

Network Control Program Version 7 Release 7  
System Support Programs Version 4 Release 7  
Emulation Program Release 14



# Library Directory



Network Control Program Version 7 Release 7  
System Support Programs Version 4 Release 7  
Emulation Program Release 14



# Library Directory

**Note**

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

**First Edition (October 1998)**

This edition applies to:

- Advanced Communications Function/Network Control Program (ACF/NCP) Version 7 Release 7 (program number 5648-063)
- Advanced Communications Function/System Support Programs (ACF/SSP) Version 4 Release 7 for MVS (program number 5655-041)
- Advanced Communications Function/System Support Programs (ACF/SSP) Version 4 Release 7 for VM (program number 5654-009)
- Advanced Communications Function/System Support Programs (ACF/SSP) Version 4 Release 7 for VSE (program number 5686-064)
- Emulation Program for IBM Communication Controllers Release 14 (program number 5735-XXB)

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ESCON	MVS/XA	System/390
ES/9370	NetView	Virtual Machine/Enterprise Systems Architecture
Hardware Configuration Definition	NTune	VM/ESA
IBM	NTuneMON	VSE/ESA
	NTuneNCP	VTAM
	Nways	

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## About This Book

This book gives you an overview of Advanced Communications Function for Network Control Program (NCP), System Support Programs (SSP), and Emulation Program (EP) and directs you to information about tasks related to these programs. It also describes the changes made to NCP, SSP, and EP and to the library for NCP Version 7 Release 7 (V7R7), SSP Version 4 Release 7 (V4R7), and EP Release 14.

It describes the softcopy collection kit on which manuals have been updated and included.

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## Who Should Use This Book

This book is for system analysts, system programmers, system operators, and system engineers who perform NCP tasks and who want to know where to find information about those tasks.

Before you use this or any other NCP book, you should be familiar with Systems Network Architecture (SNA). Refer to *Systems Network Architecture Technical Overview* for this information.

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## How to Use This Book

Use this book to obtain a general understanding of NCP, SSP, and EP and to learn where specific information is located in the library.

For a general description of NCP, SSP, and EP and the role of each in a telecommunications network, read Chapter 1, "Introduction to NCP, SSP, and EP."

For a high-level description of the enhancements to the products and library for NCP V7R7, SSP V4R7 and EP Release 14, read Chapter 2, "New Items in this Release of NCP, SSP, and NTuneMON."

To find information about a specific task, read Chapter 4, "Directory to Task-Specific Information." Each section describes a network task and provides a table showing where you can find information about the task. Find the section for the task you are performing and refer to the book and chapters cited for particular sub-tasks.

---

## Terms Used in This Book

### **MVS, VM, and VSE**

The term *MVS* means the MVS/ESA and OS/390 systems. The term *VM* means the VM/ESA systems in the CMS environment. The term *VSE* means the VSE/ESA operating system. If information is applicable to only one system, the specific system name is used.

### **Port and Channel Used with LPDA**

In discussions concerning Link Problem Determination Aid (LPDA) for multiport and data multiplex mode (DMPX) modems, the terms *port* and *channel* are synonymous. Although *port* is the more commonly used term, *channel* can be used in sections describing LPDA.

### **IBM Special Products or User-Written Code**

This book sometimes refers to *IBM special products or user-written code*. IBM special products include Network Terminal Option (NTO), Network Routing Facility (NRF), and X.25 NCP Packet Switching Interface (NPSI).

### **NTuneMON and Its Tuning Feature NTuneNCP**

NTuneMON is a program that runs with NetView and monitors NCPs that were activated by the VTAM on the host where NTuneMON is running. If you have the NTuneMON tuning feature, NTuneNCP, you can also tune NCP resources. For more information on NTuneMON and its tuning feature, NTuneNCP, see the *NTuneMON V2R5 User's Guide*.

### **IBM 3745 Communication Controller Model Numbers**

In this book, the term *IBM 3745 Communication Controller* refers to all IBM 3745 models. When particular models are discussed, the appropriate model numbers are specified. Model numbers include IBM 3745-130, 3745-150, 3745-160, 3745-170, 3745-17A, 3745-210, 3745-21A, 3745-310, 3745-31A, 3745-410, 3745-41A, 3745-610, and 3745-61A.

### **CSS, 37CS, and 3746 Model 900**

The terms *connectivity subsystem (CSS)* and *37CS* refer to the 3746 Model 900 connectivity subsystem, an expansion frame that extends the connectivity and enhances the performance of the IBM 3745 Communication Controller.

### **Token Ring**

NCP can connect to an IBM Token-Ring Network using the NCP/Token-Ring interconnection (NTRI) or the 3746 Model 900 connectivity subsystem attachment. This book uses the term *token ring* when referring to either type of connection.

### **Frame Relay**

To support frame-relay networks, NCP can use a transmission subsystem (TSS) or high performance transmission subsystem (HPTSS) adapter on the 3745, or NCP can use a communication line processor (CLP) adapter on the 3746 Model 900 connectivity subsystem. Unless otherwise stated, this book uses the term *frame relay* when referring to a 3745 or a 3746 Model 900 connection.

### **Integrated Services Digital Network (ISDN)**

Integrated services digital network (ISDN) is an Open Systems Interconnection (OSI) protocol for a public or private end-to-end digital telecommunications network. The 3746 Model 900 connectivity subsystem (CSS) supports an interface into existing ISDN environments for SNA sessions routed through the CSS.

## Symbols Used in This Book

Figure 0-1 shows the networking symbols used in the illustrations that appear throughout the library.

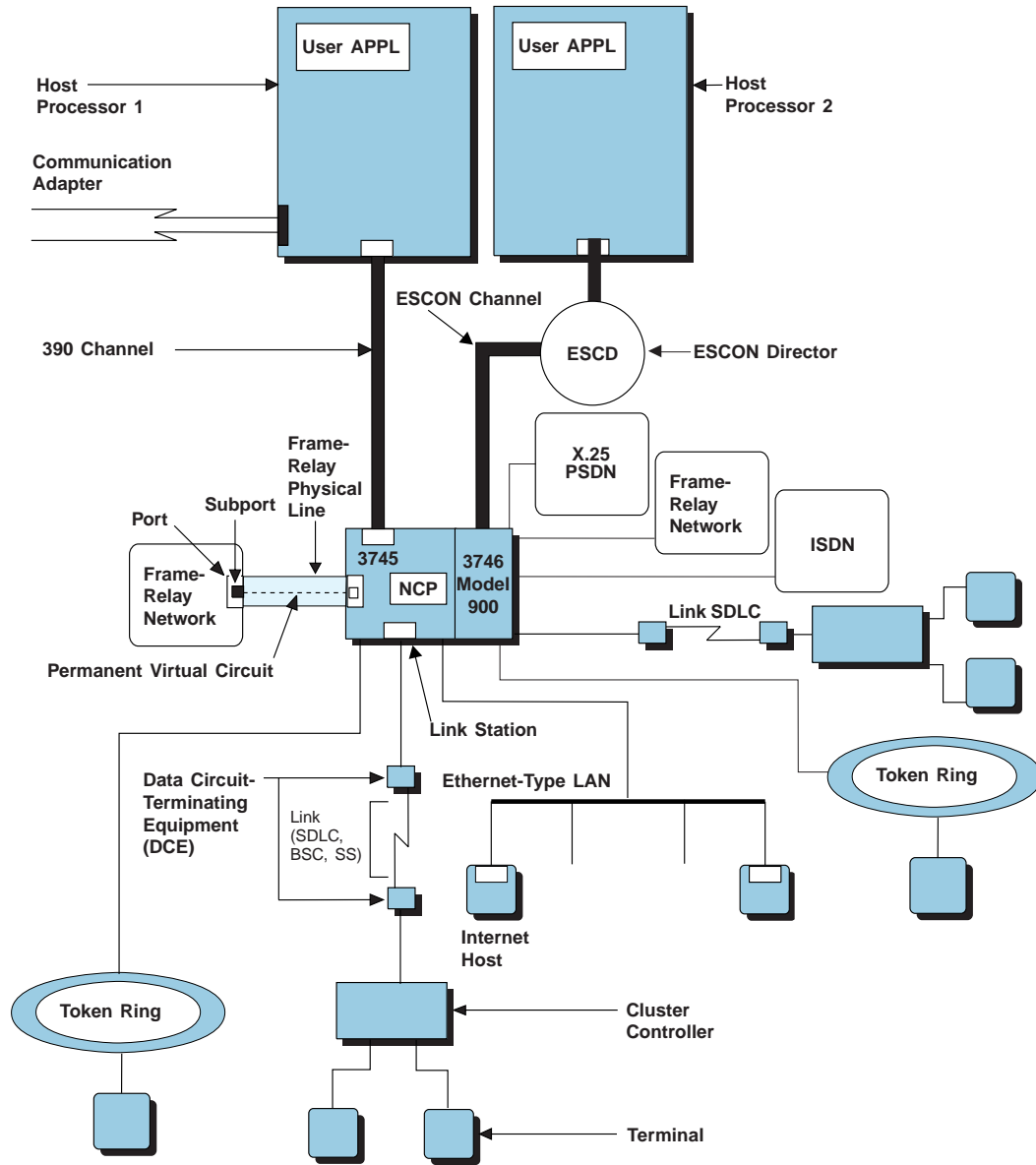


Figure 0-1. Symbols Used in Illustrations

## Where to Find More Information

This book, *NCP V7R7, SSP V4R7, and EP R14 Library Directory*, is a good place to start any task regarding NCP, SSP, or EP. This directory introduces the enhancements for the current release and shows where these enhancements are described in the NCP library. It gives you an overview of NCP, SSP, and EP and directs you to information on a variety of tasks related to these programs. When you are using this book online, you can use *hypertext links*<sup>1</sup> to move directly from task and enhancement descriptions to the appropriate chapters of other books in the library.

## Information for NCP Tasks

The books in the NCP, SSP, and EP library are listed here according to task, along with closely related books and tools you may find helpful. See “Bibliography” on page X-19 for a brief summary of each book in the NCP, SSP, and EP library and listings of related publications.

Table 0-1 (Page 1 of 2). Sources of Information by Task for NCP V7R7

Order No.	Title	Hardcopy	Softcopy
<b>Planning</b>			
SC31-8063	<i>Planning for NetView, NCP, and VTAM</i>		■
SC31-8062	<i>Planning for Integrated Networks</i>		■
SC30-3971	<i>NCP V7R7, SSP V4R7, and EP R14 Library Directory</i>	■	■
SC30-3470	<i>NCP Version 7 and X.25 NPSI Version 3 Planning and Installation</i>	■	■
<b>Installation and Resource Definition</b>			
SC31-6221	<i>NCP, SSP, and EP Generation and Loading Guide</i>	■	■
SC30-3889	<i>NCP V7R7 Migration Guide</i>	■	■
SC31-6223	<i>NCP, SSP, and EP Resource Definition Guide</i>	■	■
SC31-6224	<i>NCP, SSP, and EP Resource Definition Reference</i>	■	■
<b>Customization</b>			
LY43-0031	<i>NCP and SSP Customization Guide</i>		■
LY43-0032	<i>NCP and SSP Customization Reference</i>	■	■
<b>Operation</b>			
SC31-6222	<i>NCP, SSP, and EP Messages and Codes</i>	■	■

<sup>1</sup> A *hypertext link* is a pointer from a location in an online book to another location in the same book or another book. By selecting highlighted information, such as a message number, you can move quickly to related information and, if desired, back again.



Table 0-1 (Page 2 of 2). Sources of Information by Task for NCP V7R7

Order No.	Title	Hardcopy	Softcopy
<b>Diagnosis</b>			
LY43-0033	<i>NCP, SSP, and EP Diagnosis Guide</i>	■	■
LY43-0037	<i>NCP, SSP, and EP Trace Analysis Handbook</i>	■	■
LY43-0029	<i>NCP and EP Reference</i>	■	■
LY43-0030	<i>NCP and EP Reference Summary and Data Areas</i>	■	■
LY30-5610	<i>NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning</i>	■	■
<b>Monitoring and Tuning</b>			
SC31-6266	<i>NTuneMON V2R5 User's Guide</i>	■	■
LY43-0039	<i>NTuneNCP Feature Reference</i>	■	■

Those publications available as softcopy books have cross-document search and hypertext links for speedy, online information retrieval. These softcopy books are grouped together on an electronic bookshelf and are part of the *ACF/NCP, ACF/SSP, EP, NPSI, and NTuneMON Softcopy Collection Kit*, LK2T-0414, on compact disc read-only memory (CD-ROM).

You can view and search softcopy books by using BookManager READ products or by using the IBM Library Reader product included on CD-ROM. For more information on CD-ROMs and softcopy books, see *IBM Online Libraries: Softcopy Collection Kit User's Guide* and BookManager READ documentation. Or see the BookManager home page at:

<http://booksrv2.raleigh.ibm.com>

## World Wide Web

Visit the NCP Home Page at:

<http://www.networking.ibm.com/375/375prod.html>



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## Chapter 1. Introduction to NCP, SSP, and EP

This chapter introduces Advanced Communications Function (ACF) for NCP, SSP, EP, and several related IBM telecommunications products.

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### NCP

NCP is a program that controls the flow of data between the host processor and the other components of a telecommunications network. NCP provides efficient and reliable communication throughout the network by selecting routes to carry data and managing the flow along those routes. In addition, NCP frees the host processor and access method from performing network control functions, which increases the amount of processing available for host functions.

NCP resides in an IBM communication controller, which is located between the host processor and the other network components. These components may include terminals, cluster controllers, token rings, or other peripheral devices, as well as other networks or NCPs in other communication controllers. Figure 1-1 on page 1-2 shows the location of NCP in a sample network.

For more information about NCP, refer to the NCP, SSP, and EP library listed in the Bibliography.

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### SSP

SSP is a collection of support programs that run in the host processor. These programs help you generate and load an NCP, dump communication controller storage, and diagnose network problems. SSP includes the following programs:

- The NCP/EP definition facility (NDF) generates an NCP object module from a generation definition that you code to define the NCP resources for your network. For more information, including sample definitions, see *NCP, SSP, and EP Resource Definition Guide*.

NDF includes a migration aid function that automatically migrates an NCP generation definition from an earlier NCP release to the current release, and from one communication controller model to another. For more information, see *NCP V7R7 Migration Guide*.

- The loader utility loads an NCP load module into communication controller storage. For more information, including control statements, see *NCP, SSP, and EP Generation and Loading Guide*.
- The Hardware Configuration Definition (HCD) program dynamically defines NCP channel connections to an MVS host. For more information, see *IBM MVS/ESA Hardware Configuration Definition: Using the Dialog*.
- The configuration report program (CRP) produces a detailed report of the resources and characteristics of your network. For more information, see Chapter 9, "Using the Configuration Report Program (CRP)" in *NCP, SSP, and EP Diagnosis Guide*.
- The Advanced Communications Function/Trace Analysis Program (ACF/TAP) helps you analyze traces from NCP, EP, NRF, NTO, NPSI, X.25 SNA Interconnection (XI), Telecommunications Access Method (TCAM), and Virtual Tele-

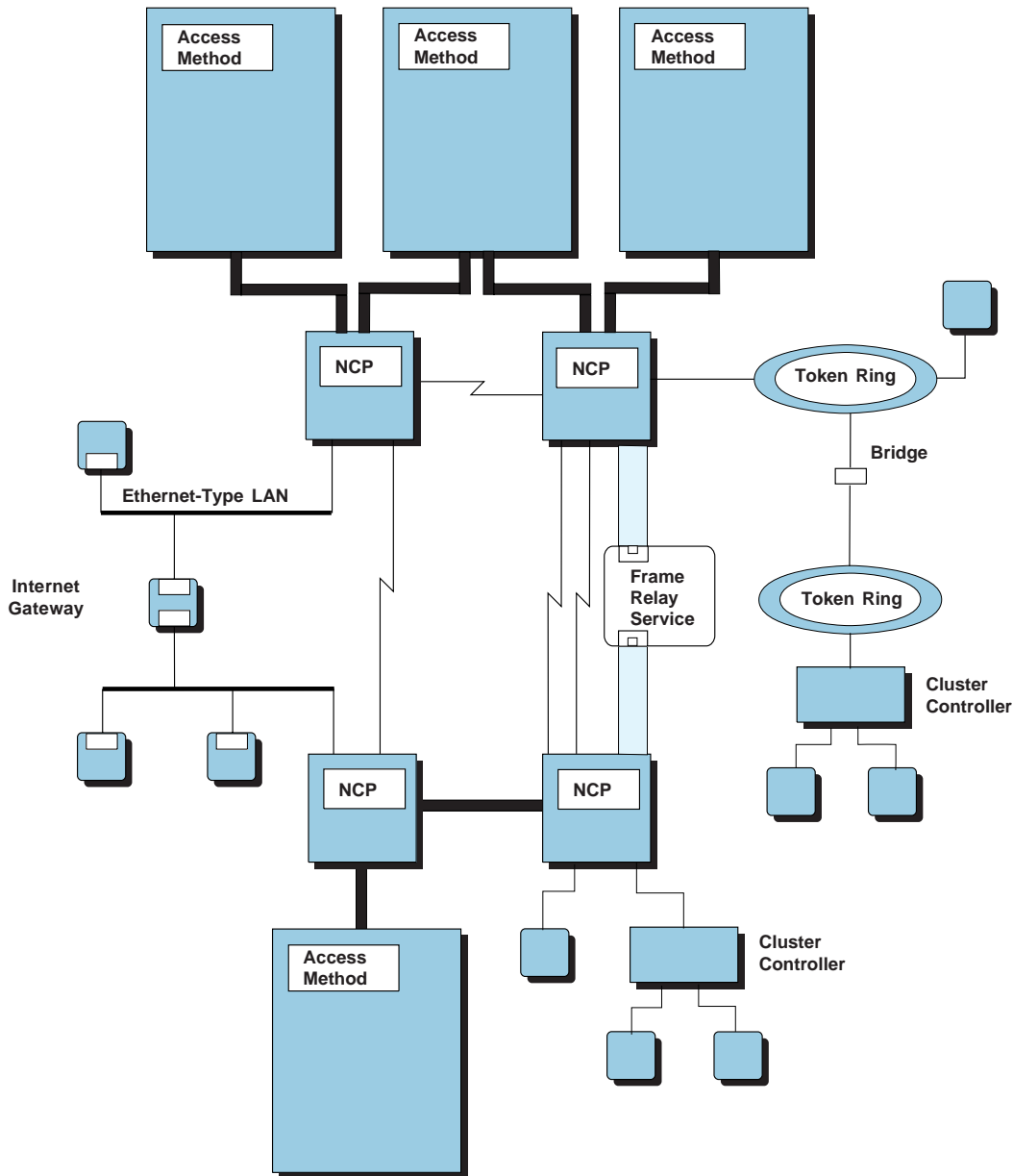


Figure 1-1. Location of NCP in a Sample Network

communications Access Method (VTAM) to identify and solve network problems. For more information, including sample output, see *NCP, SSP, and EP Trace Analysis Handbook*.

- The dumper utility sends the contents of communication controller storage to the host to help you identify and solve NCP problems. For more information, including sample control statements, see *NCP, SSP, and EP Diagnosis Guide*.
- The dump formatter utility formats and indexes the contents of communication controller storage to help you identify and solve NCP problems. For more information, including sample control statements, see *NCP, SSP, and EP Diagnosis Guide*.
- The dynamic dump utility for the partitioned emulation program (PEP) or EP environment displays the contents of communication controller storage while NCP or EP is running. For more information, including sample control state-

ments, see Chapter 6, “Using the Dynamic Dump Utility in EP” in *NCP, SSP, and EP Diagnosis Guide*.

- The interactive problem control system (IPCS) CLISTs for analyzing NCP dumps enable you to view selected portions of an NCP dump without formatting or printing them. For more information, including sample output, see Chapter 7, “SSP CLISTs” in *NCP, SSP, and EP Diagnosis Guide*.

**Note:** When you update your release of NCP, you also need to update your release of SSP. For more information about SSP, refer to the books listed in the bibliography.

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## EP

EP is a control program that enables a communication controller to emulate certain line control functions for binary synchronous communication (BSC) and start-stop devices. EP enables an IBM communication controller to perform most of the functions of an IBM 2701 Data Adapter Unit, an IBM 2702 Transmission Control Unit, an IBM 2703 Transmission Control Unit, or any combination of the three. Many host programs that use these 270x devices can, without modification, use a communication controller running EP.

You can use EP combined with NCP in a single communication controller environment called the partitioned emulation programming (PEP) extension of NCP. In PEP, the communication controller operates as a 270x device (emulation mode) part of the time and as a communication controller under the control of NCP (network control mode) the remainder of the time. PEP automatically switches between emulation mode and control mode when necessary. The NCP resources defined in a PEP generation definition are used when the communication controller is operating in network control mode.

For more information about EP, refer to the NCP, SSP, and EP library listed in the Bibliography.

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### Supported Releases

Table 1-1 shows the releases of NCP, SSP, and EP that are currently supported by IBM. If you need information on an unsupported release of NCP, SSP, or EP, refer to an earlier edition of this book.

*Table 1-1. Supported Releases of NCP, SSP, and EP*

Product	Release	Operating Systems
NCP	V4R3.1	MVS, VM, VSE
	V5R4	MVS, VM, VSE
	V6R2	VM
	V6R3	MVS
	V7R1	VSE
	V7R3	MVS, VM
	V7R4	MVS, VM, VSE
	V7R5	MVS, VM, VSE
	V7R6	MVS, VM, VSE
	V7R7	MVS, VM, VSE
SSP	V3R6	VSE
	V3R8	VM
	V3R9	MVS
	V4R1	VSE
	V4R3	MVS, VM
	V4R4	MVS, VM, VSE
	V4R5	MVS, VM, VSE
	V4R6	MVS, VM, VSE
EP	R6.1	MVS, VM, VSE
	R8	MVS, VM, VSE
	R9	MVS, VM, VSE
	R11	MVS,
	R12	MVS, VM, VSE
	R14	MVS, VM, VSE

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## NCP-Related Products

This section describes some IBM products that you can use with NCP.

### Products That Run in the Host

The following IBM licensed products run in the host and interact with NCP.

#### **Virtual Telecommunications Access Method (VTAM)**

VTAM controls the communication between resources in a telecommunications network. VTAM performs a variety of functions, including starting and stopping the network, allocating network resources, and managing input and output operations. VTAM also provides an interface that enables an operator to monitor and modify the network. VTAM is controlled by user-written definitions of the network, the network operator, and VTAM programs.

For more information about VTAM, refer to the books listed for VTAM in the Bibliography.

### **Transmission Control Protocol/Internet Protocol (TCP/IP)**

The IBM TCP/IP family of products provides a logical connection service between IBM systems and other internet hosts. TCP/IP enables NCP to route Internet Protocol (IP) datagrams between internet hosts connected to token-ring and Ethernet-type LANs, channels, and frame-relay and SNA networks. The objective of TCP/IP is to improve reliability of the data transfer process governed by IP.

For more information about IBM's TCP/IP products, refer to the books listed for TCP/IP in the Bibliography.

### **NetView**

NetView helps network support personnel monitor and manage a network and diagnose network problems. The NetView program provides centralized network management for single- host or multiple-host networks. It can also isolate hardware and software problems in the network. You can use the NetView program to automate many system and network tasks.

For more information about the NetView program, refer to *NetView General Information*.

### **NetView Performance Monitor (NPM)**

NPM helps network support personnel manage the performance and growth of VTAM-based communication networks. NPM monitors various network operating parameters and can alert the host or operator if those parameters exceed specified limits. NPM also collects performance data for network traffic flowing through VTAM and NCP, and collects accounting data on network and gateway sessions.

For more information about NPM, refer to *NetView Performance Monitor at a Glance*.

### **NTuneMON**

NTuneMON allows you to monitor your NCP while your telecommunications network is running. NTuneMON runs with NetView and monitors NCPs that were activated by VTAM on the host where NTuneMON is running.

NTuneMON provides assistance in detecting, resolving, and preventing network problems. It uses online color panels, help panels, and the NetView log to present detailed information about a wide variety of NCP resources.

For more information about NTuneMON, refer to the *NTuneMON V2R5 User's Guide*.

## **Products That Run in the Communication Controller**

The following IBM licensed products run in the communication controller along with NCP.

### **NPSI**

NPSI provides access to SNA application programs through an X.25 packet switched data network. NPSI also provides communication between two NCPs.

For more information about NPSI, refer to *X.25 NCP Packet Switching Interface General Information*.

## **NRF**

NRF provides a path between terminals attached to a communication controller and routes messages among those terminals without going through the host processors. NRF also provides a path between devices attached to a communication controller and application programs running in the host processor.

For more information about NRF, refer to *Network Routing Facility Planning*.

## **NTO**

NTO enables certain non-SNA devices to participate in sessions with SNA application programs running in the host processor. NTO does this by making non-SNA devices appear as SNA 3767 terminals. It also provides the line control for links, PUs, and LUs.

For more information about NTO, refer to *Network Terminal Option Planning, Migration, and Resource Definition*.

## **NTuneNCP**

NTuneNCP is the tuning feature of NTuneMON. It can be used with NTuneMON to tune NCP resources. It resides in a communication controller, and allows you to change the values of key NCP parameters while the NCP is active, reducing the need to regenerate or reload the NCP.

For more information about NTuneNCP, see the *NTuneMON V2R5 User's Guide*.

## **XI**

XI resides in one or more communication controllers in an SNA network. It opens IBM SNA networks to X.25 traffic and provides resource sharing for X.25 and SNA traffic.

For more information about XI, refer to *X.25 SNA Interconnection and X.25 SNA Network Supervisory Function General Information Manual*.



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## Chapter 2. New Items in this Release of NCP, SSP, and NTuneMON

This chapter introduces the enhancements for NCP V7R7 and SSP V4R7 and shows where these enhancements are described in the NCP library.

To find information about a particular enhancement, refer to the book and chapter cited. If a chapter is not cited for a particular book, refer to “What Is New in This Book” in the preface of that book.

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### What Is New in NCP V7R7

NCP V7R7 offers the following enhancements:

- Internet Protocol
  - “Support for IP over 3745 Frame-Relay Switched Physical Lines” on page 2-2
  - “Remote Access to NCPRoute in the Absence of SNALINK” on page 2-2
- Frame-Relay
  - “Switched Support for NCP Controlled 3746 Model 900 lines” on page 2-2
  - “Boundary Access Node (BAN) Connection Balancing on 3745 lines” on page 2-3
  - “Committed Information Rate (CIR) support for NCP Controlled 3746 Model 900 Lines” on page 2-3
  - “Number of Frames Queued for a Frame-Relay TSS or HPTSS Adapter” on page 2-4
  - “Frame-Relay Logical Line Trace” on page 2-4
- Token-Ring
  - “Path Switch Request for Token Ring Subarea Connections” on page 2-5
- Advanced Peer-to-Peer Network (APPN)
  - “New VTAM Selective Resource Reporting Capabilities” on page 2-5
- Subarea
  - “Enhanced Support for Subarea Dial Connections” on page 2-5
  - “Enhanced TH/RH Protection for Subarea Connections” on page 2-6
- Network Management
  - “Greater Granularity in ACF/TAP Transmission Group Trace Data Report” on page 2-6
  - “Enhanced Queue Size Alert Mechanism” on page 2-6
- Emulation Program (EP) Repackaging
  - “Integration of EP Standalone (EPSA)” on page 2-8
- New Generation Assembler Support
  - “New Generation Assembler Support” on page 2-7
- Year 2000 Updates
  - “Year 2000 Updates” on page 2-8
- NTuneMON Enhancements
  - “Support for Multiple Stations Multiplexed Over a Single DLCI” on page 2-8
  - “Support for 3746 Model 900 Frame-Relay Congestion Control Parameters” on page 2-9
  - “Support to Display Exact Line Speeds” on page 2-9

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## Internet Protocol

### Support for IP over 3745 Frame-Relay Switched Physical Lines

NCP V7R6 provided support for 3745 switched frame-relay physical lines for SNA traffic (peripheral and subarea). Now NCP V7R7 updates this function by providing support for IP over 3745 switched frame-relay lines. This allows you the ability to provide frame-relay backup support to IBM's 2210 or 2216 router transporting IP traffic.

Table 2-1 shows where you can find more information about IP support over switched Frame-Relay physical lines.

*Table 2-1. Where to Find Information about IP support over switched Frame-Relay physical lines*

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*NCP, SSP, and EP Resource Definition Guide*  
"Defining Frame-Relay Attachments for IP" on page 15-44

### Remote Access to NCPRoute in the Absence of SNALINK

In the absence of SNALINK, an alternative, indirect path for remote NCPs to NCPROUTE is available by way of an NCST connection to a local NCP with an IP channel connection to the NCPROUTE host.

Table 2-2 shows where you can find more information about remote access to NCPROUTE in the absence of SNALINK.

*Table 2-2. Where to Find Information about Remote Access to NCPROUTE in the Absence of SNALINK*

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*NCP, SSP, and EP Resource Definition Reference*  
P2PDEST on the IPLOCAL definition statement on page 2-157  
HOSTADDR on the IPOWNER definition statement on page 2-161

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## Frame-Relay

### Switched Support for NCP Controlled 3746 Model 900 lines

NCP V7R6 provided support for 3745 switched frame-relay physical interfaces for SNA traffic (peripheral and subarea). NCP V7R7 now extends this support to NCP controlled 3746 Model 900 physical lines. This support allows devices such as IBM 2210 and 2216 router to backup frame-relay connections to NCP controlled 3746 Model 900 physical lines. Support for IP over these switched lines is not provided at this time.

The ability to display 3746 Model 900 switched frame-relay physical lines has been added to NTumeMON V2R5. Previous versions supported 3745 switched frame-relay physical interfaces for SNA traffic. The same panels that were used to display 3745 lines, the Frame Relay Details Page 1 and 2 panels (ATUFP and ATUFP2) now show 3746 lines. An indicator has been added to differentiate between 3745 and 3746 lines. Furthermore, ANSTONE, RING, and REDIAL are tunable for 3746 lines as they are for 3745 lines.

Table 2-3 on page 2-3 shows where you can find more information about switched support for NCP controlled 3746 Model 900 lines.

*Table 2-3. Where to Find Information about Switched Support for NCP Controlled 3746 Model 900 lines*

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*NCP, SSP, and EP Resource Definition Guide*

Figure 16-45 on page 16-92

*NTuneMON V2R5 User's Guide*

## Boundary Access Node (BAN) Connection Balancing on 3745 lines

ACF/NCP now offers connection balancing for frame-relay 3745 lines supporting BAN connections. With this new function, you can balance peripheral BAN connections across DLCIs with the same BAN DLCI MAC address configured in the BAN router. These DLCIs do not have to be supported by the same frame-relay physical line or to originate from the same router.

NCP V7R7 achieves a controlled distribution of frame-relay BAN connections by delaying responses to an end station's initial "path determination frame." Because NCP performs connection balancing for each selected DLCI independently of other DLCIs, there is no theoretical limit to the number of duplicate DLCIs that can participate in this balancing scheme.

Another enhancement to NTuneMON V2R5 support is in the area of connection balancing or frame-relay BAN connections across permanent virtual circuits (PVCs). A new panel has been added to display each DLCI entry's connection balancing factor and supported number of BAN connections. From this panel the user will be able to modify the DLCI's balancing factor.

Table 2-4 shows where you can find more information about boundary access node connection balancing on 3745 lines.

*Table 2-4. Where to Find Information about Boundary Access Node (BAN) Connection Balancing on 3745 lines*

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*NCP, SSP, and EP Resource Definition Guide*

BALANCE keyword on the DLCI statement on page 16-14

*NTuneMON V2R5 User's Guide*

## Committed Information Rate (CIR) support for NCP Controlled 3746 Model 900 Lines

NCP controlled 3746 Model 900 frame-relay lines can now take advantage of Committed Information Rate (CIR) algorithms available for Network Node Processor (NNP) controlled lines on the 3746 Model 900. Prior to this enhancement, a Communications Rate (COMRATE) bandwidth management algorithm was provided for NCP controlled 3746 Model 900 frame-relay lines.

CIR is the subscriber data throughput that the network commits to supporting under normal network conditions. This enhancement allows you to specify the Committed Burst Size (Bc), the Excess Burst Size (Be), and the Committed Rate Measurement Interval (Tc) for specific DLCIs on a frame-relay line.

Now both CIR and COMRATE bandwidth management algorithms are provided for an NCP controlled 3746 Model 900 frame-relay line. This allows you the ability to choose which bandwidth management algorithm is optimum for your environment.

NTuneMON V2R5 has added the ability to display and modify the CIR parameters for 3746 Model 900 attached lines. A new panel, Frame Relay DLCI CIR Parameters (ATUFB), has been added to allow modification of the CIR parameters. If a DLCI statement has been coded for a particular line, the ATUFB panel will be available. It will display the Bc, Be, and Tc tuning parameters for each DLC address. The user will be able to modify the tuning parameters if the line is active.

Table 2-5 shows where you can find more information about Committed Information Rate (CIR) support for NCP Controlled 3746 Model 900 Lines.

*Table 2-5. Where to Find Information about Committed Information Rate (CIR) support for NCP Controlled 3746 Model 900 Lines.*

---

*NCP, SSP, and EP Resource Definition Guide*

CIR keyword on the LINE definition statement on page 16-74

*NTuneMON V2R5 User's Guide*

## Frame-Relay Logical Line Trace

New frame-relay logical line trace capability offers you increased diagnostic capability for 3745 frame-relay logical lines. To provide you with greater flexibility, multiple frame-relay logical lines can be traced simultaneously. With you quantifying the amount of data to trace, the frame-relay logical line trace data is formatted similar to frame-relay physical line trace data.

Table 2-6 shows where you can find more information about frame-relay logical line trace.

*Table 2-6. Where to Find Information about Frame-Relay Logical Line Trace*

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*NCP, SSP, and EP Trace Analysis Handbook*

"Frame-Relay Logical Line Trace Summary Report" on page 6-16

## Number of Frames Queued for a Frame-Relay TSS or HPTSS Adapter

NCP V7R7 provides a new keyword, TRANSBUF, which allows you to define the maximum number of frames that can be queued for a TSS or HPTSS adapter awaiting transmission over a 3745 frame-relay physical line. This provides greater flexibility and control in determining the optimum number of outstanding frames queued based on expected traffic rates.

NTuneMON V2R5 has been updated to allow modification of the number of outstandframes that can be queued for a frame-relay TSS or HPTSS adapter.

Table 2-7 shows where you can find more information about the number of frames queued for a frame-relay TSS or HPTSS adapter.

*Table 2-7. Where to Find Information about the Number of Frames Queued for a Frame-Relay TSS or HPTSS Adapter*

---

*NCP, SSP, and EP Resource Definition Guide*

TRANSBUF keyword on the LINE definition statement on page 16-13

*NTuneMON V2R5 User's Guide*

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## Token-Ring

### Path Switch Request for Token Ring Subarea Connections

New NTuneMON support has been added that allows an operator to invoke a reroute function from the NTuneMON console in the event of bridge congestion. This function is available for TIC1 and TIC2 logical subarea lines. It is invoked via a PF key from the Token-Ring SNA Stations Panel (ATUTL).

When this command is issued, NCP will broadcast Test frames in an attempt to find a faster path to the destination station. If a path switch occurs, NCP will issue a Path Switch Notification Generic Alert. This function requires NTuneNCP V2R5 to be installed and is available from the Token-Ring SNA Stations Details Panel (ATUTL).

Table 2-8 shows where you can find more information about the path switch request for Token-Ring subarea connections.

*Table 2-8. Where to Find Information about the Path Switch Request for Token-Ring Subarea Connection*

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*NCP and EP Reference*  
*NTuneMON V2R5 User's Guide*

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## APPN

### New VTAM Selective Resource Reporting Capabilities

NCP V7R7 now offers support for the VTAM keyword (VTAMTOPO=). This keyword provides a filtering mechanism that allows you to eliminate unnecessary resource statistical reporting by the CMIP manager. This new support reduces both storage and cycle consumption by eliminating these unnecessary reports.

Table 2-9 shows where you can find more information about New VTAM Selective Resource Reporting Capabilities.

*Table 2-9. Where to Find Information about New VTAM Selective Resource Reporting Capabilities*

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*NCP, SSP, and EP Resource Definition Reference*  
VTAMTOPO syntax on the BUILD Statement on page 2-9

---

## Subarea

### Enhanced Support for Subarea Dial Connections

eNetwork Communications Server for OS/390 Release 6 (VTAM) has added support for two NCP keywords (TGCONF and MLTGPRI) on your Switched Major Node (SMN) definition. After a connection is made to a remote subarea, VTAM sends this definition information to NCP. NCP then uses this information instead of the definitions that were coded during the NCP generation for this PU.

## New Items in Release

This new support allows you to dynamically change these parameters on a connection basis via the Switched Major Node definitions without the need for reconfiguring and reloading your 3745 Communications Controller.

Table 2-10 shows where you can find more information about Enhanced Support for Subarea Dial Connections.

*Table 2-10. Where to Find Information about Enhanced Support for Subarea Dial Connections*

---

See *NCP, SSP, and EP Resource Definition Reference* at the paragraph added to the TGCONF keyword description on page 2-420 and the paragraph added to the MLTGPR1 keyword description on page 2-250.

## Enhanced TH/RH Protection for Subarea Connections

This support allows you to request that NCP employ a 2-byte checksum to provide added protection of the Transmission Header and the Request/Response Header for PIUs flowing on a subarea connection.

Table 2-11 shows where you can find more information about enhanced TH/TH protection for subarea connections.

*Table 2-11. Where to Find Information about Enhanced TH/TH Protection for Subarea Connections*

---

See *NCP, SSP, and EP Resource Definition Guide* at PIUCHECK keyword on the PU definition statement on page 24-9

---

## Network Management

### Greater Granularity in ACF/TAP Transmission Group Trace Data Report

*SNA Summary Report (SSPRT)* has been updated to provide greater granularity on the Transmission Group Trace Data Report. Prior to NCP V7R7 and ACF/SSP V4R7, the trace report did not distinguish between transmit data and receive data. ACF/SSP V4R7 with NCP V7R7 now provides this new granularity.

Table 2-12 shows where you can find more information about greater granularity in ACF/TAP Transmission Group Trace Data Report.

*Table 2-12. Where to Find Information about Greater Granularity in ACF/TAP Transmission Group Trace Data Report*

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*NCP, SSP, and EP Trace Analysis Handbook*  
"TG Trace Data" on page 6-72

### Enhanced Queue Size Alert Mechanism

NCP V7R7 enhances its current queue size alert mechanism to detect the presence of an excessive amount of data on the outbound queue for peripheral stations and issue an alert.

This update gives network managers early indications that downstream congestion or outages may be occurring.

Table 2-13 on page 2-7 shows where you can find more information about Enhanced Queue Size Alert Mechanism.

*Table 2-13. Where to Find Information about Enhanced Queue Size Alert Mechanism*

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*NCP, SSP, and EP Diagnosis Guide*  
Description of queue size alert on page 3-111

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## New Generation Assembler Support

Starting with ACF/NCP V7R7, important changes have been made to the NCP generation assembler support. Beginning with ACF/SSP V4R7, the Network Definition Facility (NDF) will offer exclusive support for the High Level Assembler (HLAS) program product, 5696-234. Prior to ACF/SSP V4R7, two different assemblers were shipped with ACF/SSP. Support for the IFZ assembler (VSE) and IHR90 assembler (MVS and VM) will be discontinued on the ACF/NCP V7R7 platform. You will now be required to use the High Level Assembler for generating NCP V7R7 load modules.

If the High Level Assembler does not come installed on your system, you will need to order it.

Table 2-14 shows the operating systems and indicates whether the High Level Assembler is integrated.

*Table 2-14. High Level Assembler Integrated with Operating System*

<b>Operating System</b>	<b>High Level Assembler V1R2 (5696-234)</b>
MVS/ESA V5R1 and later (5655-068, 5655-069)	Order separately
VSE/ESA V1R4.3 and V1R4.4 (5750-ACD)	Order separately
VM/ESA V2R2 and V2R3 (5654-030)	Order separately
OS/390 R1, R2, R3 (5645-001)	Integrated
OS/390 R4, R5 (5647-A01)	Integrated
VSE/ESA V2R2 and V2R3 (5690-VSE)	Integrated

In addition to the High Level Assembler requirements, the following APARs are required:

- DFSMS/MVS OW26738 is required for the binder
- DFSMS/MVS OW27802 is required for the linkage editor
- VM/ESA VM61534 is required for the linkage editor

The IFZ and IHR90 assemblers will still be shipped with ACF/SSP V4R7 for use with levels of ACF/NCP prior to NCP V7R7.

Table 2-15 shows where you can find more information about New Generation Assembler Support.

*Table 2-15. Where to Find Information about New Generation Assembler Support*

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*NCP, SSP, and EP Generation and Loading Guide*

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### Integration of EP Standalone (EPSA)

Information about defining an EPSA generation is moved into *NCP, SSP, and EP Resource Definition Reference* and *NCP, SSP, and EP Resource Definition Guide* from the *Emulation Program Resource Definition and Diagnosis* manual, SC31-6205-0. EP Release 14 provides the ability to use the EP distribution tapes for both PEP and EP standalone installation. EPSA is now able to run on all models of the 3745.

Table 2-16 shows where you can find more information about Integration of EP Standalone (EPSA).

*Table 2-16. Where to Find Information about Integration of EP Standalone (EPSA)*

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*NCP, SSP, and EP Resource Definition Guide*  
Chapter 18, "Defining a Standalone EP Network" on page 18-1  
*NCP, SSP, and EP Resource Definition Reference*

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### Year 2000 Updates

This release of NCP brings some Year 2000 updates. These updates enhance the current Year 2000 support. Previous releases of ACF/NCP and ACF/SSP produced diagnostic traces that display two digit year values. Although these visual two digit year values were unambiguous and met the Year 2000 Ready guidelines, we have modified our NCP V7R7, SSP V4R7 and NTuneMON V2R5 products to produce and display four digit years.

In all places where it was practical and did not impact home grown user applications, NCP traces and NTuneMON display screens will display four digit year values.

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### NTuneMON Enhancements

NTuneMON V2R5 now offers support for the following capabilities:

- Multiple Stations Multiplexed Over a Single DLCI
- 3746 Model 900 Frame-Relay Congestion Control Parameters
- Display Exact Line Speeds

### Support for Multiple Stations Multiplexed Over a Single DLCI

A new Frame-Relay panel to display all the stations multiplexed over a selected DLCI (Data Link Control Identifier) has been added. Previously, the Frame Relay Support List panel (ATUFA) displayed only the first station associated with the DLCI. This meant that the user could not display the detailed data panel for the other stations on that DLCI.

A new panel, called the Frame Relay DLCI Support List panel (ATUFL), has been created. This panel is displayed when the user selects a multistation DLCI on the Frame Relay Support List Panel (ATUFA). From this new panel, the user can receive the detailed data panel for a particular station.

Table 2-17 on page 2-9 shows where you can find more information about support for multiple stations multiplexed over a single DLCI.



*Table 2-17. Where to Find Information about Support for Multiple Stations Multiplexed Over a Single DLCI*

---

*NTuneMON V2R5 User's Guide*

## Support for 3746 Model 900 Frame-Relay Congestion Control Parameters

NTuneMON V2R5 includes the ability to tune the 3746 Model 900 CLP frame-relay congestion control parameters. A third Frame Relay Details panel (ATUFP3) displays the new LINE congestion control parameters (HLOQSTOP, QSIZEDE, QSIZE, CRATEDLY, DSCRDDLY, and FRSPRI) and allows them to be changed. In making a tuning change, the user must specify all of the first five parameters. Additionally, the PU parameter FRSPRI, which specifies the relative service priority, has been added to the FR Terminating Equipment Details Panel, the FR Switching Equipment Details Panel, and the ISDN Station Details Panel.

Table 2-18 shows where you can find more information about support for 3746 Model 900 frame-relay congestion control parameters.

*Table 2-18. Where to Find Information about Support for 3746 Model 900 Frame-Relay Congestion Control Parameters*

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*NTuneMON V2R5 User's Guide*

## Support to Display Exact Line Speeds

Users can code a value from 50 bps to 2048000 bps for externally clocked TSS, HPTSS, or 3746 Model 900 lines. These are mapped to various "categories" or ranges. A single value displayed on various panels is assigned to each category. For example, the category between 600 and 32000 would have the value 19200 assigned, and this would be displayed for any value coded within that range.

Table 2-19 shows the panels that have been modified to display the exact line speeds.

*Table 2-19. Panels That Have Been Modified to Display the Exact Line Speeds.*

<b>Panel Name</b>	<b>Panel Identifier</b>
Frame Relay Physical Line Details	ATUFP
ISDN Physical Line Details	ATUDK
SDLC Physical Line Details	ATUPL
SDLC Peripheral Line Details	ATUSP1
X.25 Virtual Circuit Statistics	ATUXD
X.25 Physical Line Details	ATUXP

Table 2-20 shows where you can find more information about support to display exact line speeds.

*Table 2-20. Where to Find Information about Support to Display Exact Line Speeds*

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*NTuneMON V2R5 User's Guide*

## New Items in Release

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## Chapter 3. Changes to the NCP, SSP, and EP Library

This chapter introduces the structure of the NCP V7R7, SSP V4R7, and EP R14 product documentation. The intent of the library is to supply documentation in both traditional hardcopy and softcopy forms adequate to define and install the new release. Most hardcopy library publications as well as the softcopy library have been updated for NCP V7R7, SSP V4R7, EP R14, NPSI V3R9, and NTuneMON V2R5.

The softcopy library is called the *ACF/NCP, ACF/SSP, EP, NPSI, and NTuneMON Softcopy Library Collection Kit*, LK2T-0414. The first copy is shipped with the NCP program. You do not need a “KEY” to unlock the books. However, the CD-ROM is only available to license holders of this program product family.

You may find it practical to install the CD-ROM collection kit on a server, so that everyone using the server can have access to the softcopy documentation.

### Summary of Changes for this Release

A summary of information added to or changed in the NCP and SSP libraries for NCP V7R7 and SSP V4R7 follows. Changes consist of:

- APAR corrections, such as to NCP and EP Reference Summary and Data Areas and NCP, SSP, and EP Messages and Codes
- Integration of information defining an EP Standalone (EPSA) generation into the NCP, SSP, and EP Resource Definition Reference.
- Changes to manuals that are designed to promote ease of use and improve readability such as the NTuneMON User's Guide
- Minor functional changes

Change bars are used to make it clear where information is new or changed.

The total information package is:

- A New Library Directory
- Manuals that are updated and published in both hardcopy and softcopy
- Manuals that are not updated but are valid for NCP V7R7 and SSP V4R7 and available in both hardcopy and softcopy.

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### Manuals Updated and Published for NCP V7R7, SSP V4R7, EP R14, NPSI V3R9, and NTuneMON V2R5

The following books in the NCP V7R7, SSP V4R7, EP R14, NPSI V3R9, and NTuneMON V2R5 library have been newly published:

- NCP V7R7 Migration Guide
- NCP and EP Reference Summary and Data Areas
- NCP, SSP, and EP Resource Definition Guide
- NCP, SSP, and EP Resource Definition Reference
- NCP and EP Reference
- NCP, SSP, and EP Diagnosis Guide
- NCP, SSP, and EP Trace Analysis Handbook
- NCP, SSP, and EP Messages and Codes
- NCP, SSP, and EP Generation and Loading Guide
- NCP and SSP Customization Reference
- NTuneMON V2R5 User's Guide
- NTuneNCP Feature Reference
- NCP Version 7 and X.25 NPSI Version 3 Planning and Installation
- X.25 NPSI Version 3 Host Programming
- X.25 NPSI Version 3 General Information
- NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning
- X.25 NPSI Version 3 Release 9 Data Areas
- Network Terminal Operation R11 Planning, Migration, and Resource Definition Guide
- Network Terminal Operation R11 Diagnosis
- NCP V7R7, SSP V4R7, and EP R14 Library Directory

For more detail on the changes to a particular book, refer to “What Is New in This Book” in the respective manual's preface.

### NCP V7R7 Migration Guide

#### Description

This book describes how to migrate an NCP or EP generation definition to the current NCP or EP release from earlier releases and how to add new NCP functions introduced since earlier releases.

#### Changes for this Release

The *NCP V7R7 Migration Guide* has been updated and expanded, incorporating information for migrating to EP R14 standalone. Information regarding the calculation of storage required when migrating to NCP V7R7 has been included as well as information describing how to add new functions introduced with NCP V7R7.

### NCP and EP Reference Summary and Data Areas

#### Description

The *NCP and EP Reference Summary and Data Areas Volume 1* describes in detail the NCP control blocks. The *NCP and EP Reference Summary and Data Areas Volume 2* describes other aspects of NCP internal storage and processing. This information is useful in diagnosing NCP problems.

### **Changes for this Release**

This two-volume manual has been updated and published for NCP V7R7.

## **NCP, SSP, and EP Resource Definition Guide**

### **Description**

The *NCP, SSP, and EP Resource Definition Guide* describes the various NCP functions, lists the keywords that define the resources for those functions, and provides many small coding examples and several complete generation definitions showing how to define those resources.

### **Changes for this Release**

This manual has been updated and published for NCP V7R7. Information has been added describing the NCP V7R7 enhancements, and coding samples were added to show how to define them.

## **NCP, SSP, and EP Resource Definition Reference**

### **Description**

The *NCP, SSP, and EP Resource Definition Reference* describes in detail the definition statements and keywords for defining NCP resources.

### **Changes for this Release**

This manual has been updated and published for NCP V7R7. Information has been added to describe the NCP keywords added or changed for the NCP V7R7 enhancements.

## **NCP and EP Reference**

### **Description**

The *NCP and EP Reference* describes various aspects of the internal processing of NCP and EP. It provides information for customization and diagnosis.

### **Changes for this Release**

This manual has been updated to describe the internal processing of NCP V7R7 enhancements.

## **NCP, SSP, and EP Diagnosis Guide**

### **Description**

The *NCP, SSP, and EP Diagnosis Guide* describes how to gather information on NCP and SSP problems and how to solve the problems or report them to the IBM Service Center.

### **Changes for this Release**

The *NCP, SSP, and EP Diagnosis Guide* contains information supporting the new and enhanced functions of NCP V7R7 and SSP V4R7, as well as editorial, organizational, and technical changes.

## NCP, SSP, and EP Trace Analysis Handbook

### Description

The *NCP, SSP, and EP Trace Analysis Handbook* describes how to use the trace analysis program and how to read trace analysis program output.

### Changes for this Release

The *NCP, SSP, and EP Trace Analysis Handbook* contains information on the new and enhanced functions of NCP V7R7 and SSP V4R7, as well as editorial and technical changes.

## NCP, SSP, and EP Messages and Codes

### Description

The *NCP, SSP, and EP Messages and Codes* explains the messages issued during the generation process, the sense codes issued by NCP, and the abend codes issued by NCP and EP.

### Changes for this Release

The *NCP, SSP, and EP Messages and Codes* was updated for this release to incorporate messages and sense code supporting the new and enhanced functions of NCP V7R7 and SSP V4R7, as well as editorial and technical changes.

## NCP, SSP, and EP Generation and Loading Guide

### Description

The *NCP, SSP, and EP Generation and Loading Guide* describes how to generate an NCP load module and load it into a communication controller under the MVS, VM, and VSE operating systems. This book also describes how to load and activate NCP in a remote communication controller.

### Changes for this Release

The *NCP, SSP, and EP Generation and Loading Guide* has been updated to include new information on use of the High Level Assembler as well as technical and editorial changes.

## NCP and SSP Customization Reference

### Description

The *NCP and SSP Customization Reference* describes the NCP customization macros for user-written line control applications and the NDF utilities for user-written generation applications.

### Changes for this Release

The *NCP and SSP Customization Reference* has been updated to support the new and enhanced functions of NCP V7R7 and SSP V4R7.

## NTuneMON V2R5 User's Guide

### Description

The *NTuneMON V2R5 User's Guide* explains how to use NTuneMON and its optional tuning feature, NTuneNCP. It also explains how to use NTuneMON and its panels and product messages.

### Changes for this Release

This manual has been updated and published for NTuneMON V2R5. Information has been added to describe the panels added or changed for the NCP V7R7 enhancements.

## NTuneNCP Feature Reference

### Description

The *NTuneNCP Feature Reference* provides information on data area formats for the optional NTuneNCP tuning feature of NTuneMON. It includes information about NCP command formats and some VTAM messages.

### Changes for this Release

The *NTuneNCP Feature Reference* has been updated to support the new and enhanced functions of NCP V7R7 and SSP V4R7.

## NCP Version 7 and X.25 NPSI Version 3 Planning and Installation

### Description

The *NCP Version 7 and X.25 NPSI Version 3 Planning and Installation* describes how to plan and install support for X.25 lines for both NCP and NPSI.

### Changes for this Release

The *NCP Version 7 and X.25 NPSI Version 3 Planning and Installation* has been updated to reflect minor functional updates for this release in addition to editorial and technical changes. New or changed information is identified by a vertical bar (|) in the left margin.

## X.25 NPSI Version 3 Host Programming

### Description

*X.25 NPSI Version 3 Host Programming* assists application programmers in writing programs to interface with the IBM X.25 Network Control Program Packet Switching Interface (X.25 NPSI) licensed program.

### Changes for this Release

*X.25 NPSI Version 3 Host Programming* has been updated to reflect minor functional updates for this release in addition to editorial and technical changes. New or changed information is identified by a vertical bar (|) in the left margin.

## X.25 NPSI Version 3 General Information

### Description

*X.25 NPSI Version 3 General Information* introduces the basic concepts of packet switching, the X.25 protocol, and the IBM X.25 Network Control Program Packet Switching Interface (NPSI) licensed program.

### Changes for this Release

*X.25 NPSI Version 3 General Information* has been updated to reflect minor functional updates for this release in addition to editorial and technical changes. New or changed information is identified by a vertical bar (|) in the left margin.

## NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning

### Description

*NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning* is intended for system programmers to determine errors, resolve problems, customize and tune X.25 Network Control Program Packet Switching Interface (NPSI) and the X.25 ODLC function of Network Control Program (NCP).

### Changes for this Release

*NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning* has been updated to reflect minor functional updates for this release in addition to editorial and technical changes. New or changed information is identified by a vertical bar (|) in the left margin.

## X.25 NPSI Version 3 Release 9 Data Areas

### Description

*X.25 NPSI Version 3 Release 9 Data Areas* provides control block information for the IBM X.25 Network Control Program Packet Switching Interface (NPSI) licensed program.

### Changes for this Release

*X.25 NPSI Version 3 Release 9 Data Areas* has been updated to reflect minor functional updates for this release in addition to editorial and technical changes. New or changed information is identified by a vertical bar (|) in the left margin.

## Network Terminal Operation R11 Planning, Migration, and Resource Definition Guide

### Description

The purpose of this book is to enable system programmers to define NTO resources to a Systems Network Architecture (SNA) network.



### **Changes for this Release**

This edition of *NTO Planning, Migration, and Resource Definition* includes information about NTO R11.

## **Network Terminal Operation R11 Diagnosis**

### **Description**

This book is intended for field support personnel, system analysts, and system programmers who need to isolate and diagnose failures that occur in NTO.

### **Changes for this Release**

This edition of *NTO Planning, Migration, and Resource Definition* adds information about NTO R11.

## **NCP V7R7, SSP V4R7, and EP R14 Library Directory**

### **Description**

This manual presents an overview of NCP, SSP, EP and related network products, summarizes the changes to NCP, SSP, EP and the library for the current release, and directs you to information on a variety of network tasks in the NCP and VTAM libraries.

## Manuals That Will Not Be Updated for NCP V7R7 and SSP V4R7

### NCP and SSP Customization Guide

#### **Description**

The *NCP and SSP Customization Guide* describes how to create your own NCP line control functions and NDF generation applications.

#### **Changes for this Release**

The *NCP and SSP Customization Guide* has not been updated for this release. The existing manual applies to NCP V7R7 and SSP V4R7.

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## Chapter 4. Directory to Task-Specific Information

This chapter is a directory to the information in the NCP, SSP, and EP library. To use this directory, find the section for the task you are performing and refer to the *location* cited for particular subtasks. EP and PEP tasks are generally included with those for NCP.

**Note:** Chapter references are given in this directory when a major section of an NCP, SSP, or EP book is devoted to the topic.

### Planning the Network

The planning task is the important first step in creating or upgrading NCP. In planning the network, you need to determine the processes and resources that will be used for all subsequent network tasks.

Table 4-1 shows the planning subtasks and where to find information on them.

Table 4-1. Planning the Network

Subtask	Location
Identifying goals and requirements	<i>Planning for NetView, NCP, and VTAM</i> <i>Planning for Integrated Networks</i> <i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 1, "Defining Your NCP Configuration" "What Kind of Network Are You Defining?"
Identifying performance and availability objectives	<i>Planning for Integrated Networks</i>
Documenting your network before installing NCP, SSP, or EP	<i>Planning for Integrated Networks</i>
Defining system resources	<i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 1, "Defining Your NCP Configuration"
Migrating to the current NCP release	<i>Planning for NetView, NCP, and VTAM</i> <i>NCP V7R7 Migration Guide</i> Chapter 1, "Using the Migration Aid" Also see the chapter for the NCP release you are migrating from.
Migrating to the current SSP release	<i>Planning for NetView, NCP, and VTAM</i> <i>NCP, SSP, and EP Diagnosis Guide</i> Appendix A, "Maintaining SSP Utilities"
Migrating to a different host operating system or controller model or to a type 7 channel adapter	<i>Planning for Integrated Networks</i> <i>NCP V7R7 Migration Guide</i> Chapter 1, "Using the Migration Aid (controller only)" Chapter 3, "Host System and Hardware Updates"
Planning for change	<i>Planning for NetView, NCP, and VTAM</i> <i>Planning for Integrated Networks</i>
Managing your network	<i>Planning for Integrated Networks</i>
Recovering from errors	<i>Planning for Integrated Networks</i> <i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 25, "Backup and Recovery Procedures"
Documenting and reporting problems	<i>Planning for Integrated Networks</i>
Planning an X.25 network	<i>NCP Version 7 and X.25 NPSI Version 3 Planning and Installation</i>

## Installing NCP, SSP, and EP

NCP, SSP, and EP are supplied on machine-readable material from IBM software distribution.

- If you are running under MVS, use System Modification Program Extended (SMP/E) to install NCP, SSP, and EP.
- If you are running under VM, use the IBM-supplied materials, including VMSES/E, (Virtual Machine Serviceability Enhancements Staged/Extended), to install NCP, SSP, and EP.
- If you are running under VSE, use the Maintain System History Program (MSHP).

Table 4-2 shows the installation subtasks and where to find information on them.

Table 4-2. Installing NCP, SSP, and EP

Subtask	Location
Planning for installation	<i>Planning for NetView, NCP, and VTAM</i> <i>NCP V7R7 Migration Guide</i> Chapter 1, "Using the Migration Aid" Chapter 3, "Host System and Hardware Updates"
Verifying compatibility	<i>Planning for NetView, NCP, and VTAM</i> <i>NCP V7R7, SSP V4R7, and EP R14 Library Directory</i> Chapter 1, "Introduction to NCP, SSP, and EP" Appendix B, Cross-Product Compatibilities
Allocating storage	<i>Planning for NetView, NCP, and VTAM</i> <i>NCP V7R7 Migration Guide</i> See the chapter for the NCP release you are migrating from.
Meeting operating system requirements	<i>Planning for NetView, NCP, and VTAM</i>
Installing NCP, SSP, and EP	<i>Planning for NetView, NCP, and VTAM</i> <i>Program Directory</i> (provided with the machine-readable material)
Ensuring security	<i>Planning for Integrated Networks</i>
X.25 considerations	<i>NCP Version 7 and X.25 NPSI Version 3 Planning and Installation</i>

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### Migrating to the Current Release

Migrating to the current NCP release is the process of updating your NCP generation definition so that it generates the current release. You can migrate automatically using the NDF migration aid function, or you can migrate manually by editing your generation definition.

Table 4-3 shows the migration subtasks and where to find information on them.

Table 4-3. Migrating to the Current Release

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<b>Subtask</b>	<b>Location</b>
Identifying required and optional changes	<i>NCP V7R7 Migration Guide</i> Chapter 3, "Host System and Hardware Updates"  See also the following sections in the chapter for the NCP release you are migrating from: "Changed Defaults" "Deleted Keywords" "Changes to Storage Requirements"
Updating your generation definition automatically	<i>NCP V7R7 Migration Guide</i> Chapter 1, "Using the Migration Aid" Appendix B, "Migration Aid Modifications" Appendix C, "Migration Aid Sample"
Updating your generation definition manually	<i>NCP, SSP, and EP Resource Definition Reference</i> Chapter 2, "Definition Statement and Keyword Descriptions"  <i>NCP, SSP, and EP Resource Definition Guide</i> Look up the specific function in the index or table of contents.
Identifying keyword changes by release	<i>NCP V7R7 Migration Guide</i> Appendix A, "Quick Reference of Keyword Changes"
Migrating to the current SSP release	<i>NCP, SSP, and EP Diagnosis Guide</i> Appendix A, "Maintaining SSP Utilities" (includes sample)
Migrating from an unsupported release	<i>NCP V7R7 Migration Guide</i> Chapter 3, "Migrating from an Out-of-Service Release"
X.25 migration considerations	<i>NCP Version 7 and X.25 NPSI Version 3 Planning and Installation</i> Chapter 3, "Planning for an X.25 Network"

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## Customizing NDF

You can customize the NDF to define network resources not provided by the IBM-supplied definition functions and generate those resources when you generate NCP.

Table 4-4 shows the subtasks for customizing NDF and where to find information on them.

*Table 4-4. Customizing NDF*

<b>Subtask</b>	<b>Location</b>
Defining custom NDF functions	<i>NCP and SSP Customization Guide</i> Chapter 4, "Creating and Using User-Written Generation Applications"  <i>NCP and SSP Customization Reference</i> Chapter 4, "NDF Utility Directory"  <i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 13, "Customized Functions"
Understanding NDF exit interfaces	<i>NCP and SSP Customization Guide</i> Chapter 4, "Creating and Using User-Written Generation Applications"
Designing your own generation applications	<i>NCP and SSP Customization Guide</i> Chapter 4, "Creating and Using User-Written Generation Applications"
Implementing NDF generation applications	<i>NCP and SSP Customization Guide</i> Chapter 4, "Creating and Using User-Written Generation Applications"

### Customizing NCP

IBM provides resources and macros for modifying NCP to enhance support for certain stations or to provide support for stations that are not currently supported by the IBM-supplied programs.

Table 4-5 shows the subtasks for customizing NCP and where to find information on them.

Table 4-5. Customizing NCP

Subtask	Location
Identifying user line-control requirements	<i>NCP and SSP Customization Guide</i> Chapter 2, "Customizing NCP Line Control"  <i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 13, "Customized Functions"
Identifying programmed resource requirements	<i>NCP and SSP Customization Guide</i> Chapter 3, "Customizing Programmed Resources"  <i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 13, "Customized Functions"
Designing user line-control applications	<i>NCP and SSP Customization Guide</i> Chapter 1, "Writing Customized NCP Routines" Chapter 2, "Customizing NCP Line Control"  <i>NCP and SSP Customization Reference</i> Chapter 1, "NCP Macro Overview"
Designing programmed resource applications	<i>NCP and SSP Customization Guide</i> Chapter 1, "Writing Customized NCP Routines" Chapter 3, "Customizing Programmed Resources"  <i>NCP and SSP Customization Reference</i> Chapter 1, "NCP Macro Overview"
Implementing programmed resource applications	<i>NCP and SSP Customization Guide</i> Chapter 3, "Customizing Programmed Resources"  <i>NCP and SSP Customization Reference</i> Chapter 2, "Macro Directory" Chapter 3, "Entrances and Exits for User-Written Line Control"
Implementing user line-control applications	<i>NCP and SSP Customization Guide</i> Chapter 2, "Customizing NCP Line Control"  <i>NCP and SSP Customization Reference</i> Chapter 2, "Macro Directory" Chapter 3, "Entrances and Exits for User-Written Line Control"
Defining customized resources	<i>NCP and SSP Customization Guide</i> Chapter 3, "Customizing Programmed Resources"
Generating a customized NCP	<i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 1, "Generating the Program under MVS" Chapter 4, "Generating the Program under VM" Chapter 7, "Generating the Program under VSE"



## Defining NCP Resources

The task of defining NCP resources is the most involved step in creating an NCP. In this step, you code a generation definition that describes the characteristics of all the devices in your network and the links between them, and identifies the NCP resources needed to manage those devices and links.

Table 4-6 shows the subtasks for defining NCP resources and where to find information on them.

Table 4-6. Defining NCP Resources

Subtask	Location
Identifying NCP functions and resources needed for the network	<p><i>Planning for NetView, NCP, and VTAM</i></p> <p><i>Planning for Integrated Networks</i></p> <p><i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 1, "Defining Your NCP Configuration" "What Kind of Network Are You Defining?"</p>
Identifying configuration requirements for the network	<p><i>Planning for Integrated Networks</i></p> <p><i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 1, "Defining Your NCP Configuration" "What Kind of Network Are You Defining?"</p>
Designing the NCP configuration	<i>Planning for Integrated Networks</i>
Adding new functions	<p><i>NCP V7R7 Migration Guide</i> See the chapter for the NCP release you are migrating from.</p> <p><i>NCP, SSP, and EP Resource Definition Guide</i> Look up the specific function in the index or table of contents.</p>
Coding the NCP generation definition	<p><i>NCP, SSP, and EP Resource Definition Guide</i> See the chapter for the function you want to define. Appendix A, "NCP V7R7 Sample Generation Definitions" (includes comprehensive samples)</p> <p><i>NCP, SSP, and EP Resource Definition Reference</i> Chapter 1, "Getting Started" Chapter 2, "Definition Statement and Keyword Descriptions" Appendix A, "Keyword Summary"</p> <p><i>VTAM Resource Definition Reference</i> See information about VTAM definitions that must match corresponding NCP definitions.</p>
Defining X.25 resources	<i>NCP Version 7 and X.25 NPSI Version 3 Planning and Installation</i>

### Generating and Loading NCP and EP

The task of generating and loading NCP is the last step in implementing NCP. In this step, the NDF processes your generation definition to create an object module. This object module is then link-edited to create an NCP load module. Finally, you use the SSP loader utility or the loader facility for your access method to load NCP into communication controller storage.

Table 4-7 shows the subtasks for generating and loading NCP and where to find information on them.

Table 4-7 (Page 1 of 2). *Generating and Loading NCP and EP*

Subtask	Location
Performing a test generation	<i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 1, "Generating the Program under MVS" Chapter 4, "Generating the Program under VM" Chapter 7, "Generating the Program under VSE"
Resolving generation errors	<i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 1, "Generating the Program under MVS" Chapter 4, "Generating the Program under VM" Chapter 7, "Generating the Program under VSE"  <i>NCP, SSP, and EP Diagnosis Guide</i> Chapter 3, "Diagnostic Procedures for NCP or EP Problems," see "NCP Generation Error Procedure" Chapter 8, "Using NDF Diagnostic Aids" (includes sample)
Generating an NCP load module under MVS	<i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 1, "Generating the Program under MVS" Chapter 2, "Examples of JCL for Generation under MVS"
Generating an NCP load module under VM	<i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 4, "Generating the Program under VM" Chapter 5, "Examples of EXECs for Generation under VM"
Generating an NCP load module under VSE	<i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 7, "Generating the Program under VSE" Chapter 8, "Examples of JCL for Generation under VSE"
Loading an NCP load module	<i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 3, "Loading the Program under MVS" Chapter 6, "Loading the Program under VM" Chapter 9, "Loading the Program under VSE" Chapter 10, "Remote Loading and Activation"
Renaming a load module	<i>VTAM Operation</i> Look up the MODIFY LOAD command.
Moving a load module	<i>VTAM Operation</i> Look up the MODIFY LOAD command.
Replacing a load module	<i>VTAM Operation</i> Look up the MODIFY LOAD command.  <i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 10, "Remote Loading and Activation"
Purging a load module	<i>VTAM Operation</i> Look up the MODIFY LOAD command.
Scheduling a load module for automatic initial program load (IPL)	<i>VTAM Operation</i> Look up the MODIFY LOAD command.

Table 4-7 (Page 2 of 2). Generating and Loading NCP and EP

Subtask	Location
Testing NCP in the communication controller	<i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 22, "Diagnostic Operations for the Generation Procedure"
Linking SSP utilities with the MVS system	<i>NCP, SSP, and EP Diagnosis Guide</i> Appendix A, "Maintaining SSP Utilities" (includes sample)
Using usage tiers	<i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 1, "Defining Your NCP Configuration"
	<i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 2, "Usage Tiers"
Generating X.25 lines	<i>NCP Version 7 and X.25 NPSI Version 3 Planning and Installation</i>

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### Tuning for Performance

NCP can provide information on the usage level and performance of various network resources. Using this information, you can adjust characteristics of your network to transmit data more quickly and to carry more traffic.

Table 4-8 shows the tuning subtasks and where to find information on them.

*Table 4-8. Tuning for Performance*

<b>Subtask</b>	<b>Location</b>
Determining performance goals	<i>Planning for Integrated Networks</i>
Selecting and defining performance characteristics	<i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 24, "Network Performance"
Monitoring NCP performance	<i>NCP, SSP, and EP Diagnosis Guide</i> Chapter 3, "Diagnostic Procedures for NCP or EP Problems"
	<i>NCP and EP Reference</i> Chapter 4, "Serviceability Aids" "NPM Data Collection Functions" "PMF"
	<i>NTuneMON V2R5 User's Guide</i>
Reducing delays related to File Transfer Protocol (FTP)	<i>VTAM Resource Definition Reference</i> See information on the DELAY operand.  <i>VTAM Network Implementation Guide</i> See information on coattailing.
Monitoring the use of NCP resources	<i>NTuneMON V2R5 User's Guide</i>  <i>NCP and EP Reference</i> Chapter 10, "Control Block Management"
Tuning NCP while it is running	<i>NTuneNCP Feature Reference</i> <i>NCP Tuning with NTune</i>
Optimizing the use of NCP control blocks	<i>NCP and EP Reference</i> Chapter 10, "Control Block Management"

## Reconfiguring NCP Dynamically

Dynamic reconfiguration is the process of changing a network configuration without regenerating NCP or restarting VTAM. Dynamic reconfiguration for NCP enables you to add, delete, or move physical and logical units.

Table 4-9 shows the dynamic reconfiguration subtasks and where to find information on them.

Table 4-9. Reconfiguring NCP Dynamically

Subtask	Location
Planning to reconfigure	<i>Planning for Integrated Networks</i>
Adding, deleting, or moving an NCP device	<i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 10, "Dynamic Reconfiguration" (includes sample)  <i>NCP, SSP, and EP Resource Definition Reference</i> See individual definition statements.
Adding, deleting, or moving physical units or logical units within an NCP major node	<i>VTAM Network Implementation Guide</i> See information on dynamic reconfiguration.
Changing an SDLC address for a physical unit	<i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 10, "Dynamic Reconfiguration" (includes sample)  <i>VTAM Network Implementation Guide</i> See information on dynamic reconfiguration.
Creating and activating a spare SDLC line	<i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 5, "NCP and Link-Attached Devices"  <i>NCP, SSP, and EP Resource Definition Reference</i> Chapter 2, "Definition Statement and Keyword Descriptions"  <i>NTuneMON V2R5 User's Guide</i> Chapter 7, "Procedure for Adding SDLC Lines"

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### Maintaining NCP, SSP, and EP

The task of maintaining NCP is a part of the larger task of maintaining your network. For general information on maintaining your network, refer to *Planning for Integrated Networks*.

Table 4-10 shows the subtasks for maintaining NCP and where to find information on them.

Table 4-10. Maintaining NCP, SSP, and EP

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<b>Subtask</b>	<b>Location</b>
Performing backup and recovery	<i>Planning for Integrated Networks</i> <i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 25, "Backup and Recovery Procedures"
Using NetView reports	<i>Planning for Integrated Networks</i> <i>TME 10 NetView for OS/390 Diagnosis Guide</i> See information on resources supported by the NetView program.
Using extended network addressing	<i>VTAM Network Implementation Guide</i> <i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 4, "Channel Links and Access Methods" "Defining Subarea Addressing Limits"
Loading and activating a remote communication controller	<i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 10, "Remote Loading and Activation"
Using usage tiers	<i>NCP, SSP, and EP Resource Definition Guide</i> "Usage Tiers" <i>NCP, SSP, and EP Resource Definition Guide</i> "Usage Tiers" Chapter 3, "Defining Your Communication Controller" (includes sample)
Estimating NCP storage requirements	<i>NCP V7R7 Migration Guide</i> See the chapter for the NCP release you are migrating from.
Updating SSP	<i>NCP, SSP, and EP Diagnosis Guide</i> Appendix A, "Maintaining SSP Utilities" (includes sample)

## Solving NCP, SSP, and EP Problems

You may encounter problems as you generate and load NCP or while NCP is running. NCP and SSP provide a variety of information and tools to help you diagnose and resolve these problems. These diagnostic aids and the processes for resolving problems are described in *NCP, SSP, and EP Diagnosis Guide* and *NCP, SSP, and EP Trace Analysis Handbook*.

Table 4-11 shows the subtasks for solving NCP, SSP, and EP problems and where to find the information to identify and diagnose the problems.

Table 4-11 (Page 1 of 2). Solving NCP, SSP, and EP Problems

Subtask	Location
Identifying and localizing the problem	<i>NCP, SSP, and EP Diagnosis Guide</i> <i>NCP, SSP, and EP Trace Analysis Handbook</i>
Identifying generation errors	<i>NCP, SSP, and EP Generation and Loading Guide</i> Chapter 1, "Generating the Program under MVS" "Understanding Listings and Error Messages" Chapter 4, "Generating the Program under VM" "Understanding Listings and Error Messages" Chapter 7, "Generating the Program under VSE" "Understanding Listings and Error Messages"
Understanding error messages, sense codes, and abend codes	<i>NCP, SSP, and EP Messages and Codes</i> Chapter 1, "SSP Messages" Chapter 2, "NCP Sense Codes" Chapter 3, "Abend Codes"
Including diagnostic aids in NCP	<i>NCP, SSP, and EP Resource Definition Guide</i> Chapter 23, "Defining Diagnostic Aids" (includes sample)
Collecting data on problem symptoms	<i>NCP, SSP, and EP Diagnosis Guide</i> Chapter 2, "Identifying the Problem and Gathering Information" <i>NCP, SSP, and EP Trace Analysis Handbook</i> <i>NCP and EP Reference</i> Appendix G, "Online Tests"
Documenting and reporting problems	<i>NCP, SSP, and EP Diagnosis Guide</i>
Identifying the cause of the problem	<i>NCP, SSP, and EP Diagnosis Guide</i>
Performing initial problem resolution	<i>NCP, SSP, and EP Diagnosis Guide</i> <i>NCP and EP Reference</i> Use the table of contents to find information on the problem. <i>NCP and EP Reference Summary and Data Areas, Volume 1</i> <i>NCP and EP Reference Summary and Data Areas, Volume 2</i> Use the table of contents to find information on the problem.
Analyzing the problem	<i>NCP, SSP, and EP Diagnosis Guide</i> <i>NCP, SSP, and EP Trace Analysis Handbook</i> <i>NCP and EP Reference</i> Use the table of contents or index to find information on the problem. <i>NCP and EP Reference Summary and Data Areas, Volume 1</i> <i>NCP and EP Reference Summary and Data Areas, Volume 2</i> Use the table of contents to find information on the problem.

Table 4-11 (Page 2 of 2). Solving NCP, SSP, and EP Problems

<b>Subtask</b>	<b>Location</b>
Resolving the problem	<p><i>NCP, SSP, and EP Diagnosis Guide</i></p> <p><i>NCP and EP Reference</i> Use the table of contents or index to find information on the problem.</p> <p><i>NCP and EP Reference Summary and Data Areas, Volume 1</i> <i>NCP and EP Reference Summary and Data Areas, Volume 2</i> Use the table of contents to find information on the problem.</p>



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## Appendix A. Customization Macros

The macros identified in this appendix are provided as programming interfaces for customers by NCP.

**Attention** Do not use as programming interfaces any NCP macros other than those identified in this appendix.

The following macros are provided as product-sensitive programming interfaces:

ABEND	CALL	GETCB	PIUEND	SLL
ABORT	CASE	GETIME	POINT	SLLB
ABORTVR	CASEIF	GETPARM	POSTUACB	SLLH
ACHAIN	CASENTRY	GETPT	PRELEASE	SRL
ACTVRIT	CASEXIT	GRPEND	PURGQCB	SRLB
ADVAN	CHAIN	GRPENTRY	PUTBYTE	SRLH
AFIND	CHAP	IF	QCB	STRM
ALLOCATE	CHECKSSI	INCRP	QPOST	SUBRTN
ANDIF	CHECKVR	INHIBIT	RCBSCAN	SVLINK
ASCAN	COMMIT	INSERT	RELEASE	SWAP
ASHIFT	COMPARE	IOHM	RESET	SYSXIT
ATTACHVR	CONVRT	LA	RESTORE	TAGBUFF
AUNCHAIN	COPYBCU	LASTUACB	RETURN	TESTTGB
BAL	COPYPIU	LDM	RNSVC	THEN
BCR	CXTSVX	LEASE	ROUTE	TPPOST
BFREVENT	DACTVRIT	LEAVEDO	ROUTEMAP	TRACEPIU
BH	DECOMMIT	LINK	ROUTINE	TRIGGER
BHEXIT	DEFMSK	LINKTGB	RSLVCAP	TVSIDL
BLDR	DEQUE	MAINT	RSLVDYN	TVSMOD
BLKENTRY	DETACHVR	MAINTCS	RSLVNAD	TVSNEW
BM	DEVPARMS	MOVE	RSLVNET	TVSRAS
BMZ	DOUNTIL	MOVECHAR	RSLVRID	TVSREF
BNC	DOWHILE	MVQUE	RSLVSNP	TVSRTRN
BNDH	DTRACE	NCHNG	RSLVSSCP	TVSTIME
BNE	ECB	NEOAXT	RSLVTGB	UACTRTN
BNH	ECBINIT	NEOENQ	RSLVVVTI	UNCHAIN
BNL	ELSE	NEOXPRT	SAVE	UPARMS
BNZ	ENDCASE	NPAPIU	SAVEAREA	URETURN
BP	ENDDO	NPAQINFO	SAVESQ	VALQCB
BPZ	ENDIF	NPAQSTAT	SCAN	VRACT
BTDELETE	ENQUE	NPARMS	SDB	VRACTCK
BTECHECK	EXCR	NVRID	SETEVNTL	VREVENT
BTINSERT	EXTRACT	ORIF	SETIME	VRIMTASK
BTSEARCH	FETRACE	OUTICW1	SETLATO	XIO
BUFCHK	FINDUACB	PACEMAP	SETPRI	XIOFL
BUILDPIU	FVTABLE	PCIL4	SETRP1C	XPC
BZR	GALERT	PERFORM	SETTGB	XPORTVR
CAIO	GETBYTE	PIUDEALL	SETXTRN	



## Appendix B. Cross-Product Compatibilities

This appendix shows the compatibilities between the current releases of NCP, SSP, and related products.

### NCP to NCP

All supported versions and releases of NCP are compatible.

### NCP to SSP

<i>Table B-1. NCP-to-SSP Compatibility</i>									
SSP Releases	NCP Releases								
	V4R3.1	V5R4	V6R3	V7R1	V7R3	V7R4	V7R5	V7R6	V7R7
	3725	3720 3745	3745	3745	3745	3745	3745	3745	3745
	MVS VM VSE	MVS VM VSE	MVS	VSE	MVS VM	MVS VM VSE	MVS VM VSE	MVS VM VSE	MVS VM VSE
V3R6 VSE	Y	Y							
V3R8 VM	Y	Y							
V3R9 MVS	Y	Y	Y						
V4R1 VSE	Y	Y		Y					
V4R3 MVS VM	Y Y	Y Y	Y		Y Y				
V4R4 MVS VM VSE	Y Y Y	Y Y Y	Y		Y Y	Y Y Y			
V4R5 MVS VM VSE	Y Y Y	Y Y Y	Y		Y Y	Y Y Y	Y Y Y		
V4R6 MVS VM VSE	Y Y Y	Y Y Y	Y		Y Y	Y Y Y	Y Y Y	Y Y Y	
V4R7 MVS VM VSE	Y Y Y	Y Y Y	Y		Y Y	Y Y Y	Y Y Y	Y Y Y	Y Y Y
<b>Legend:</b>									
Y Yes, can generate, load, and dump.									
Blank Not supported.									

## NCP and Related Products

<i>Table B-2. NCP-to-Related-Product Compatibility</i>										
Related Product Releases	NCP Releases									
	V4R3.1	V5R4	V6R3	V7R1	V7R3	V7R4	V7R5	V7R6	V7R7	
	3725	3720 3745	3745	3745	3745	3745	3745	3745	3745	3745
	MVS VM VSE	MVS VM VSE	MVS	VSE	MVS VM	MVS VM VSE	MVS VM VSE	MVS VM VSE	MVS VM VSE	MVS VM VSE
EP MVS VM VSE	R6.1 <sup>1</sup> R6.1 <sup>1</sup> R6.1 <sup>1</sup>	R9 <sup>1</sup> R9 <sup>1</sup> R9 <sup>1</sup>	R11 <sup>1</sup>	R12 <sup>1</sup>	R12 <sup>1</sup> R12 <sup>1</sup>	R12 <sup>1</sup> R12 <sup>1</sup> R12 <sup>1</sup>	R12 <sup>1</sup> R12 <sup>1</sup> R12 <sup>1</sup>	R12 <sup>1</sup> R12 <sup>1</sup> R12 <sup>1</sup>	R12 <sup>1</sup> R12 <sup>1</sup> R12 <sup>1</sup>	R14 R14 R14
NPSI MVS VM VSE	V2R1 V2R1 V2R1	V3R4 V3R4 V3R4	V3R6	V3R7	V3R8 V3R8	V3R8 V3R8 V3R8	V3R8 V3R8 V3R8	V3R8 V3R8 V3R8	V3R8 V3R8 V3R8	V3R9 V3R9 V3R9
NRF MVS VM	R3.3, R4 R4	R6 R6	R8		R9 R9	R9 R9	R9 R9	R9 R9	R9 R9	R9 R9
NSI MVS VSE	R5 R5	R6 R6								
NTO MVS VM VSE	R5.1 R5.1 R5.1	R7 R7 R7	R9	R10	R10 R10	R10 R10 R10	R10 R10 R10	R10 R10 R10	R10 R10 R10	R11 R11 R11
XI MVS VM	V1.2 V1.2	V2R3 V2R3	V2R4.1		V2R4.2 V2R4.2	V2R4.2 V2R4.2	V2R4.2 V2R4.2	V2R4.2 V2R4.2	V2R4.2 V2R4.2	V2R4.2 V2R4.2
<b>Notes:</b>										
1. PEP only. The support of EP R5 through R12 is provided by PEP mode only.										

### Comments

- EP R4 provides support for the 3720 in a stand-alone environment.
- EP R8 provides support for the 3745 in a stand-alone environment.
- EP R14 provides support for the 3745 in a stand-alone or PEP environment.

## NCP to NetView

All supported versions and releases of NCP are compatible with all supported versions and releases of NetView. For full function, NetView requires VTAM V3R2 and NCP V4R3.1 or NCP V5R4 or later.

## NCP to VTAM for LU-LU Sessions

All supported versions and releases of NCP are compatible with all supported versions and releases of VTAM.

## NCP to VTAM for SSCP-PU Sessions

<i>Table B-3. NCP-to-VTAM Compatibility for SSCP-PU Sessions</i>										
VTAM Releases		NCP Releases								
		V4R3.1	V5R4	V6R3	V7R1	V7R3	V7R4	V7R5	V7R6	V7R7
		3725 MVS VM VSE	3720 3745 MVS VM VSE	3745 MVS	3745 VSE	3745 MVS VM	3745 MVS VM VSE	3745 MVS VM VSE	3745 MVS VM VSE	3745 MVS VM VSE
V3R2	VSE	Y	Y <sup>1</sup>	A <sup>1</sup>	Y <sup>1</sup>	A <sup>1</sup>	Y <sup>1</sup>	Y <sup>1</sup>	Y <sup>1</sup>	Y <sup>1</sup>
V3R3	MVS/XA VSE/ESA <sup>2</sup>	Y Y	Y Y	Y A	Y Y	Y A	Y Y	Y Y	Y Y	Y Y
V3R4	VSE/ESA <sup>2</sup>	Y	Y	A	Y	A	Y	Y	Y	Y
V3R4.1	VM/ESA VM/SP	Y Y	Y Y	A A	Y Y	Y Y	Y Y	Y Y	Y Y	Y Y
V3R4.2	MVS/ESA	Y	Y	Y	Y	Y	Y	Y	Y	Y
V4R1	MVS/ESA	Y	Y	Y	Y	Y	Y	Y	Y	Y
V4R2	MVS/ESA VM/ESA VSE/ESA	Y Y Y	Y Y Y	Y A A	Y Y Y	Y Y A	Y Y Y	Y Y Y	Y Y Y	Y Y Y
V4R3	MVS/ESA	Y	Y	Y	Y	Y	Y	Y	Y	Y
V4R4	MVS/ESA	Y	Y	Y	Y	Y	Y	Y	Y	Y
CS OS/390	R5	Y	Y	Y	Y	Y	Y	Y	Y	Y
CS OS/390	R6	Y	Y	Y	Y	Y	Y	Y	Y	Y
CS OS/390	R7	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>Legend:</b>										
A    Activate only: NCP cannot be generated or loaded from the operating system for this VTAM. However, if a copy of the NCP resource resolution table (RRT) and a copy of the NCP definition deck are moved to this operating system, VTAM can then activate this NCP. Program temporary fix (PTF) requirements must be investigated.										
Y    Load and activate: this VTAM level can load and activate this NCP level. Specifics must be investigated on an individual basis.										
<b>Footnotes:</b>										
1. Compatible with the appropriate VTAM PTF.										
2. VTAM V3R3 and V3R4 for VSE/ESA requires SSP V3R5 or later to load the NCP.										



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## List of Abbreviations

<b>ACF</b>	Advanced Communications Function	<b>NCP</b>	Network Control Program
<b>ANR</b>	Automatic network routing	<b>NCST</b>	NCP connectionless SNA transport
<b>ANSI</b>	American National Standards Institute	<b>NDF</b>	NCP/EP definition facility
<b>APPN</b>	Advanced Peer-to-Peer Networking	<b>NPA</b>	network performance analyzer
<b>ARP</b>	Address Resolution Protocol	<b>NPM</b>	NetView Performance Monitor
<b>BAN</b>	boundary access node	<b>NPSI</b>	X.25 NCP Packet Switching Interface
<b>BCCA</b>	buffer-chaining channel adapter	<b>NRF</b>	Network Routing Facility
<b>BECN</b>	backward explicit congestion notification	<b>NTO</b>	Network Terminal Option
<b>BNN</b>	boundary network node	<b>NTRI</b>	NCP/Token-Ring interconnection
<b>CCITT</b>	International Telegraph and Telephone Consultative Committee	<b>ODLC</b>	outboard data link control
<b>CD-ROM</b>	compact disk read-only memory	<b>PEP</b>	partitioned emulation program (EP & NCP)
<b>CLA</b>	communication line adapter	<b>PLU</b>	primary logical unit
<b>CLP</b>	communication line processor	<b>PTF</b>	program temporary fix
<b>CMS</b>	conversational monitor system	<b>PU</b>	physical unit
<b>CRP</b>	configuration report program	<b>PVC</b>	permanent virtual circuit
<b>CSS</b>	connectivity subsystem	<b>RIP</b>	Routing Information Protocol
<b>DLCI</b>	data link connection identifier	<b>RNR</b>	receive not ready
<b>DMPX</b>	data multiplexing	<b>RRT</b>	resource resolution table
<b>EP</b>	Emulation Program	<b>RTP</b>	rapid transport protocol
<b>ESCON</b>	Enterprise Systems Connection	<b>SDLC</b>	Synchronous Data Link Control
<b>ESS</b>	Ethernet-type subsystem	<b>SLU</b>	secondary logical unit
<b>FRFH</b>	frame-relay frame handler	<b>SMMF</b>	SSCP monitor mode function
<b>FTP</b>	file transfer protocol	<b>SMP/E</b>	system modification program extended
<b>HCD</b>	hardware configuration definition	<b>SNA</b>	Systems Network Architecture
<b>HPR</b>	high-performance routing	<b>SNI</b>	SNA network interconnection
<b>HPTSS</b>	high-performance transmission subsystem	<b>SPE</b>	small programming enhancement
<b>IEEE</b>	Institute of Electrical and Electronics Engineers	<b>SSCP</b>	system services control point
<b>InARP</b>	inverse address resolution protocol	<b>SSP</b>	System Support Program(s)
<b>INN</b>	intermediate network node	<b>TAP</b>	Trace analysis program
<b>IP</b>	Internet Protocol	<b>TCAM</b>	Telecommunications access method
<b>IPCS</b>	Interactive problem control system	<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>IPF</b>	Interactive Presentation facility	<b>TG</b>	transmission group
<b>ISDN</b>	integrated services digital network	<b>TIC</b>	token-ring interface coupler
<b>LAN</b>	local area network	<b>TSS</b>	transmission subsystem
<b>LIC</b>	line interface coupler	<b>VM</b>	virtual machine (IBM S/370 and S/390)
<b>LMI</b>	local management interface	<b>VM/ESA</b>	Virtual Machine/Enterprise Systems Architecture
<b>LPDA</b>	Link Problem Determination Aid	<b>VMSES/E</b>	Virtual Machine Serviceability Enhancements Staged/Extended
<b>LU</b>	logical unit	<b>VTAM</b>	Virtual telecommunications access method
<b>MLTG</b>	multilink transmission group	<b>WAN</b>	Wide area network
<b>MSHP</b>	maintain system history program	<b>XI</b>	X.25 SNA interconnection
<b>MVS</b>	Multiple Virtual Storage		
<b>MVS/ESA</b>	Multiple Virtual Storage/Enterprise Systems Architecture		





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# Glossary

This glossary includes terms and definitions from:

- The *IBM Dictionary of Computing*, New York: McGraw-Hill, 1994.
- The *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036. Definitions are identified by the symbol (A) after the definition.
- The ANSI/EIA Standard—440-A, *Fiber Optic Terminology*. Copies may be purchased from the Electronic Industries Association, 2001 Pennsylvania Avenue, N.W., Washington, DC 20006. Definitions are identified by the symbol (E) after the definition.
- The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). Definitions of published parts of this vocabulary are identified by the symbol (I) after the definition; definitions taken from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1 are identified by the symbol (T) after the definition, indicating that final agreement has not yet been reached among the participating National Bodies of SC1.
- Internet Request for Comments: 1208, *Glossary of Networking Terms*
- Internet Request for Comments: 1392, *Internet Users' Glossary*
- The *Object-Oriented Interface Design: IBM Common User Access Guidelines*, Carmel, Indiana: Que, 1992.

The following cross-references are used in this glossary:

**Contrast with:** This refers to a term that has an opposed or substantively different meaning.

**Synonym for:** This indicates that the term has the same meaning as a preferred term, which is defined in its proper place in the glossary.

**Synonymous with:** This is a backward reference from a defined term to all other terms that have the same meaning.

**See:** This refers the reader to multiple-word terms that have the same last word.

**See also:** This refers the reader to terms that have a related, but not synonymous, meaning.

**Deprecated term for:** This indicates that the term should not be used. It refers to a preferred term, which is defined in its proper place in the glossary.

## A

**abend.** (1) Abnormal end of task; the termination of a task before its completion because of an error condition that cannot be resolved by recovery facilities while the task is executing. (2) Synonym for *abnormal termination*.

**abnormal termination.** (1) The cessation of processing prior to planned termination. (T) (2) A system failure or operator action that causes a job to end unsuccessfully. (3) Synonymous with *abend*.

**access method.** (1) A technique, implemented in software, that controls the flow of information through a network. (2) A technique for moving data between main storage and input/output devices.

**ACF/TAP.** Advanced Communications Function/Trace Analysis Program. Synonymous with *TAP*.

**ACF/TCAM.** Advanced Communications Function for the Telecommunications Access Method. Synonym for *TCAM*.

**ACF/VTAM.** Advanced Communications Function for the Virtual Telecommunications Access Method. Synonym for *VTAM*.

**activate.** To make a resource ready to perform its function. Contrast with *deactivate*.

**active.** (1) Operational. (2) Pertaining to a node or device that is connected or is available for connection to another node or device. (3) The state of a resource when it has been activated and is operational. (4) Contrast with *inactive* and *inoperative*.

**ACTPU.** Activate physical unit. In SNA, a command used to start a session on a physical unit.

**adapter.** A part that electrically or physically connects a device to a computer or to another device.

**address.** In data communication, the unique code assigned to each device or workstation connected to a network.

**address resolution.** (1) A method for mapping network-layer addresses to media-specific addresses. (2) See also *Address Resolution Protocol (ARP)*.

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**Address Resolution Protocol (ARP).** In the Internet suite of protocols, the protocol that dynamically maps an IP address to an address used by a supporting metropolitan or local area network such as Ethernet or token-ring. See also *Reverse Address Resolution Protocol (RARP)*.

**addressing.** (1) The assignment of addresses to the instructions of a program. (2) A means of identifying storage locations. (3) In data communication, the way in which a station selects the station to which it is to send data. (4) Specifying an address or location within a file.

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

**Advanced Communications Function/Trace Analysis Program (ACF/TAP).** An SSP program service aid that assists in analyzing trace data produced by VTAM, TCAM, and NCP and provides network data traffic and network error reports. Synonymous with *Trace Analysis Program (TAP)*.

**Advanced Peer-to-Peer Networking (APPN).** An extension to SNA featuring (a) greater distributed network control that avoids critical hierarchical dependencies, thereby isolating the effects of single points of failure; (b) dynamic exchange of network topology information to foster ease of connection, reconfiguration, and adaptive route selection; (c) dynamic definition of network resources; and (d) automated resource registration and directory lookup. APPN extends the LU 6.2 peer orientation for end-user services to network control and supports multiple LU types, including LU 2, LU 3, and LU 6.2.

**Advanced Peer-to-Peer Networking (APPN) end node.** A node that provides a broad range of end-user services and supports sessions between its local control point (CP) and the CP in an adjacent network node. It uses these sessions to dynamically register its resources with the adjacent CP (its network node server), to send and receive directory search requests, and to obtain management services. An APPN end node can also attach to a subarea network as a peripheral node or to other end nodes.

**Advanced Peer-to-Peer Networking (APPN) network.** A collection of interconnected network nodes and their client end nodes.

**Advanced Peer-to-Peer Networking (APPN) network node.** A node that offers a broad range of end-user services and that can provide the following:

- Distributed directory services, including registration of its domain resources to a central directory server
- Topology database exchanges with other APPN network nodes, enabling network nodes throughout the network to select optimal routes for LU-LU sessions based on requested classes of service
- Session services for its local LUs and client end nodes
- Intermediate routing services within an APPN network

**Advanced Peer-to-Peer Networking (APPN) node.** An APPN network node or an APPN end node.

**allocate.** An LU 6.2 application programming interface (API) verb used to assign a session to a conversation for the conversation's use. Contrast with *deallocate*.

**application.** A collection of software components used to perform specific types of user-oriented work on a computer.

**APPN.** Advanced Peer-to-Peer Networking.

**ARP.** Address Resolution Protocol.

## B

**backbone.** (1) A set of nodes and their interconnecting links providing the primary data path across a network. (2) In a local area network multiple-bridge ring configuration, a high-speed link to which the rings are connected by means of bridges or routers. A backbone may be configured as a bus or as a ring. (3) In a wide area network, a high-speed link to which nodes or data switching exchanges (DSEs) are connected.

**bandwidth.** The difference, expressed in hertz, between the highest and the lowest frequencies of a range of frequencies.

**batch.** (1) An accumulation of data to be processed. (2) A group of records or data processing jobs brought together for processing or transmission. (3) Pertaining to activity involving little or no user action. Contrast with *interactive*.

**binary synchronous communication (BSC).** (1) A form of telecommunication line control that uses a standard set of transmission control characters and control character sequences, for binary synchronous transmission of binary-coded data between stations. (2) Contrast with *Synchronous Data Link Control (SDLC)*.

**block.** A string of data elements recorded or transmitted as a unit. The elements may be characters, words, or physical records. (T)

**boundary access node (BAN).** A router (such as the IBM 6611) that provides its attached LAN-based SNA peripheral nodes direct frame-relay access to a subarea boundary node (such as an IBM 3745 or an IBM 3746 Model 900).

**bracket protocol.** In SNA, a data flow control protocol in which exchanges between two session partners are achieved through the use of brackets, with one partner designated at session activation as the first speaker and the other as the bidder. The bracket protocol involves bracket initiation and termination rules.

**bridge.** (1) A functional unit that interconnects two local area networks that use the same logical link control protocol but may use different medium access control protocols. (T) (2) A functional unit that interconnects multiple LANs (locally or remotely) that use the same logical link control protocol but that can use different medium access control protocols. A bridge forwards a frame to another bridge based on the medium access control (MAC) address. (3) In the connection of local loops, channels, or rings, the equipment and techniques used to match circuits and to facilitate accurate data transmission. (4) Contrast with *gateway* and *router*.

**BSC.** Binary synchronous communication.

**byte.** (1) A string that consists of a number of bits, treated as a unit, and representing a character. (T) (2) A binary character operated upon as a unit and usually shorter than a computer word. (A) (3) A group of 8 adjacent binary digits that represent one EBCDIC character.

## C

**CD-ROM.** High-capacity read-only memory in the form of an optically read compact disc.

**channel.** (1) A path along which signals can be sent, for example, data channel, output channel. (A) (2) In data communication, a means of one-way transmission. (3) A functional unit, controlled by the processor, that handles the transfer of data between processor storage and local peripheral equipment.

**channel adapter.** A communication controller hardware unit that is used to attach the communication controller to a host channel.

**channel-attached.** (1) Pertaining to the attachment of devices directly by input/output channels to a host processor. (2) Pertaining to devices attached to a controlling unit by cables, rather than by telecommunication lines. Contrast with *link-attached*. Synonymous with *local*.

**circuit.** (1) One or more conductors through which an electric current can flow. See *physical circuit* and *virtual circuit*. (2) A logic device.

**circuit switching.** (1) A process that, on demand, connects two or more data terminal equipment (DTEs) and permits the exclusive use of a data circuit between them until the connection is released. (I) (A) (2) Synonymous with *line switching*. (3) See also *message switching* and *packet switching*.

**cluster.** (1) A station that consists of a control unit (a cluster controller) and the terminals attached to it. (2) A group of APPN nodes that have the same network ID and the same topology database. A cluster is a subset of a NETID subnetwork.

**coattailing.** The concept of VTAM's writing PIUs to NCP and reading PIUs from NCP with a single channel program. The values coded for the DELAY keywords on the VTAM PCCU definition statement and the NCP LINE definition statement affect the degree of coattailing. A user can increase the probability of VTAM's writing and reading PIUs with a single channel program by adjusting these DELAY keywords. An increase in the degree of coattailing improves channel efficiency but may increase response time.

**command.** (1) A request from a terminal for the performance of an operation or the execution of a particular program. (2) In SNA, any field set in the transmission header (TH), request header (RH), and sometimes portions of a request unit (RU), that initiates an action or that begins a protocol; for example: (a) Bind Session (session-control request unit), a command that activates an LU-LU session, (b) the change-direction indicator in the RH of the last RU of a chain, (c) the virtual route reset window indicator in an FID4 transmission header. (3) See also *VTAM operator command*.

**communication controller.** A type of communication control unit whose operations are controlled by one or more programs stored and executed in the unit. It manages the details of line control and the routing of data through a network.

**communication line.** Deprecated term for *telecommunication line*.

**communication line processor (CLP).** In a communication controller, the processor that manages telecommunication lines.

**communication management configuration host node.** The type 5 host processor in a communication management configuration that does all network-control functions in the network except for the control of devices channel-attached to data hosts. Synonymous

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with *communication management host*. Contrast with *data host node*.

**communication management host.** Synonym for *communication management configuration host node*. Contrast with *data host*.

**configuration.** (1) The manner in which the hardware and software of an information processing system are organized and interconnected. (T) (2) The devices and programs that make up a system, subsystem, or network. (3) In CCP, the arrangement of controllers, lines, and terminals attached to an IBM 3710 Network Controller. Also, the collective set of item definitions that describe such a configuration.

**configuration report program (CRP).** An SSP utility program that creates a configuration report listing network resources and resource attributes for networks with NCP, EP, PEP, or VTAM.

**connectivity.** (1) The capability of a system or device to be attached to other systems or devices without modification. (T) (2) The capability to attach a variety of functional units without modifying them.

**connectivity subsystem (CSS).** An expansion frame, such as the 3746 Model 900, that extends connectivity and enhances the performance of the IBM 3745 Communication Controller.

**control block.** (1) A storage area used by a computer program to hold control information. (I) (2) In the IBM Token-Ring Network, a specifically formatted block of information provided from the application program to the Adapter Support Interface to request an operation.

**controller.** A device that coordinates and controls the operation of one or more input/output devices, such as workstations, and synchronizes the operation of such devices with the operation of the system as a whole.

**CSS.** Connectivity subsystem.

## D

**data.** (1) A re-interpretable representation of information in a formalized manner suitable for communication, interpretation, or processing. Operations can be performed upon data by humans or by automatic means. (T) (2) Any representations such as characters or analog quantities to which meaning is or might be assigned. (A) (3) A representation of facts or instructions in a form suitable for communication, interpretation, or processing by human or automatic means. Data include constants, variables, arrays, and character strings.

**Note:** Programmers make a distinction between instructions and the data they operate on; however, in the usual sense of the word, data includes programs and program instructions.

**data circuit.** (1) A pair of associated transmit and receive channels that provide a means of two-way data communication. (I) (2) In SNA, synonym for *link connection*. (3) See also *physical circuit* and *virtual circuit*.

### Notes:

1. Between data switching exchanges, the data circuit may include data circuit-terminating equipment (DCE), depending on the type of interface used at the data switching exchange.
2. Between a data station and a data switching exchange or data concentrator, the data circuit includes the data circuit-terminating equipment at the data station end, and may include equipment similar to a DCE at the data switching exchange or data concentrator location.

**data host.** Synonym for *data host node*. Contrast with *communication management configuration host*.

**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-attached or communication adapter-attached devices. Synonymous with *data host*. Contrast with *communication management configuration host node*.

**data link.** In SNA, synonym for *link*.

**data network.** An arrangement of data circuits and switching facilities for establishing connections between data terminal equipment. (I)

**data set.** (1) Synonym for *file*. (2) Deprecated term for *modem*.

**deactivate.** To take a resource of a node out of service, rendering it inoperable, or to place it in a state in which it cannot perform the functions for which it was designed. Contrast with *activate*.

**deallocate.** An LU 6.2 application programming interface (API) verb that terminates a conversation, thereby freeing the session for a future conversation. Contrast with *allocate*.

**definition statement.** (1) In VTAM, the statement that describes an element of the network. (2) In NCP, a type of instruction that defines a resource to the NCP. See Figure X-1 on page X-7, Figure X-2 on page X-7, and Figure X-3 on page X-7. See also *macroinstruction*.

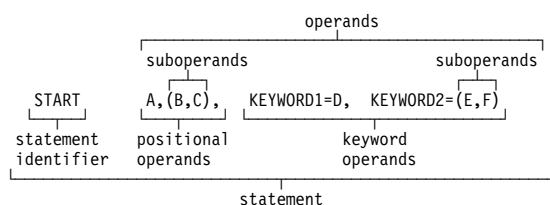


Figure X-1. Example of a Language Statement

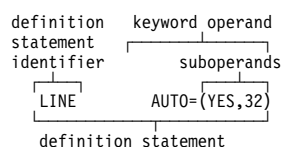


Figure X-2. Example of an NCP Definition Statement

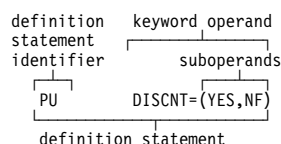


Figure X-3. Example of a VTAM Definition Statement

**dialog.** (1) The interaction between a user and a computer. (2) In an interactive system, a series of related inquiries and responses similar to a conversation between two people.

**directory.** (1) A table of identifiers and references to the corresponding items of data. (I) (A) (2) A database in an APPN node that lists names of resources (in particular, logical units) and records the CP name of the node where each resource is located. See *distributed directory database* and *local directory database*. (3) A type of file containing the names and controlling information for other files or other directories. (4) A listing of the files stored on a disk or diskette. (5) In VM, a Control Program (CP) disk file that defines each virtual machine's typical configuration: the user ID, password, regular and maximum allowable virtual storage, CP command privilege class or classes allowed, dispatching priority, logical editing symbols to be used, account number, and CP options desired.

**diskette.** (1) A small magnetic disk enclosed in a jacket. (T) (2) A thin, flexible magnetic disk and a semi-rigid protective jacket, in which the disk is permanently enclosed.

**distributed directory database.** The complete listing of all the resources in the network as maintained in the individual directories scattered throughout an APPN network. Each node has a piece of the complete directory, but it is not necessary for any one node to have the entire list. Entries are created, modified, and deleted through system definition, operator action, automatic registration, and ongoing network search proce-

dures. Synonymous with *distributed network directory* and *network directory database*.

**distributed network directory.** Synonym for *distributed directory database*.

**dump.** (1) To record, at a particular instant, the contents of all or part of one storage device in another storage device. Dumping is usually for the purpose of debugging. (T) (2) Data that has been dumped. (T) (3) To copy data in a readable format from main or auxiliary storage onto an external medium such as tape, diskette, or printer. (4) To copy the contents of all or part of virtual storage for the purpose of collecting error information.

**dynamic.** (1) In programming languages, pertaining to properties that can only be established during the execution of a program; for example, the length of a variable-length data object is dynamic. (I) (2) Pertaining to an operation that occurs at the time it is needed rather than at a predetermined or fixed time. (3) Contrast with *static*.

**dynamic reconfiguration (DR).** The process of changing the network configuration (peripheral PUs and LUs) without regenerating complete configuration tables or deactivating the affected major node.

## E

**emulation mode.** The function of a network control program that enables it to perform activities equivalent to those performed by a transmission control unit. Contrast with *network control mode*.

**Emulation Program (EP).** (1) An IBM control program that allows a channel-attached IBM communication controller to emulate the functions of an IBM 2701 Data Adapter Unit, an IBM 2702 Transmission Control, or an IBM 2703 Transmission Control. (2) See also *network control program*.

**enable.** To make functional.

**error.** A discrepancy between a computed, observed, or measured value or condition and the true, specified, or theoretically correct value or condition. (I) (A)

**Ethernet.** A 10-Mbps baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by using collision detection and delayed retransmission. Ethernet uses carrier sense multiple access with collision detection (CSMA/CD).

**extended network addressing.** The network addressing system that splits the address into an 8-bit subarea and a 15-bit element portion. The subarea

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portion of the address is used to address host processors or communication controllers. The element portion is used to permit processors or controllers to address resources.

**extended subarea addressing.** A network addressing system that is used in a network with more than 255 subareas.

## F

**file.** A named set of records stored or processed as a unit. (T) Synonymous with *data set*.

**File Transfer Protocol (FTP).** In the Internet suite of protocols, an application layer protocol that uses TCP and Telnet services to transfer bulk-data files between machines or hosts.

**flow control.** (1) In data communication, control of the data transfer rate. (I) (2) In SNA, the process of managing the rate at which data traffic passes between components of the network. The purpose of flow control is to optimize the rate of flow of message units with minimum congestion in the network; that is, to neither overflow the buffers at the receiver or at intermediate routing nodes, nor leave the receiver waiting for more message units.

**frame.** (1) In Open Systems Interconnection architecture, a data structure pertaining to a particular area of knowledge and consisting of slots that can accept the values of specific attributes and from which inferences can be drawn by appropriate procedural attachments. (T) (2) The unit of transmission in some local area networks, including the IBM Token-Ring Network. It includes delimiters, control characters, information, and checking characters. (3) In SDLC, the vehicle for every command, every response, and all information that is transmitted using SDLC procedures.

**frame handler (FH).** Synonym for *frame-relay frame handler (FRFH)*.

**frame relay.** (1) An interface standard describing the boundary between a user's equipment and a fast-packet network. In frame-relay systems, flawed frames are discarded; recovery comes end-to-end rather than hop-by-hop. (2) A technique derived from the integrated services digital network (ISDN) D channel standard. It assumes that connections are reliable and dispenses with the overhead of error detection and control within the network.

**frame-relay frame.** The frame-relay frame structure defined by American National Standards Institute (ANSI) Standard T1.618.

**frame-relay frame handler (FRFH).** (1) The function in a frame-relay node that switches frames along a per-

manent virtual circuit (PVC). A frame handler receives frames from an adjacent frame-relay node and uses the DLCI to forward them to the next node on the PVC. Synonymous with *frame handler*. See also *frame-relay switching equipment support* and *frame-relay terminating equipment*. (2) In NCP, the function that switches frames between frame handler supports on an internal PVC segment. The NCP frame handler function can also switch frames to the frame-relay terminating equipment function.

**frame-relay network.** A network that consists of frame-relay frame handlers (FRFH) and in which frames are passed from one frame-relay terminating equipment (FRTE) station to another through a series of one or more FRFHs.

**frame-relay switching equipment (FRSE) support.** In NCP, a set of frame-relay functions that include the frame-relay frame handler function and the local management interface (LMI) function. These functions are defined by American National Standards Institute (ANSI) Standards T1.617 and T1.618 and International Telegraph and Telephone Consultative Committee (CCITT) Standards Q.922 and Q.933. NCP provides additional functions, including performance measurement and enhanced reliability, that are not defined by ANSI or CCITT standards.

**frame-relay terminal equipment.** A device that can connect to a frame-relay network and provide the frame-relay terminating equipment function. See also *frame-relay frame handler* and *frame-relay terminating equipment*.

**frame-relay terminating equipment (FRTE).** The function at the end of a frame-relay permanent virtual circuit (PVC). Frame-relay terminating equipment provides higher-layer protocols with access to a frame-relay network through terminating equipment subports (TESPs). It does this by (a) adding frame-relay frame headers to data for another protocol and sending the frames to adjacent frame-relay nodes, and (b) receiving frames from adjacent frame-relay nodes and removing the frame headers. See also *frame-relay frame handler*, *frame-relay switching equipment support*, and *frame-relay terminal equipment*.

**FRFH.** Frame-relay frame handler.

## G

**gateway.** (1) A functional unit that interconnects two computer networks with different network architectures. A gateway connects networks or systems of different architectures. A bridge interconnects networks or systems with the same or similar architectures. (T) (2) The combination of machines and programs that provide address translation, name translation, and

system services control point (SSCP) rerouting between independent SNA networks to allow those networks to communicate. A gateway consists of one gateway NCP and at least one gateway VTAM. (3) In the IBM Token-Ring Network, a device and its associated software that connect a local area network to another local area network or a host that uses different logical link protocols. (4) In the AIX operating system, an entity that operates above the link layer and translates, when required, the interface and protocol used by one network into those used by another distinct network. (5) In TCP/IP, synonym for *router*.

**generation.** The process of assembling and link editing definition statements so that resources can be identified to all the necessary programs in a network.

**generation definition.** The definition statement of a resource used in generating a program.

## H

**hardcopy.** (1) A permanent copy of a display image generated on an output device such as a printer or plotter, and which can be carried away. (T) (2) A printed copy of machine output in a visually readable form; for example, printed reports, listings, documents, and summaries. (3) Contrast with *softcopy*.

**hardware configuration definition.** An interactive tool that can be used to define hardware configurations to the operating system and the channel subsystem.

**high-performance routing (HPR).** An addition to APPN that enhances data-routing performance and session reliability.

**high-performance transmission subsystem (HPTSS).** A high-speed line adapter that attaches to the IBM 3745 Communication Controller.

**host.** (1) In the Internet suite of protocols, an end system. The end system can be any workstation; it does not have to be a mainframe. (2) See *host processor*.

**host processor.** (1) A processor that controls all or part of a user application network. (T) (2) In a network, the processing unit in which the data communication access method resides.

**HPTSS.** High-performance transmission subsystem.

## I

**IBM software distribution (ISD).** The IBM department responsible for software distribution.

**IEEE.** Institute of Electrical and Electronics Engineers.

**inactive.** (1) Not operational. (2) Pertaining to a node or device not connected or not available for connection to another node or device. (3) In VTAM, the state of a resource or a major or minor node that has not been activated or for which the VARY INACT command has been issued. (4) Contrast with *active*. (5) See also *inoperative*.

**InARP.** Inverse Address Resolution Protocol.

**initial program load (IPL).** (1) The initialization procedure that causes an operating system to commence operation. (2) The process by which a configuration image is loaded into storage at the beginning of a work day or after a system malfunction. (3) The process of loading system programs and preparing a system to run jobs. (4) Synonymous with *system restart* and *system startup*.

**inoperative.** (1) The condition of a resource that has been active but is not currently active. A resource may be inoperative for reasons such as the following: a) it may have failed, b) it may have received an INOP request, or c) it may be suspended while a reactivate command is being processed. (2) See also *inactive*.

**installation.** (1) In system development, preparing and placing a functional unit in position for use. (T) (2) A particular computing system, including the work it does and the people who manage it, operate it, apply it to problems, service it, and use the results it produces.

**Institute of Electrical and Electronics Engineers (IEEE).** A professional society accredited by the American National Standards Institute (ANSI) to issue standards for the electronics industry.

**interactive.** (1) Pertaining to a program or system that alternately accepts input and then responds. An interactive system is conversational, that is, a continuous dialog exists between user and system. Contrast with *batch*. (2) Pertaining to the exchange of information between a user and a computer.

**interactive problem control system (IPCS).** A component of VM that permits online problem management, interactive problem diagnosis, online debugging for disk-resident CP abend dumps, problem tracking, and problem reporting.

**interconnection.** See *SNA network interconnection (SNI)*.

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**interface.** (1) A shared boundary between two functional units, defined by functional characteristics, signal characteristics, or other characteristics, as appropriate. The concept includes the specification of the connection of two devices having different functions. (T)

(2) Hardware, software, or both, that links systems, programs, or devices.

**internet.** A collection of networks interconnected by a set of routers that allow them to function as a single, large network. See also *Internet*.

**Internet.** The internet administered by the Internet Architecture Board (IAB), consisting of large national backbone networks and many regional and campus networks all over the world. The Internet uses the Internet suite of protocols.

**Internet Protocol (IP).** A connectionless protocol that routes data through a network or interconnected networks. IP acts as an intermediary between the higher protocol layers and the physical network. However, this protocol does not provide error recovery and flow control and does not guarantee the reliability of the physical network.

**Inverse Address Resolution Protocol (InARP).** In the Internet suite of protocols, the protocol used for locating a protocol address through the known hardware address. In a frame-relay context, the data link connection identifier (DLCI) is synonymous with the known hardware address.

**IPCS.** Interactive problem control system.

**IPL.** (1) Initial program loader. (A) (2) Initial program load.

**ISDN.** (1) Integrated Services Digital Network

## K

**keyword.** (1) In programming languages, a lexical unit that, in certain contexts, characterizes some language construct; for example, in some contexts, IF characterizes an if-statement. A keyword normally has the form of an identifier. (I) (2) One of the predefined words of an artificial language. (A) (3) A significant and informative word in a title or document that describes the content of that document. (4) A name or symbol that identifies a parameter. (5) The part of a command operand that consists of a specific character string (such as DSNAME=). (6) See also *definition statement*.

## L

**LAN.** Local area network.

**line.** (1) The portion of a data circuit external to data circuit-terminating equipment (DCE), that connects the DCE to a data switching exchange (DSE), that connects a DCE to one or more other DCEs, or that connects a DSE to another DSE. (I) (2) Synonymous with *channel* and *circuit*.

**line control discipline.** Synonym for *link protocol* and *protocol*.

**line discipline.** Synonym for *link protocol* and *protocol*.

**line switching.** Synonym for *circuit switching*.

**link.** (1) The combination of the link connection (the transmission medium) and two link stations, one at each end of the link connection. A link connection can be shared among multiple links in a multipoint or token-ring configuration. (2) To interconnect items of data or portions of one or more computer programs: for example, the linking of object programs by a linkage editor, linking of data items by pointers. (T) (3) In SNA, synonymous with *data link*.

**link-attached.** Pertaining to devices that are connected to a controlling unit by a data link. Contrast with *channel-attached*. Synonymous with *remote*.

**link connection.** (1) The physical equipment providing two-way communication between one link station and one or more other link stations; for example, a telecommunication line and data circuit-terminating equipment (DCE). (2) In SNA, synonymous with *data circuit*.

**Link Problem Determination Aid (LPDA).** A series of procedures that are used to test the status of and to control DCEs, the communication line, and the remote device interface. These procedures, or a subset of them, are implemented by host programs (such as the NetView program and VTAM), communication controller programs (such as NCP), and IBM LPDA DCEs. See also *LPDA-1* and *LPDA-2*.

**link protocol.** (1) The rules for sending and receiving data at the link level. (2) Synonymous with *line control discipline* and *line discipline*.

**load.** To bring all or part of a computer program into memory from auxiliary storage so that the computer can run the program.

**load module.** All or part of a computer program in a form suitable for loading into main storage for execution. A load module is usually the output of a linkage editor. (T)



**local.** (1) Pertaining to a device accessed directly without use of a telecommunication line. (2) Synonym for *channel-attached*. (3) Contrast with *remote*.

**local area network (LAN).** (1) A computer network located on a user's premises within a limited geographical area. Communication within a local area network is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation. (T) (2) A network in which a set of devices are connected to one another for communication and that can be connected to a larger network. (3) See also *Ethernet* and *token ring*. (4) Contrast with *metropolitan area network (MAN)* and *wide area network (WAN)*.

**local directory database.** That set of resources (LUs) in the network known at a particular node. The resources included are all those in the node's domain as well as any cache entries.

**logical line.** In NCP, the representation of the connection between NCP and a node communicating with NCP over a physical line such as token-ring or frame-relay. A single physical line can support multiple logical lines. Contrast with *physical line*.

**LPDA.** Link Problem Determination Aid.

**LPDA-1.** The first version of the LPDA command set. LPDA-1 is not compatible with LPDA-2. See also *Link Problem Determination Aid (LPDA)* and *LPDA-2*.

**LPDA-2.** The second version of the LPDA command set. LPDA-2 provides all of the functions of LPDA-1; it also supports commands such as the following:

- DCE configuration
- Dial
- Set transmit speed
- Commands to operate a contact that can control external devices.

See also *Link Problem Determination Aid (LPDA)* and *LPDA-1*.

## M

**macroinstruction.** (1) An instruction in a source language that is to be replaced by a defined sequence of instructions in the same source language and that may also specify values for parameters in the replaced instructions. (T) (2) In assembler programming, an assembler language statement that causes the assembler to process a predefined set of statements called a macro definition. The statements normally produced from the macro definition replace the macroinstruction in the program. See also *definition statement*.

**maintain system history program (MSHP).** A program used for automating and controlling various installation, tailoring, and service activities for a VSE system.

**major node.** In VTAM, a set of resources that can be activated and deactivated as a group. See *minor node*.

**MAN.** Metropolitan area network.

**message.** (1) An assembly of characters and sometimes control codes that is transferred as an entity from an originator to one or more recipients. A message consists of two parts: envelope and content. (T) (2) In VTAM, the amount of function management data (FMD) transferred to VTAM by the application program with one SEND request.

**message switching.** The process of receiving a message, storing it, and forwarding it to its destination unaltered. (T)

**method.** In the NetView program, the code that runs within the Resource Object Data Manager (RODM) address space. Methods are used to implement behavior specified by an operation.

**metropolitan area network (MAN).** A network formed by the interconnection of two or more networks which may operate at higher speed than those networks, may cross administrative boundaries, and may use multiple access methods. (T) Contrast with *local area network (LAN)* and *wide area network (WAN)*.

**migration.** The installation of a new version or release of a program to replace an earlier version or release.

**minor node.** In VTAM, a uniquely defined resource within a major node. See *major node* and *node*.

**mode.** See *mode name*.

**mode name.** The name used by the initiator of a session to designate the characteristics desired for the session, such as traffic pacing values, message-length limits, sync point and cryptography options, and the class of service within the transport network.

**modem (modulator/demodulator).** (1) A functional unit that modulates and demodulates signals. One of the functions of a modem is to enable digital data to be transmitted over analog transmission facilities. (T) (A) (2) A device that converts digital data from a computer to an analog signal that can be transmitted on a telecommunication line, and converts the analog signal received to data for the computer.

**module.** A program unit that is discrete and identifiable with respect to compiling, combining with other units, and loading; for example, the input to or output

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from an assembler, compiler, linkage editor, or executive routine. (A)

**mouse.** A commonly used pointing device, containing one or more buttons, with which a user can interact with a product or the operating environment.

**MSHP.** Maintain system history program.

## N

**NCP major node.** In VTAM, a set of minor nodes representing resources, such as lines and peripheral nodes, controlled by a network control program. See *major node*.

**NCP/EP definition facility (NDF).** A program that is part of System Support Programs (SSP) and that is used to generate a load module for a partitioned emulation program (PEP), a Network Control Program (NCP), or an Emulation Program (EP).

**NCP/Token-Ring interconnection (NTRI).** An NCP function that allows a communication controller to attach to the IBM Token-Ring Network and that provides both subarea and peripheral node data link control (DLC) services in the SNA network.

**NetView log.** Synonym for *network log*.

**NetView Performance Monitor (NPM).** An IBM licensed program that collects, monitors, analyzes, and displays data relevant to the performance of a VTAM telecommunication network. It runs as an online VTAM application program.

**NetView program.** An IBM licensed program used to monitor and manage a network and to diagnose network problems.

**network.** (1) An arrangement of nodes and connecting branches. (T) (2) A configuration of data processing devices and software connected for information interchange. (3) A group of nodes and the links interconnecting them.

**network architecture.** The logical structure and operating principles of a computer network. (T)

**Note:** The operating principles of a network include those of services, functions, and protocols.

**network control mode.** The mode in which a network control program can direct a communication controller to perform such activities as polling, device addressing, dialing, and answering. See also *emulation mode*.

**network control program.** A program, generated by the user from a library of IBM-supplied modules, that controls the operation of a communication controller.

**Network Control Program (NCP).** An IBM licensed program that provides communication controller support for single-domain, multiple-domain, and interconnected network capability.

**network directory database.** Synonym for *distributed directory database*.

**network log.** A file containing messages, commands, and command procedures that have been processed by the NetView program. In addition, output resulting from command procedure traces, command echoes, and other activity occurring within the NetView program appears in the network log. Synonymous with *NetView log*.

**network management.** The process of planning, organizing, and controlling a communication-oriented data processing or information system.

**network operator.** (1) A person who controls the operation of all or part of a network. (2) In a multiple-domain network, a person or program responsible for controlling all domains. See also *domain operator*.

**Network Routing Facility (NRF).** An IBM licensed program that resides in NCP. NRF provides a path for routing messages between terminals and routes messages over this path without going through the host processor.

**Network Terminal Option (NTO).** An IBM licensed program, used in conjunction with NCP, that allows certain non-SNA devices to participate in sessions with SNA application programs in the host processor. When data is sent from a non-SNA device to the host processor, NTO converts non-SNA protocol to SNA protocol; and when data is sent from the host processor to the non-SNA device, NTO converts SNA protocol to non-SNA protocol.

**node.** (1) In a network, a point at which one or more functional units connect channels or data circuits. (I) (2) In network topology, the point at an end of a branch. (T) (3) The representation of a state or an event by means of a point on a diagram. (A) (4) In a tree structure, a point at which subordinate items of data originate. (A) (5) Any device, attached to a network, that transmits and receives data. (6) An endpoint of a link or a junction common to two or more links in a network. Nodes can be processors, communication controllers, cluster controllers, or terminals. Nodes can vary in routing and other functional capabilities. (7) In VTAM, a point in a network defined by a symbolic name. See *major node* and *minor node*.

**NPSI.** See *X.25 NCP Packet Switching Interface*.

**NTRI.** NCP/Token-Ring interconnection.

**NTuneMON.** A program that runs with the NetView program and monitors NCPs that were activated by the VTAM on the host where NTuneMON is running.

**NTuneNCP.** A tuning feature of NTuneMON. NTuneNCP runs in a communication controller and, with NTuneMON and VTAM, enables a network administrator to tune NCP interactively.

## O

**Nways family.** A group of IBM switched networking hardware products plus the software that uses or manages these products.

**ODLC.** See *outboard data link control*.

**outboard data link control (ODLC).** (1) Data link control (DLC) processing performed by a coprocessor. (2) In NCP, data link control (DLC) processing performed by the 3746 Model 900 connectivity subsystem (CSS).

**offline.** (1) Pertaining to the operation of a functional unit that takes place either independently of, or in parallel with, the main operation of a computer. (T) (2) Neither controlled by, nor communicating with, a computer. Contrast with *online*.

**online.** (1) Pertaining to the operation of a functional unit when under the direct control of the computer. (T) (2) Pertaining to a user's ability to interact with a computer. (A) (3) Pertaining to a user's access to a computer via a terminal. (A) (4) Controlled by, or communicating with, a computer. (5) Contrast with *offline*.

**online information.** Information stored in a computer system that can be displayed, used, and modified in an interactive manner without any need to obtain hardcopy.

**operand.** (1) An entity on which an operation is performed. (I) (2) That which is operated upon. An operand is usually identified by an address part of an instruction. (A) (3) Information entered with a command name to define the data on which a command processor operates and to control the execution of the command processor.

**operating system (OS).** Software that controls the execution of programs and that may provide services such as resource allocation, scheduling, input/output control, and data management. Although operating systems are predominantly software, partial hardware implementations are possible. (T)

**output.** Pertaining to a device, process, or channel involved in an output process, or to the associated data or states. The word "output" may be used in place of

"output data," "output signal," "output process," when such a usage is clear in a given context. (T)

## P

**packet.** (1) In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole. The data, control signals and, possibly, error control information are arranged in a specific format. (I) (2) In X.25, a data transmission information unit. A group of data and control characters, transferred as a unit, determined by the process of transmission. Commonly used data field lengths in packets are 128 or 256 bytes. (3) The field structure and format defined in the CCITT X.25 Recommendation.

**packet mode operation.** Synonym for *packet switching*.

**packet switching.** (1) The process of routing and transferring data by means of addressed packets so that a channel is occupied only during transmission of a packet. On completion of the transmission, the channel is made available for transfer of other packets. (I) (2) Synonymous with *packet mode operation*. See also *circuit switching*.

**peer.** In network architecture, any functional unit that is in the same layer as another entity. (T)

**peripheral PU.** In SNA, a physical unit in a peripheral node. Contrast with *subarea PU*.

**physical circuit.** A circuit established without multiplexing. See also *data circuit*. Contrast with *virtual circuit*.

**physical connection.** (1) A connection that establishes an electrical circuit. (2) A point-to-point or multi-point connection. (3) Synonymous with *connection*.

**physical line.** In NCP, the physical connection between NCP and an adjacent device or local area network (LAN). A single physical line, such as token-ring or frame-relay, can support multiple logical lines. Contrast with *logical line*.

**physical unit (PU).** The component that manages and monitors the resources (such as attached links and adjacent link stations) associated with a node, as requested by an SSCP via an SSCP-PU session. An SSCP activates a session with the physical unit in order to indirectly manage, through the PU, resources of the node such as attached links. This term applies to type 2.0, type 4, and type 5 nodes only. See also *peripheral PU* and *subarea PU*.

**port.** (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices

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such as display stations and printers are attached. (3) The representation of a physical connection to the link hardware. A port is sometimes referred to as an adapter; however, there can be more than one port on an adapter. There may be one or more ports controlled by a single DLC process. (4) In the Internet suite of protocols, a 16-bit number used to communicate between TCP or the User Datagram Protocol (UDP) and a higher-level protocol or application. Some protocols, such as File Transfer Protocol (FTP) and Simple Mail Transfer Protocol (SMTP), use the same well-known port number in all TCP/IP implementations. (5) An abstraction used by transport protocols to distinguish among multiple destinations within a host machine. (6) Synonymous with *socket*.

**problem determination.** The process of determining the source of a problem; for example, a program component, machine failure, telecommunication facilities, user or contractor-installed programs or equipment, environmental failure such as a power loss, or user error.

**processor.** In a computer, a functional unit that interprets and executes instructions. A processor consists of at least an instruction control unit and an arithmetic and logic unit. (T)

**program temporary fix (PTF).** A temporary solution or bypass of a problem diagnosed by IBM in a current unaltered release of the program.

**protocol.** (1) A set of semantic and syntactic rules that determine the behavior of functional units in achieving communication. (I) (2) In Open Systems Interconnection architecture, a set of semantic and syntactic rules that determine the behavior of entities in the same layer in performing communication functions. (T) (3) In SNA, the meanings of, and the sequencing rules for, requests and responses used for managing the network, transferring data, and synchronizing the states of network components. Synonymous with *line control discipline* and *line discipline*. See *bracket protocol* and *link protocol*.

## R

**RARP.** Reverse Address Resolution Protocol.

**read-only.** A type of access to data that allows data to be read but not copied, printed, or modified.

**read-only memory (ROM).** Memory in which stored data cannot be modified by the user except under special conditions.

**record.** (1) In programming languages, an aggregate that consists of data objects, possibly with different attributes, that usually have identifiers attached to them. In some programming languages, records are called struc-

tures. (I) (2) A set of data treated as a unit. (T) (3) A set of one or more related data items grouped for processing. (4) In VTAM, the unit of data transmission for record mode. A record represents whatever amount of data the transmitting node chooses to send.

**remote.** (1) Pertaining to a system, program, or device that is accessed through a telecommunication line. (2) Synonym for *link-attached*. (3) Contrast with *local*.

**resource.** (1) Any facility of a computing system or operating system required by a job or task, and including main storage, input/output devices, the processing unit, data sets, and control or processing programs. (2) In the NetView program, any hardware or software that provides function to the network.

**resource resolution table (RRT).** In NPM, this table contains the names of network resources for which data is to be collected. The NPM RRT corresponds with an NCP and is built by NPMGEN from an NCP Stage I and an NCP RRT.

**Reverse Address Resolution Protocol (RARP).** In the Internet suite of protocols, the protocol that maps a hardware (MAC) address to an IP address. RARP can be used to determine a port's IP address. See also *Address Resolution Protocol (ARP)*.

**ring.** See *ring network*.

**ring network.** (1) A network in which every node has exactly two branches connected to it and in which there are exactly two paths between any two nodes. (T) (2) A network configuration in which devices are connected by unidirectional transmission links to form a closed path.

**route.** (1) An ordered sequence of nodes and transmission groups (TGs) that represent a path from an origin node to a destination node traversed by the traffic exchanged between them. (2) The path that network traffic uses to get from source to destination.

**router.** (1) A computer that determines the path of network traffic flow. The path selection is made from several paths based on information obtained from specific protocols, algorithms that attempt to identify the shortest or best path, and other criteria such as metrics or protocol-specific destination addresses. (2) An attaching device that connects two LAN segments, which use similar or different architectures, at the reference model network layer. (3) In OSI terminology, a function that determines a path by which an entity can be reached. (4) In TCP/IP, synonymous with *gateway*. (5) Contrast with *bridge*.

**routing.** (1) The process of determining the path to be used for transmission of a message over a network. (T) (2) The assignment of the path by which

a message is to reach its destination. (3) In SNA, the forwarding of a message unit along a particular path through a network, as determined by parameters carried in the message unit, such as the destination network address in a transmission header.

## S

**SDLC.** Synchronous Data Link Control.

**session control (SC).** In SNA, either of the following:

- One of the components of transmission control. Session control is used to purge data flowing in a session after an unrecoverable error occurs, to resynchronize the data flow after such an error, and to perform cryptographic verification.
- A request unit (RU) category used for requests and responses exchanged between the session control components of a session and for session activation and deactivation requests and responses.

**SMP/E.** System Modification Program Extended.

**SNA network.** The part of a user-application network that conforms to the formats and protocols of Systems Network Architecture. It enables reliable transfer of data among end users and provides protocols for controlling the resources of various network configurations. The SNA network consists of network accessible units (NAUs), boundary function, gateway function, and intermediate session routing function components; and the transport network.

**snap.** See *snapshot program*.

**snapshot program.** A trace program that produces output data only for selected instructions or for selected conditions. (I) (A)

**SNA network interconnection (SNI).** The connection, by gateways, of two or more independent SNA networks to allow communication between logical units in those networks. The individual SNA networks retain their independence.

**SNI.** SNA network interconnection.

**socket.** (1) An endpoint for communication between processes or application programs. (2) Synonym for *port*.

**softcopy.** (1) A nonpermanent copy of the contents of storage in the form of a display image. (T) (2) One or more files that can be electronically distributed, manipulated, and printed by a user. (3) Contrast with *hard-copy*.

**SSCP.** System services control point.

**statement.** A language syntactic unit consisting of an operator, or other statement identifier, followed by one or more operands. See *definition statement*.

**static.** (1) In programming languages, pertaining to properties that can be established before execution of a program; for example, the length of a fixed length variable is static. (I) (2) Pertaining to an operation that occurs at a predetermined or fixed time. (3) Contrast with *dynamic*.

**status.** The condition or state of hardware or software, usually represented by a status code.

**subarea.** A portion of the SNA network consisting of a subarea node, attached peripheral nodes, and associated resources. Within a subarea node, all network accessible units (NAUs), links, and adjacent link stations (in attached peripheral or subarea nodes) that are addressable within the subarea share a common subarea address and have distinct element addresses.

**subarea PU.** In SNA, a physical unit in a subarea node. Contrast with *peripheral PU*.

**subsystem.** A secondary or subordinate system, usually capable of operating independently of, or asynchronously with, a controlling system. (T)

**synchronous.** (1) Pertaining to two or more processes that depend upon the occurrence of specific events such as common timing signals. (T) (2) Occurring with a regular or predictable time relationship.

**Synchronous Data Link Control (SDLC).** (1) A discipline conforming to subsets of the Advanced Data Communication Control Procedures (ADCCP) of the American National Standards Institute (ANSI) and High-level Data Link Control (HDLC) of the International Organization for Standardization, 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. (I) (2) Contrast with *binary synchronous communication (BSC)*.

**SYNTAX.** In the Simple Network Management Protocol (SNMP), a clause in the MIB module that defines the abstract data structure that corresponds to a managed object.

**system.** In data processing, a collection of people, machines, and methods organized to accomplish a set of specific functions. (I) (A)

**System Modification Program (SMP).** A program used to install software and software changes on MVS systems.

## Glossary

### **System Modification Program Extended (SMP/E).**

An IBM licensed program used to install software and software changes on MVS systems. In addition to providing the services of SMP, SMP/E consolidates installation data, allows more flexibility in selecting changes to be installed, provides a dialog interface, and supports dynamic allocation of data sets.

**system restart.** Synonym for *initial program load (IPL)*.

**system services control point (SSCP).** A component within a subarea network for managing the configuration, coordinating network operator and problem determination requests, and providing directory services and other session services for end users of the network. Multiple SSCPs, cooperating as peers with one another, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units and logical units within its own domain.

**system services control point (SSCP) domain.** The system services control point, the physical units (PUs), the logical units (LUs), the links, the link stations, and all the resources that the SSCP has the ability to control by means of activation and deactivation requests.

**system startup.** Synonym for *initial program load (IPL)*.

**System Support Programs (SSP).** An IBM licensed program, made up of a collection of utilities and small programs, that supports the operation of the NCP.

**Systems Network Architecture (SNA).** The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through, and controlling the configuration and operation of, networks. The layered structure of SNA allows the ultimate origins and destinations of information, that is, the end users, to be independent of and unaffected by the specific SNA network services and facilities used for information exchange.

## T

**TAP.** Synonym for *ACF/TAP*.

**TCAM.** Telecommunications Access Method. Synonymous with *ACF/TCAM*.

**TCP/IP.** Transmission Control Protocol/Internet Protocol.

**telecommunication line.** (1) The portion of a data circuit external to a data circuit-terminating equipment (DCE) that connects the DCE to a data-switching exchange (DSE), that connects a DCE to one or more other DCEs, or that connects a DSE to another

DSE. (T) (2) Any physical medium, such as a wire or microwave beam, that is used to transmit data. Synonymous with *transmission line*.

**Telecommunications Access Method (TCAM).** An access method used to transfer data between main storage and remote or local terminals.

**terminal.** A device, usually equipped with a keyboard and a display device, that is capable of sending and receiving information.

**token.** (1) In a local area network, the symbol of authority passed successively from one data station to another to indicate the station temporarily in control of the transmission medium. Each data station has an opportunity to acquire and use the token to control the medium. A token is a particular message or bit pattern that signifies permission to transmit. (T) (2) In LANs, a sequence of bits passed from one device to another along the transmission medium. When the token has data appended to it, it becomes a frame.

**token ring.** (1) According to IEEE 802.5, network technology that controls media access by passing a token (special packet or frame) between media-attached stations. (2) A FDDI or IEEE 802.5 network with a ring topology that passes tokens from one attaching ring station (node) to another. (3) See also *local area network (LAN)*.

**token-ring network.** (1) A ring network that allows unidirectional data transmission between data stations, by a token passing procedure, such that the transmitted data return to the transmitting station. (T) (2) A network that uses a ring topology, in which tokens are passed in a circuit from node to node. A node that is ready to send can capture the token and insert data for transmission.

**trace.** (1) A record of the execution of a computer program. It exhibits the sequences in which the instructions were executed. (A) (2) For data links, a record of the frames and bytes transmitted or received.

**Trace Analysis Program (TAP).** Synonym for *Advanced Communications Function for the Trace Analysis Program (ACF/TAP)*.

**Transmission Control Protocol (TCP).** A communications protocol used in the Internet and in any network that follows the U.S. Department of Defense standards for internetwork protocol. TCP provides a reliable host-to-host protocol between hosts in packet-switched communications networks and in interconnected systems of such networks. It uses the Internet Protocol (IP) as the underlying protocol.

**Transmission Control Protocol/Internet Protocol (TCP/IP).** A set of communications protocols that

support peer-to-peer connectivity functions for both local and wide area networks.

**transmission control unit (TCU).** A communication control unit whose operations are controlled solely by programmed instructions from the computing system to which the unit is attached. No program is stored or executed in the unit. Examples are the IBM 2702 and 2703 Transmission Controls. Contrast with *communication controller*.

**transmission line.** Synonym for *telecommunication line*.

**transmission subsystem (TSS).** A line adapter that attaches to the IBM 3745 Communication Controller.

**tuning.** The process of adjusting an application or a system to operate in a more efficient manner in the work environment of a particular installation.

## U

**user.** (1) Any person or any thing that may issue or receive commands and messages to or from the information processing system. (T) (2) Anyone who requires the services of a computing system.

## V

**version.** A separately licensed program that usually has significant new code or new function.

**virtual circuit.** (1) In packet switching, the facilities provided by a network that give the appearance to the user of an actual connection. (T) See also *data circuit*. Contrast with *physical circuit*. (2) A logical connection established between two DTEs.

**Virtual Machine/Enterprise Systems Architecture (VM/ESA).** An IBM licensed program that manages the resources of a single computer so that multiple computing systems appear to exist. Each virtual machine is the functional equivalent of a real machine.

**virtual storage.** The storage space that may be regarded as addressable main storage by the user of a computer system in which virtual addresses are mapped into real addresses. The size of virtual storage is limited by the addressing scheme of the computer system and by the amount of auxiliary storage available, not by the actual number of main storage locations. (I) (A)

**Virtual Telecommunications Access Method (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.

**VM/ESA.** Virtual Machine/Enterprise Systems Architecture.

**VSE/ESA.** Virtual Storage Extended/Enterprise Systems Architecture.

**VTAM.** (1) Virtual Telecommunications Access Method. (2) Synonymous with *ACF/VTAM*.

**VTAM operator command.** A command used to monitor or control a VTAM domain. See also *definition statement*.

## W

**WAN.** Wide area network.

**wide area network (WAN).** (1) A network that provides communication services to a geographic area larger than that served by a local area network or a metropolitan area network, and that may use or provide public communication facilities. (T) (2) A data communications network designed to serve an area of hundreds or thousands of miles; for example, public and private packet-switching networks, and national telephone networks. (3) Contrast with *local area network (LAN)* and *metropolitan area network (MAN)*.

## X

**X.21.** An International Telegraph and Telephone Consultative Committee (CCITT) recommendation for a general-purpose interface between data terminal equipment and data circuit-terminating equipment for synchronous operations on a public data network.

**X.25.** (1) An International Telegraph and Telephone Consultative Committee (CCITT) recommendation for the interface between data terminal equipment and packet-switched data networks. (2) See also *packet switching*.

**X.25 NCP Packet Switching Interface (NPSI).** An IBM licensed program that allows SNA users to communicate over packet switching data networks that have interfaces complying with CCITT Recommendation X.25. It allows SNA programs to communicate with SNA or non-SNA equipment over such networks.

**X.25 ODLC.** X.25 protocols processed by the IBM 3746 Model 900 connectivity subsystem (CSS) *outboard data link control* (ODLC) in conjunction with the IBM Network Control Program (NCP) licensed program. It

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**37CS.** Deprecated term for *3746 Model 900 connectivity subsystem (CSS)*.



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# Bibliography

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## NCP, SSP, and EP Library

The following paragraphs briefly describe the library for NCP, SSP, and EP. Other publications related to NTuneMON, VTAM, NPSI, NetView, NTO, and NRF are listed without the accompanying descriptions.

*NCP and EP Reference* (LY43-0029)

This book describes various aspects of the internal processing of NCP and EP (PEP or EP Standalone). It provides information for customization and diagnosis.

*NCP and EP Reference Summary and Data Areas* (LY43-0030)

This two-volume book provides quick access to often-used diagnostic and debugging information about NCP and EP (PEP or EP Standalone).

*NCP and SSP Customization Guide* (LY43-0031)

This book helps users who are familiar with the internal logic of NCP and SSP to modify these products. It describes how to change NCP and SSP to support stations that IBM-supplied programs do not support.

*NCP and SSP Customization Reference* (LY43-0032)

This book supplements the *NCP and SSP Customization Guide*. It describes the resources and macroinstructions provided by IBM for customizing NCP and SSP.

*NCP, SSP, and EP Diagnosis Guide* (LY43-0033)

This book helps users isolate and define problems in NCP and EP (PEP or EP Standalone) using SSP. The primary purpose of the book is to help the user interact with the IBM Support Center to resolve a problem. In addition, it explains some of the diagnostic aids and service aids available with SSP.

*NCP, SSP, and EP Trace Analysis Handbook* (LY43-0037)

This book describes how to use the trace analysis program and how to read trace analysis program output.

*NCP, SSP, and EP Generation and Loading Guide* (SC31-6221)

This book provides detailed explanations of how to generate and load NCP and EP (PEP or EP Standalone)

using SSP. It contains information for generating and loading under MVS, VM, and VSE.

*NCP, SSP, and EP Messages and Codes* (SC31-6222)

This book is a reference book of abend codes issued by NCP and EP (PEP or EP Standalone), and messages issued by the System Support Programs associated with NCP. This information is also available through the online message facility, an IBM OS/2 application available on diskette.

*NCP, SSP, and EP Resource Definition Guide* (SC31-6223)

This book helps users understand how to define NCP and EP (PEP or EP Standalone), using SSP. It describes functions and resources and lists the definition statements and keywords that define those functions and resources.

*NCP, SSP, and EP Resource Definition Reference* (SC31-6224)

This book helps users code definition statements and keywords to define NCP and EP (PEP or EP Standalone), using SSP. It also provides a quick reference of definition statement coding order and keyword syntax.

*NCP V7R7, SSP V4R7, and EP R14 Library Directory* (SC30-3971)

This book helps users locate information on a variety of NCP, SSP, and EP tasks. It also provides a high-level understanding of NCP, SSP, and EP and summarizes the changes to these products and to the library for NCP V7R7, SSP V4R7, and EP R14.

*NCP V7R7 Migration Guide* (SC30-3889)

This book helps users migrate an NCP generation definition from an earlier release to NCP V7R7. It also describes how to add new functions for NCP V7R7.

*NCP Version 7 and X.25 NPSI Version 3 Planning and Installation* (SC30-3470)

This book helps users plan and install support for X.25 lines in the 3745 or 3746 Model 900.

*NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning* (LY30-5610)

This book helps users diagnose, customize, and tune X.25 lines in the 3745 or 3746 Model 900.

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### Other Networking Products' Libraries

The following publications provide cross-product information for NTuneMON, VTAM, NPSI, NetView, and NPM. For detailed information about these products, refer to the library for each.

### Networking Library

*Planning for NetView, NCP, and VTAM* (SC31-8063)

*Planning for Integrated Networks* (SC31-8062)

*ACF/NCP, ACF/SSP, EP, NTuneMON, and NPSI Softcopy Collection Kit* (CD-ROM, LK2T-0414)

### NTuneMON Library

*NTuneMON V2R5 User's Guide* (SC31-6266)

*NTuneNCP Feature Reference* (LY43-0039)

**Related Publication:** *NCP Tuning with NTune*, GG24-2520

### VTAM Library

*VTAM Migration Guide* (GC31-6547)

*VTAM Release Guide* (GC31-6555)

*Estimating Storage for VTAM* (SK2T-6400)

*VTAM Network Implementation Guide* (SC31-6548)

*VTAM Resource Definition Reference* (SC31-6552)

*VTAM Resource Definition Samples* (SC31-6554, book and diskettes)

*VTAM Customization* (LY43-0068)

*VTAM Operation* (SC31-6549)

*VTAM Operation Quick Reference* (SX75-0207)

*VTAM Messages and Codes* (SC31-6546)

*VTAM Licensed Program Specifications* (GC31-6553)

*VTAM Programming* (SC31-6550)

*VTAM Programming for LU 6.2* (SC31-6551)

*VTAM Diagnosis* (LY43-0069)

*VTAM Data Areas for MVS/ESA* (LY43-0071)

*VTAM CMIP Services and Topology Agent Programming Guide* (SC31-6544)

*APPC Application Suite User's Guide* (SC31-6532)

*APPC Application Suite Administration* (SC31-6533)

*APPC Application Suite Programming* (SC31-6534)

### NPSI Library

*X.25 NPSI Version 3 General Information* (GC30-3469)

*NCP Version 7 and X.25 NPSI Version 3 Planning and Installation* (SC30-3470)

*X.25 NPSI Version 3 Host Programming* (SC30-3502)

*NCP Version 7 and X.25 NPSI Version 3 Diagnosis, Customization, and Tuning* (LY30-5610)

*X.25 NPSI Version 3 Release 9 Data Areas* (LY30-5627)

### NetView Library

*TME 10 NetView for OS/390 NGMF User's Guide* (SC31-8234)

*TME 10 NetView for OS/390 User's Guide* (SC31-8241)

*TME 10 NetView for OS/390 Administration and Security Reference* (SC31-8222)

*TME 10 NetView for OS/390 Application Programmer's Guide* (SC31-8223)

*TME 10 NetView for OS/390 Automation Guide* (SC31-8225)

*TME 10 NetView for OS/390 Bridge Implementation* (SC31-8238)

*TME 10 NetView for OS/390 Command Reference* (SC31-8227)

*TME 10 NetView for OS/390 Customization Guide* (SC31-8228)

*TME 10 NetView for OS/390 Customization: Using Assembler* (SC31-8229)

*TME 10 NetView for OS/390 Customization: Using PL/I and C* (SC31-8230)

*TME 10 NetView for OS/390 Customization: Using REXX and the NetView Command List Language* (SC31-8231)

*TME 10 NetView for OS/390 Planning Guide*  
(GC31-8226)

*TME 10 NetView for OS/390 Installation and Administration Guide* (SC31-8236)

*TME 10 NetView for OS/390 Messages* (SC31-8237)

*TME 10 NetView for OS/390 Diagnosis Guide*  
(LY43-0108)

*TME 10 NetView for OS/390 Resource Object Data Manager and GMFHS Programmer's Guide*  
(SC31-8233)

*TME 10 NetView for OS/390 Tuning Guide* (SC31-8240)

*TME 10 NetView for OS/390 User's Guide* (SC31-8241)

*TME 10 NetView for OS/390 NGMF User's Guide*  
(SC31-8234)

*TME 10 NetView for OS/390 SNA Topology Manager and APPN Accounting Manager Implementation Guide*  
(SC31-8239)

*TME 10 NetView for OS/390 Data Model Reference*  
(SC31-8232)

*TME 10 NetView for OS/390 APPN Topology and Accounting Agent Guide* (SC31-8224)

## NTO Library

*Network Terminal Option: Planning, Migration, and Resource Definition Guide* (SC30-3347)

*Network Terminal Option: Diagnosis* (LY30-3194)

## NRF Library

*NRF Planning* (SC27-0593)

*NRF Migration, Resource Definition and Customization*  
(SC31-6203)

*NRF Resource Definition and Customization*  
(SC30-3407)

*NRF Diagnosis* (LY30-5597)

## Related Publications

The following publications, though not directly related to NCP, may be helpful in understanding your network.

*Interactive System Productivity Facility/Program Development Facility (MVS) Guide* (SC34-4299)

*Remote Loading/Activation Guide* (SA33-0161)

*9370 LAN—Volume 2, IEEE 902.3 Support*  
(GG24-3227)

*IBM MVS/ESA Hardware Configuration Definition: Using the Dialog* (GC33-6457)

## IBM 3745 Communication Controller Publications

The following list shows selected publications for the IBM 3745 Communication Controller.

*IBM 3745 Communication Controller Introduction*  
(GA33-0092 for the 3745-210, 3745-310, 3745-410, and 3745-610)

*IBM 3745 Communication Controller Introduction*  
(GA33-0138 for the 3745-130, 3745-150, and 3745-170)

*IBM 3745 Communication Controller Configuration Program* (GA33-0093)

*IBM 3745 Communication Controller (All Models): Principles of Operation* (SA33-0102)

*IBM 3745 Basic Operations Guide for MOSS Operations* (SA33-0098)

*3745 Models 21A through 61A Migration and Planning Guide* (GA33-0183)

## IPCS Publications

The following publications contain information on Interactive Problem Control System (IPSC).

*MVS Interactive Problem Control System Command Reference* (GC28-1834)

*MVS Interactive Problem Control System User's Guide*  
(GC28-1833)

## Systems Network Architecture Publications

The following publications contain information on SNA.

*Systems Network Architecture Technical Overview*  
(GC30-3073)

*Systems Network Architecture Format and Protocol Reference Manual: Management Services* (SC30-3346)

*Systems Network Architecture Formats* (GA27-3136)

## Bibliography

### Transmission Control Protocol/Internet Protocol (TCP/IP) Publications.

The following publications contain information on Transmission Control Protocol/Internet Protocol (TCP/IP).

**General:** The following list shows selected publications with general information on TCP/IP.

*TCP/IP Introduction* (GC31-6080)

*IBM TCP/IP Tutorial and Technical Overview* (GG24-3376)

**MVS Publications:** The following list shows selected publications on TCP/IP for MVS.

*IBM TCP/IP Version 2 Release 2.1 for MVS: Planning and Customization* (SC31-6085)

*IBM TCP/IP Version 2 Release 2.1 for MVS: User's Guide* (SC31-6088)

**VM Publications:** The following list shows selected publications on TCP/IP for VM.

*IBM TCP/IP Version 2 Release 2 for VM: Planning and Customization* (SC31-6082)

*IBM TCP/IP Version 2 Release 2 for VM: User's Guide* (SC31-6081)

**IBM OS/2 Publications:** The following list shows selected publications on TCP/IP for IBM OS/2.

*IBM TCP/IP Version 2.0 for OS/2: Installation and Administration* (SC31-6075)

*IBM TCP/IP Version 2.0 for OS/2: User's Guide* (SC31-6076)

**DOS Publications:** The following list shows selected publications on TCP/IP for DOS.

*IBM TCP/IP Version 2.0 for DOS: Installation and Maintenance* (SC31-6154)

*IBM TCP/IP Version 2.0 for DOS: User's Guide* (SC31-6152)

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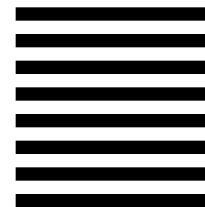
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