetwork Protocol (IP) host to act as a gateway for routing data between separate networks.

line interface coupler (LIC). A circuit that attaches up to four transmission cables to the controller (from DTEs, DCEs or telecommunication lines).

locally administered address. In a local area network, an adapter address that the user can assign to override the universally administered address.

maintenance and operator subsystem - extended (MOSS-E). The licensed internal code loaded on the service processor hard disk to provide maintenance and operator facilities to the user and IBM service representative.

microcode. A program that is loaded in a processor (for example, the MOSS processor) to replace a hardware function. The microcode is not accessible to the customer.

modem (modulator-demodulator). See DCE.

multiple virtual storage (MVS). Multiple Virtual Storage, consisting of MVS/System Product Version 1 and the MVS/370 Data Facility Product operating on a System/370™ processor.

NetView. An IBM licensed program used to monitor a network, manage it, and diagnose its problems.

nonswitched line. A connection between systems or devices that does not have to be made by dialing. The connection can be point-to-point or multipoint. The line can be leased or private. Contrast with *switched line.*.

ping. A simple IP application that sends one or more messages to a specified destination host requesting a reply. Usually used to verify that the target host exists, or that its IP address is a valid address.

remote console. A PS/2 attached to the 3746 Network Node either by a switched line (with modems) or by one of the communication lines of the user network.

remote technical assistance information network (RETAIN).

service processor. The processor attached to a 3745, 3746-900, and 3746-950 via a token-ring LAN.

remote support facility (RSF). RSF provides IBM maintenance assistance when requested via the public switched network. It is connected to the IBM RETAIN database system.

service representative. See IBM service representative

services. A set of functions designed to simplify the maintenance of a device or system.

switched line. A transmission line with which the connections are established by dialing, only when data transmission is needed. The connection is point-to-point and uses a different transmission line each time it is established. Contrast with *nonswitched line*.

synchronous data link control (SDLC). A discipline for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. SDLC conforms to subsets of the Advanced Data Communication Control Procedures of the American National Standards Institute and High-Level Data Link Control (HDLC) of the International Standards Organization.

synchronous transmission. Data transmission in which the sending and receiving instruments are operating continuously at substantially the same frequency and are maintained, through correction, in a desired phase relationship.

Token-ring adapter (TRA) type 3. 3746-900 and 3746-950 line adapter for IBM Token-Ring Network, composed of one token-ring processor card (TRP2), and two Token-Ring interface couplers type 3 (TIC 3s).

Token-ring interface coupler type 2 (TIC2). A circuit that attaches an IBM Token-Ring network to the 3745.

Token-Ring Interface Coupler type 3 (TIC3). A circuit that attaches an IBM Token-Ring network to the 3746-900 or 3746-950.

user access area. A specific area in the controller where the customer can install, remove, change, or swap couplers and cables without IBM assistance.

universally administered address. In a local area network, the address permanently encoded in an adapter at the time of manufacture. All universally administered addresses are unique.

user application network. A configuration of data processing products, such as processors, controllers, and terminals, for data processing and information exchange. This configuration may use circuit-switched, packet-switched, and leased-circuit services provided by carriers or PTT. Also called a *user network*.

V.24, V.35, and X.21. ITU-T (ex-CCITT) recommendations on transmission interfaces.

Bibliography

Customer Documentation for the 3745 (All Models) and 3746 (Model 900)

Table 7 (Page 1 of 6). Customer Documentation for the 3745 Models X10 and X1A, and 3746 Model 900

This customer documentation has the following formats:		
📖 Books Online 📖 Books and Diskettes 📖 Books and CD-ROM		
Finding Information		
		3745 Models A and 3746 Books All of the books in the 3745 Models A and 3746 library are available on the CD-ROM that contains the Licensed Internal Code (LIC) for the machine.
Evaluating and Configuring		
📖	GA33-0092	***IBM 3745 Communication Controller Models 210, 310, 410, and 610*** ***Introduction*** Gives an introduction of the IBM Models 210 to 610 capabilities. For Models A, refer to the *Overview*, GA33-0180.
📖	GA33-0180	***IBM 3745 Communication Controller Models A and 170***[2] ***IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***Overview*** Gives an overview of connectivity capabilities within SNA, APPN, and IP networking.
📖	GA27-4234	***IBM 3745 Communication Controller Models A***[2] ***IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***Planning Series: Overview, Installation, and Integration*** Provides information for: • Overall 3746 planning • Installation and upgrade scenarios • Controller and service processor network integration • Related MOSS-E and CCM worksheets for these tasks.

Table 7 (Page 2 of 6). Customer Documentation for the 3745 Models X10 and X1A, and 3746 Model 900

📖	GA27-4235	***IBM 3745 Communication Controller Models A[2]*** ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Serial Line Adapters*** Provides information for: • Serial line adapter descriptions • Serial line adapter line weights and connectivity • Types of SDLC support • Configuring X.25 lines • Performance tuning for frame-relay, PPP, X.25, and NCP lines. • ISDN adapter description and configuration.
📖	GA27-4236	***IBM 3745 Communication Controller Models A[2]*** ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Token Ring and Ethernet*** Provides information for: • Token-ring adapter description and configuration • Ethernet adapter description and configuration.
📖	GA27-4237	***IBM 3745 Communication Controller Models A[2]*** ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***ESCON Channels*** Provides information for: • ESCON adapter descriptions • ESCON configuration and tuning information • ESCON configuration examples.
📖	GA27-4238	***IBM 3745 Communication Controller Models A[2]*** ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Physical Planning*** Provides information for: • 3746 and MAE physical planning details • 3746 and MAE cable information • Explanation of installation sheets • 3746 plugging sheets.

Table 7 (Page 3 of 6). Customer Documentation for the 3745 Models X10 and X1A, and 3746 Model 900

📖	GA27-4239	***IBM 3745 Communication Controller Models A[2] IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***Planning Series: Management Planning*** Provides information for: • Overview for 3746 • 3746 APPN/HPR, IP router, and X.25 • NetView Performance Monitor (NPM), remote consoles, and RSF • MAE APPN/HPR management.
📖	GA27-4240	***IBM 3745 Communication Controller Models A[2] IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***Planning Series: Multiaccess Enclosure Planning*** Provides information for: • MAE adapters details • MAE ESCON planning and configuration • ATM and ISDN support.
📖	GA27-4241	***IBM 3745 Communication Controller Models A[2] IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***Planning Series: Protocol Descriptions*** Provides information for: • Overview and details about APPN/HPR and IP.
🖥	On-line information	***IBM 3745 Communication Controller Models A[2] IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***Planning Series: Controller Configuration and Management Worksheets*** Provides planning worksheets for ESCON, Multiaccess Enclosure, serial line, and token-ring definitions.
Preparing Your Site		
📖	GC22-7064	***IBM System/360™, System/370™, 4300 Processor*** ***Input/Output Equipment Installation Manual-Physical Planning*** (Including Technical News Letter GN22-5490) Provides information for physical installation for the 3745 Models 130 to 610. For 3745 Models A and 3746 Model 900, refer to the *Planning Guide*, GA33-0457.
📖	GA33-0127	***IBM 3745 Communication Controller Models 210, 310, 410, and 610*** ***Preparing for Connection*** Helps for preparing the 3745 Models 210 to 610 cable installation. For 3745 Models A refer to the *Connection and Integration Guide*, SA33-0129.

Table 7 (Page 4 of 6). Customer Documentation for the 3745 Models X10 and X1A, and 3746 Model 900

Preparing for Operation		
📖	GA33-0400	***IBM 3745 Communication Controller All Models*[3]** ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Safety Information*[1]** Provides general safety guidelines.
📖 💿	SA33-0129	***IBM 3745 Communication Controller All Models*[3]** ***IBM 3746 Nways Multiprotocol Controller Model 900*** ***Connection and Integration Guide*[1]** Contains information for connecting hardware and integrating network of the 3745 and 3746-900 after installation.
📖	SA33-0416	***Line Interface Coupler Type 5 and Type 6*** ***Portable Keypad Display*** ***Migration and Integration Guide*** Contains information for moving and testing LIC types 5 and 6.
📖 💾	SA33-0158	***IBM 3745 Communication Controller All Models*[3]** ***IBM 3746 Nways Multiprotocol Controller Model 900*** ***Console Setup Guide*[1]** Provides information for: • Installing local, alternate, or remote consoles for 3745 Models 130 to 610 • Configuring user workstations to remotely control the service processor for 3745 Models A and 3746 Model 900 using: – DCAF program – Telnet Client program – Java Console support.
Customizing Your Control Program		
📖	SA33-0178	***Guide to Timed IPL and Rename Load Module*** Provides VTAM procedures for: • Scheduling an automatic reload of the 3745 • Getting 3745 load module changes transparent to the operations staff.
Operating and Testing		
📖	SA33-0098	***IBM 3745 Communication Controller*** ***All Models*[4]** ***Basic Operations Guide*[1]** Provides instructions for daily routine operations on the 3745 Models 130 to 610.
📖	SA33-0177	***IBM 3745 Communication Controller Models A*[2]** ***IBM 3746 Nways Multiprotocol Controller Model 900*** ***Basic Operations Guide*[1]** Provides instructions for daily routine operations on the 3745 Models 17A to 61A, and 3746 Model 900 operating as an SNA node (using NCP), APPN/HPR Network Node, and IP Router.

Table 7 (Page 5 of 6). Customer Documentation for the 3745 Models X10 and X1A, and 3746 Model 900

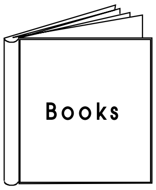
📖💿	SA33-0097	***IBM 3745 Communication Controller All Models*[3]** ***Advanced Operations Guide*[1]** Provides instructions for advanced operations and testing, using the 3745 MOSS console.
🖥	On-line Information	***Controller Configuration and Management Application*** Provides a graphical user interface for configuring and managing a 3746 APPN/HPR Network Node and IP Router, and its resources. It is also available as a stand-alone application, using an OS/2 workstation. Defines and explains all the 3746 Network Node and IP Router configuration parameters through its online help.
📖	SH11-3081	***IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***Controller Configuration and Management: User's Guide*[5]** Explains how to use CCM and gives examples of the configuration process.
📖	GA33-0479	***IBM 3745 Communication Controller Models A IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***NetView Console APPN Command Reference Guide*** Explains how to use the RUN COMMAND from the NetView S/390 Program and gives examples.
Managing Problems		
📖	SA33-0096	***IBM 3745 Communication Controller All Models*[3]** ***Problem Determination Guide*[1]** A guide to perform problem determination on the 3745 Models 130 to 61A.
🖥	On-line Information	***Problem Analysis Guide*** An online guide to analyze alarms, events, and control panel codes on: • IBM 3745 Communication Controller Models A[2] • IBM 3746 Nways Multiprotocol Controller Models 900 and 950.
📖	SA33-0175	***IBM 3745 Communication Controller Models A*[2] *IBM 3746 Expansion Unit Model 900 IBM 3746 Nways Multiprotocol Controller Model 950*** ***Alert Reference Guide*** Provides information about events or errors reported by alerts for: • IBM 3745 Communication Controller Models A[2] • IBM 3746 Nways Multiprotocol Controller Models 900 and 950.

Table 7 (Page 6 of 6). Customer Documentation for the 3745 Models X10 and X1A, and 3746 Model 900

[1] Documentation shipped with the 3745.
[2] 3745 Models 17A to 61A.
[3] 3745 Models 130 to 61A.
[4] Except 3745 Models A.
[5] Documentation shipped with the 3746-900.

Additional Customer Documentation for the 3745 Models 130, 150, 160, and 170

Table 8. Additional Customer Documentation for the 3745 Models 130 to 170

This customer documentation has the following format:		
		
Finding Information		
		3745 Models A and 3746 Books All of the books in the 3745 Models A and 3746 library are available on the CD-ROM that contains the Licensed Internal Code (LIC) for the machine.
Evaluating and Configuring		
📖	GA33-0138	***IBM 3745 Communication Controller Models 130, 150, 160, and 170*** ***Introduction*** Gives an introduction about the IBM Models 130 to 170 capabilities, including Model 160. For Model 17A refer to the *Overview*, GA33-0180.
Preparing Your Site		
📖	GA33-0140	***IBM 3745 Communication Controller Models 130, 150, 160, and 170*** ***Preparing for Connection*** Helps for preparing the 3745 Models 130 to 170 cable installation. For 3745 Model 17A refer to the *Connection and Integration Guide*, SA33-0129.
[1] Documentation shipped with the 3745.		

Customer Documentation for the 3746 Model 950

Table 9 (Page 1 of 4). Customer Documentation for the 3746 Model 950

This customer documentation has the following formats:

Books	Online	Books and Diskettes
Finding Information		
		3745 Models A and 3746 Books All of the books in the 3745 Models A and 3746 library are available on the CD-ROM that contains the Licensed Internal Code (LIC) for the machine.
Preparing for Operation		
📖	GA33-0400	***IBM 3745 Communication Controller All Models***[1] ***IBM 3746 Expansion Unit Model 900*** ***IBM 3746 Nways Multiprotocol Controller Model 950*** ***Safety Information***[2] Provides general safety guidelines.
Evaluating and Configuring		
📖	GA33-0180	***IBM 3745 Communication Controller Models A and 170***[3] ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Overview*** Gives an overview of connectivity capabilities within SNA, APPN, and IP networking.
📖	GA27-4234	***IBM 3745 Communication Controller Models A***[2] ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Overview, Installation, and Integration*** Provides information for: • Overall 3746 planning • Installation and upgrade scenarios • Controller and service processor network integration • Related MOSS-E and CCM worksheets for these tasks.

Table 9 (Page 2 of 4). Customer Documentation for the 3746 Model 950

📖	GA27-4235	***IBM 3745 Communication Controller Models A***[2] ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Serial Line Adapters*** Provides information for: • Serial line adapter descriptions • Serial line adapter line weights and connectivity • Types of SDLC support • Configuring X.25 lines • Performance tuning for frame-relay, PPP, X.25, and NCP lines. • ISDN adapter description and configuration.
📖	GA27-4236	***IBM 3745 Communication Controller Models A***[2] ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Token Ring and Ethernet*** Provides information for: • Token-ring adapter description and configuration • Ethernet adapter description and configuration.
📖	GA27-4237	***IBM 3745 Communication Controller Models A***[2] ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***ESCON Channels*** Provides information for: • ESCON adapter descriptions • ESCON configuration and tuning information • ESCON configuration examples.
📖	GA27-4238	***IBM 3745 Communication Controller Models A***[2] ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Physical Planning*** Provides information for: • 3746 and MAE physical planning details • 3746 and MAE cable information • Explanation of installation sheets • 3746 plugging sheets.

Table 9 (Page 3 of 4). Customer Documentation for the 3746 Model 950

📖	GA27-4239	***IBM 3745 Communication Controller Models A^2*** ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Management Planning*** Provides information for: • Overview for 3746 • 3746 APPN/HPR, IP router, and X.25 • NetView Performance Monitor (NPM), remote consoles, and RSF • MAE APPN/HPR management.
📖	GA27-4240	***IBM 3745 Communication Controller Models A^2*** ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Multiaccess Enclosure Planning*** Provides information for: • MAE adapters details • MAE ESCON planning and configuration • ATM and ISDN support.
📖	GA27-4241	***IBM 3745 Communication Controller Models A^2*** ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Protocol Descriptions*** Provides information for: • Overview and details about APPN/HPR and IP.
🖥	On-line information	***IBM 3745 Communication Controller Models A^2*** ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Planning Series:*** ***Controller Configuration and Management Worksheets*** Provides planning worksheets for ESCON, Multiaccess Enclosure, serial line, and token-ring definitions.

Table 9 (Page 4 of 4). Customer Documentation for the 3746 Model 950

Operating and Testing		
📖💾	SA33-0356	***IBM 3746 Nways Multiprotocol Controller Model 950*** ***User's Guide***[2] Explains how to: • Carry out daily routine operations on Nways controller • Install, test, and customize the Nways controller after installation • Configure user's workstations to remotely control the service processor using: – DCAF program – Telnet client program – Java Console support.
💻	On-line information	***Controller Configuration and Management Application*** Provides a graphical user interface for configuring and managing a 3746 APPN/HPR network node and IP Router, and its resources. It is also available as a stand-alone application, using an OS/2 workstation. Defines and explains all the 3746 Network Node and IP Router configuration parameters through its on-line help.
📖	SH11-3081	***IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***Controller Configuration and Management: User's Guide***[2] Explains how to use CCM and gives examples of the configuration process.
📖	GA33-0479	***IBM 3745 Communication Controller Models A*** ***IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***NetView Console*** ***APPN Command Reference Guide*** Explains how to use the RUN COMMAND from the NetView S/390 Program and gives examples.
Managing Problems		
💻	On-line information	***Problem Analysis Guide*** An on-line guide to analyze alarms, events, and control panel codes on: • IBM 3745 Communication Controller Models A[3] • IBM 3746 Nways Multiprotocol Controller Models 900 and 950.
📖	SA33-0175	***IBM 3745 Communication Controller Models A***[3] ***IBM 3746 Expansion Unit Model 900*** ***IBM 3746 Nways Multiprotocol Controller Model 950*** ***Alert Reference Guide*** Provides information about events or errors reported by alerts for: • IBM 3745 Communication Controller Models A[3] • IBM 3746 Nways Multiprotocol Controller Models 900 and 950.

[1] Models 130 to 61A.

[2] Documentation shipped with the 3746-950

[3] 3745 Models 17A to 61A.

Required Documentation

The following documents are indispensable for planning for your 3745/3746 controllers:

- *3745 Communication Controller Models A and 170, 3746 Nways Multiprotocol Controller Models 900 and 950: Overview*, GA33-0180
- *3745 Communication Controller All Models, 3746 Nways Multiprotocol Controller Model 900: Console Setup Guide*, SA33-0158.

Be sure to use the latest editions of the above documents.

Related Documentation

The following documents are also helpful for **planning** for your 3745/3746 controllers:

- *Planning for Integrated Networks*, SC31-8062
- *Planning and Reference for NetView, NCP, and VTAM*, SC31-7122.
- *Virtual Telecommunications Access Method V3 R4: Resource Definition Reference*, SC31-6438

The following Enterprise Systems Connection (**ESCON**) documents may be helpful:

- *Introducing the Enterprise Systems Connection*, GA23-0383
- *Enterprise Systems Connection Migration*, GA23-0383
- *Planning for Enterprise Systems Connection Links*, GA23-0367
- *Introducing Enterprise Systems Connection Directors*, GA23-0363.

The following *IBM International Technical Support Centers* “redbooks” are generally very helpful:

- *Frame Relay Guide*, GG24-4463
- *3746-900 and NCP Version 7 Release 2*, GG24-4464.

The following Network Control Program (**NCP**) documents may be helpful:

- For NCP V6 R2:
  - *Network Control Program V6 R2: Migration Guide*, SC31-6216
  - *Network Control Program V6 R2, ACF/SSP V3 R8, EP R11: Resource Definition Guide*, SC31-6209-01
  - *Network Control Program V6 R2, ACF/SSP V3 R8, EP R11: Resource Definition Reference*, SC31-6210-01
  - *Network Control Program V6 R2: Planning and Implementation Guide*, GG24-4012
  - *Network Control Program V6 R2, ACF/SSP V3 R8, EP R11: Library Directory*, SC31-6215.
- For NCP V6 R3:
  - *Network Control Program V6 R3: Migration Guide*, SC31-6217
  - *Network Control Program V6 R3, ACF/SSP V3 R9, EP R11: Resource Definition Guide*, SC31-6209-02
  - *Network Control Program V6 R3, ACF/SSP V3 R9, EP R11: Resource Definition Reference*, SC31-6210-02 Guide,
  - *Network Control Program V6 R3, ACF/SSP V3 R9, EP R11: Library Directory*, SC31-6218.
- For NCP V7 R1:
  - *Network Control Program V7 R1: Migration Guide*, SC31-6219
  - *Network Control Program V7 R1, ACF/SSP V4 R1, EP R12: Resource Definition Guide*, SC31-6223-00
  - *Network Control Program V7 R1, ACF/SSP V4 R1, EP R12: Resource Definition Reference*, SC31-6224-00
  - *Network Control Program V7 R1, ACF/SSP V4 R1, EP R12: Library Directory*, SC31-6220.

- For NCP V7 R2:
  - *Network Control Program V7 R2, ACF/SSP V4 R2, EP R12: Generation and Loading Guide*, SC31-6221.
  - *Network Control Program V7 R2: Migration Guide*, SC31-6258-00
  - *Network Control Program V7 R2, ACF/SSP V4 R2, EP R12: Resource Definition Guide*, SC31-6223-01
  - *Network Control Program V7 R2, ACF/SSP V4 R2, EP R12: Resource Definition Reference*, SC31-6224-01
  - *Network Control Program V7 R2, ACF/SSP V4 R2, EP R12: Library Directory*, SC31-6259.
- For NCP V7 R3:
  - *Network Control Program V7 R3: Migration Guide*, SC31-6258-01
  - *Network Control Program V7 R3, ACF/SSP V4 R3, EP R12: Resource Definition Guide*, SC31-6223-02
  - *Network Control Program V7 R3, ACF/SSP V4 R3, EP R12: Resource Definition Reference*, SC31-6224-02
  - *Network Control Program V7 R3, ACF/SSP V4 R3, EP R12: Library Directory*, SC31-6262.
- For NCP V7 R4:
  - *Network Control Program V7 R4: Migration Guide*, SC30-3786
  - *Network Control Program V7 R4, ACF/SSP V4 R4, EP R12: Resource Definition Guide*, SC31-6223-03
  - *Network Control Program V7 R4, ACF/SSP V4 R4, EP R12: Resource Definition Reference*, SC31-6224-03
  - *Network Control Program V7 R4, ACF/SSP V4 R4, EP R12: Library Directory*, SC30-3785.
- For NCP V7 R5:
  - *Network Control Program V7 R5: Migration Guide*, SC30-3833
  - *Network Control Program V7 R5, ACF/SSP V4 R4, EP R12: Resource Definition Guide*, SC31-6223-04
  - *Network Control Program V7 R5, ACF/SSP V4 R4, EP R12: Resource Definition Reference*, SC31-6224-04
  - *Network Control Program V7 R5, ACF/SSP V4 R4, EP R12: Library Directory*, SC30-3832.
- For NCP V7 R6:
  - *Network Control Program V7 R6: Migration Guide*, SC30-3833-01
  - *Network Control Program V7 R6, ACF/SSP V4 R4, EP R14: Resource Definition Guide*, SC31-6223-06
  - *Network Control Program V7 R6, ACF/SSP V4 R4, EP R14: Resource Definition Reference*, SC31-6224-06
  - *Network Control Program V7 R6, ACF/SSP V4 R4, EP R14: Library Directory*, SC30-3785.
- For NCP V7 R7:
  - *Network Control Program V7 R7: Migration Guide*, SC30-3889
  - *Network Control Program V7 R7, ACF/SSP V4 R4, EP R14: Resource Definition Guide*, SC31-6223-07
  - *Network Control Program V7 R7, ACF/SSP V4 R4, EP R14: Resource Definition Reference*, SC31-6224-07
  - *Network Control Program V7 R7, ACF/SSP V4 R4, EP R14: Library Directory*, SC30-3971.
- For NCP V7 R8:
  - *Network Control Program V7 R8: Migration Guide*, SC30-4024
  - *Network Control Program V7 R8, ACF/SSP V4 R8, EP R14: Resource Definition Guide*, SC31-6223-09

- *Network Control Program V7 R8, ACF/SSP V4 R8, EP R14: Resource Definition Reference*, SC31-6224-09
- *Network Control Program V7 R8, ACF/SSP V4 R8, EP R14: Library Directory*, SC30-4025.

The following **OS/2** document may be of some help:

IBM Extended Services® for OS/2 Programming Services and Advanced Problem Determination for Communications, SO4G-1007.

For the Distributed Console Access Facility (**DCAF**) Version 1.3 the following documents are needed:

- *DCAF: Installation and Configuration Guide*, SH19-4068
- *DCAF: User's Guide*, SH19-4069
- *DCAF: Target User's Guide*, SH19-6839.

To learn more about the **APPN** architecture, including high-performance routing (HPR), adaptive rate based flow and congestion control (ARB), dependent LU requesters/servers (DLURs/DLUSs), and other subjects, refer to:

- *Inside APPN - The Essential Guide to the Next-Generation SNA*, SG24-3669.
- *APPN Architecture and Protocol Implementations Tutorial* SG24-3669.

The following Virtual Telecommunications Access Method (**VTAM**), may be helpful:

- *Virtual Telecommunications Access Method V4R3: Resource Definition Reference*, SC31-6438.

For help with **TCP/IP**, refer to:

- *TCP/IP for MVS: Performance Tuning Guide*, SC31-7188.

To learn about token-ring configurations and the **IEEE 802.2** standard, refer to:

- *Token-Ring Network Architecture Reference*, SC30-3374.

These latest NetView documents may be helpful:

- *TME 10 NetView for OS/390 Version 1: Planning Guide*, GC31-8226
- *TME 10 NetView for OS/390 Version 1: Tuning Guide*, SC31-8240.

The following NetView Performance Monitor (**NPM**) documents are available:

- *NetView Performance Monitor: Concepts and Planning V2R2*, GH19-6961-01
- *NetView Performance Monitor: Concepts and Planning V2R3*, GH19-6961-02
- *NetView Performance Monitor: Concepts and Planning V2R4*, GH19-6961-03
- *NetView Performance Monitor: Concepts and Planning V3R1*, GH19-4221-00.

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3745 Communication Controller Model A
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Models 900 and 950
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Management Planning Guide

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