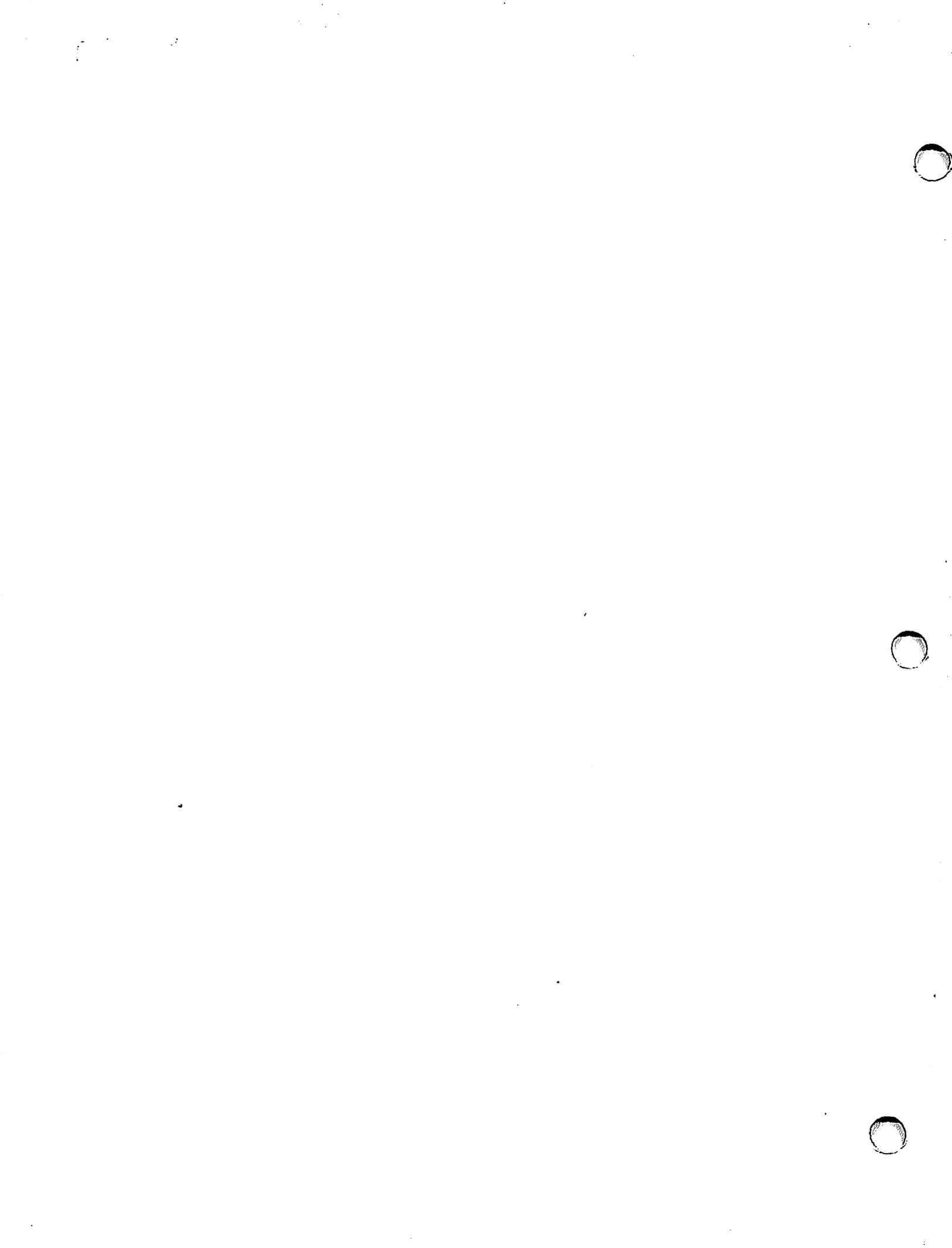




WANG

Wang Systems Networking

**VS Network
Configuration Guide**



Wang Systems Networking

VS Network

Configuration Guide

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WANG

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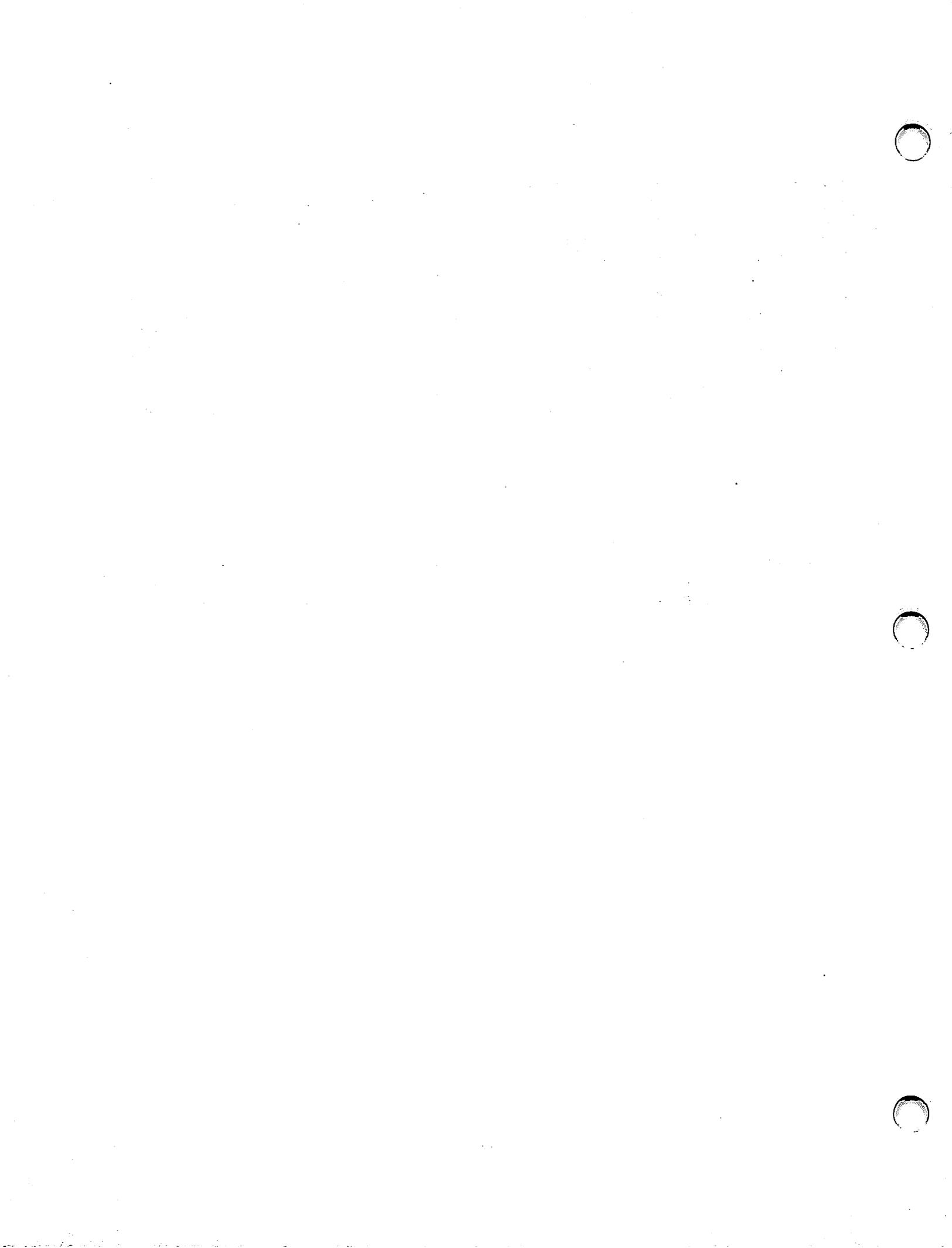
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PREFACE

This guide describes the configuration utilities that you use to establish and maintain a Wang VS as part of a Wang computer network. This guide also discusses network-wide planning and configuration as they relate to a network in which Wang and certain non-Wang systems use Wang Systems Networking (WSN) products to communicate. It is written for VS system administrators who are responsible for the operation of their systems in a network environment, and for individuals involved in network-wide planning, configuration, and administration.

Chapter 1 gives an overview of the WSN software products and networking hardware.

Chapter 2 introduces networking terms, and describes the concepts of network architecture, data routing, and network and system level configuration.

Chapter 3 summarizes network and system level planning and describes how the configuration aid utility CNFGAID is used to guide administrators through the configuration process.

Chapter 4 describes how to use the VS system configuration utility GENEDIT to configure the VS hardware necessary for network communications.

Chapter 5 describes how to create and maintain a directory of areas and systems in the network.

Chapter 6 describes how to use WSNEDIT to create a local-view configuration file and how to create and edit transport definitions, including the definitions of systems that share a transport.

Chapter 7 describes how to use WSNEDIT to define a communications path to a destination in the network.

Chapter 8 describes how to use WSNEDIT to create and edit WSN service definitions, and to specify the output local-view configuration file.

Chapter 9 describes how to use the VS SECURITY utility to assign user IDs to remote users, and how to provide file access rights for remote systems configured for network communications with a VS. This chapter also describes how to use the TRANSFER utility to define transfer groups for files and documents that a VS receives.

Chapter 10 describes how to use the WSNAPPS utility to manage WSN networked applications.

Appendix A describes configuration error messages.

Appendix B contains configuration checklists.

For related documentation, refer to the following Wang publications:

- *Multi-Line Telecommunications Controller* data sheet (715-0998)
- *Network Management VS Software Manager* data sheet (715-0153A)
- *Network User Guide for VS Systems* (800-1316-03)
- *Virtual Terminal Interface User's Guide* (700-8668)
- *VS System Administrator's Reference* (800-1144-02)
- *VS System Operator's Guide* (715-0418A)
- *VS 3271 BSC Emulator User's Guide* (800-1306)
- *VS 3274 SNA System Administrator's Guide* (800-1333)
- *Wang Systems Networking VS Network Application Interface Programmer's Guide* (715-0425)
- *Wang Systems Networking VS Network Control and Monitoring Guide* (715-0164A)
- *Wang Systems Networking VS X.25 General Access Interface Programmer's Guide* (715-0464)
- *Wang Systems Networking VS X.3 PAD Emulation Facility User's Guide* (715-0458)
- *WangNet Cable Interface Unit* data sheet (700-7183)
- *802.3 Local Area Network Overview* data sheet (715-1036A)

For additional release-specific information, refer to the customer software release notice that accompanies each WSN or VS software product.

CHAPTER 1

WANG SYSTEMS NETWORKING OVERVIEW

1.1 INTRODUCTION

This chapter provides an introduction to Wang Systems Networking (WSN) products as they relate to the VS computer. It gives a summary on these products, with emphasis on the key networking functions and capabilities that are later discussed in this guide in terms of configuration and management.

1.2 NETWORK SOFTWARE

The following sections give an overview of the WSN VS networking software, highlighting product relationships and features.

1.2.1 Wang Systems Networking

Wang Systems Networking (WSN) is the Wang Laboratories, Inc., framework for distributed processing systems. WSN is a layered structure that is evolving into an open communications architecture for compliance with the International Standards Organization (ISO) Open System Interconnection (OSI) model (see Figure 2-2). In contrast to host-based architectures, WSN is a peer-to-peer architecture providing exceptional flexibility. By using the WSN VS products, you can configure many types of links and systems into a wide variety of networks designed to meet specific requirements for function and performance.

WSN networking products are consistent with its framework, its design principles, and its strategic objectives. Products in one layer use the network resources supplied by products in the layer below and in turn supply network resources to the products in the layer above.

WSN products are generally categorized into the following four layers:

Application Layer -- Serves the needs of the end user by performing the operations required to access the network services. Since the Service layer provides the interface to the network, end users are freed from the tasks that the application software performs.

Service Layer -- Provides the interface between the network and network applications, including end users and applications.

Core Layer -- Establishes and maintains the sessions, manages data routing, and provides the means for network recovery in networks consisting of multiple systems and programs that configure and manage network resources. The core layer includes the configuration and monitoring utilities that enable administrators to configure, control, and monitor WSN networks. This layer also provides alternate routing capabilities, allowing network administrators to configure multiple routes between systems in the network. These capabilities minimize communications costs, support backup communication links for use in the event of equipment failures and severe network congestion, and provide gateways between different transports.

Link Server Layer -- Provides the software that is used by the communications hardware to establish a link between two systems that are directly connected to one another.

Figure 1-1 shows how WSN VS products fit into the Application, Service, Core, and Link Server layers. These product layers overlay the WSN/Communications Network Servers (CNS) architecture, described in Section 2.3. Certain WSN products, such as File Transfer Service and VS Terminal Emulation, contain components from more than one layer, as indicated in Figure 1-1. Wang Software Manager is a VS product that can also be used independently of WSN. (Refer to the *Network Management VS Software Manager* data sheet for information about Software Manager.)

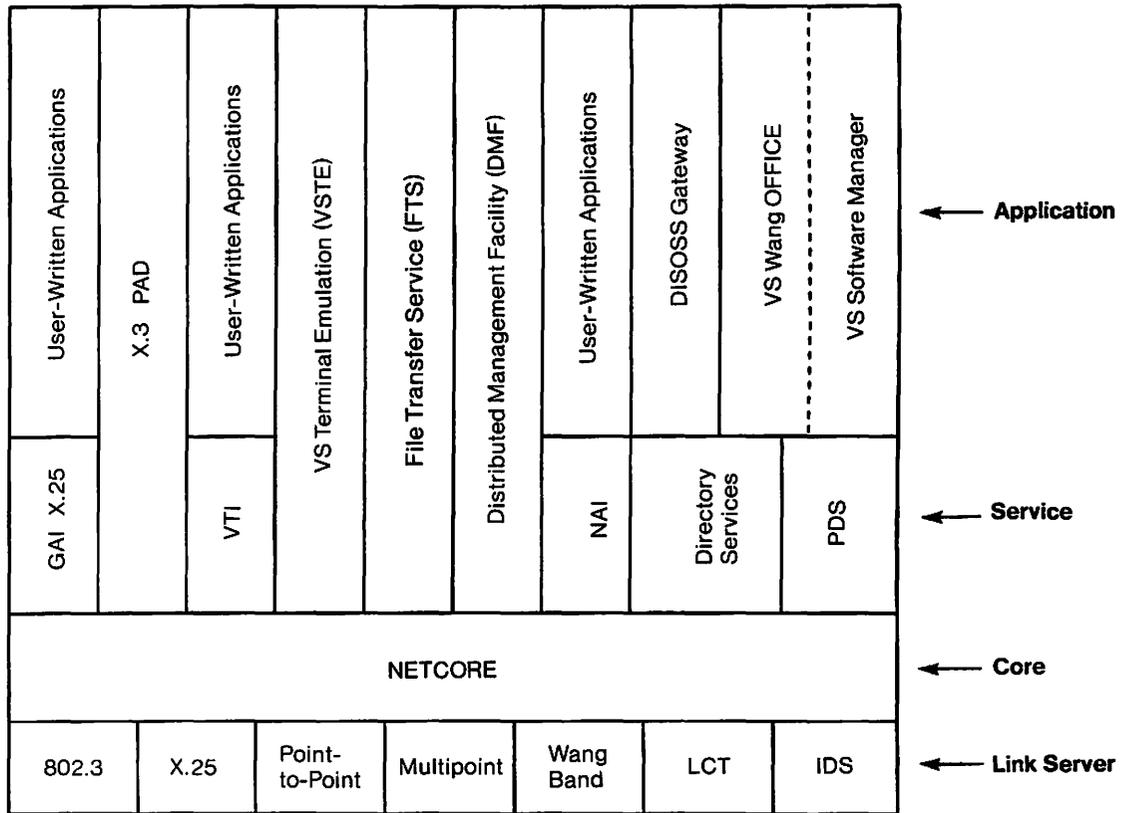


Figure 1-1. Relationship of WSN VS Products to the WSN Layers

In order for a system to participate in a WSN network and perform its networking functions it requires one or more services or applications, NETCORE, and at least one transport.

1.2.2 Network Applications

Network applications are products supported in a WSN networking environment that provide an end user interface to the lower level networking programs. In most cases, WSN applications are packaged with and provide access to WSN services. For example, VS File Transfer Service consists of an end user interface that provides access to the File Transfer Manager service component.

Wang VS OFFICE is another example of a WSN network application. The electronic mail component of Wang OFFICE enables you to create, revise, and forward electronic mail to multiple users in the network. This component works with WSN VS NETCORE components, PDS Store and Forward, and WSN transports to move mail through the network.

1.2.3 Network Services

This section describes the following four categories of WSN VS network services and the products that make up each of them:

- Terminal Emulation Services
- Directory Services
- Distribution Services
- Programmable Network Interface Services

Terminal Emulation Services

VS Terminal Emulation services include a group of WSN products that serve to expand support for network applications, enabling applications on remote systems to communicate with the local VS. These emulation products include

VS Terminal Emulation (VSTE) -- Enables users of Wang systems to log on to another VS on their network and run any program that does not require special device software to be loaded into the workstation. Depending on the type of network, all major Wang product lines can support this service. (For information on the operation of VSTE, refer to the *Network User Guide for VS Systems*.)

Virtual Terminal Interface (VTI) -- Enables a customer-written program running on one VS to act as a VS workstation performing I/O operations to a program or utility running on another VS. With VTI, you can create applications that provide a seamless interface to applications that are distributed over multiple systems. The customer-written program that calls the VTI subroutines runs on one VS system and functions like a data processing workstation operator that is logged on to the other VS systems. VTI uses VSTE to access remote VS systems. (For information on the operation of VTI, refer to the *VS Virtual Terminal Interface User's Guide*.)

X.3 VS Packet Assembler/Disassembler (PAD) Service -- Implements CCITT recommendations X.3, X.28, and X.29, and uses the X.25 General Access Interface (GAI) service to gain access to a remote system through the network. To the remote system, the workstation appears to be an asynchronous terminal. (For information on the operation of X.3 VS PAD, refer to the *WSN X.3 PAD Emulation Facility User's Guide*.)

Directory Services

Directory Services enable the network administrator to build and maintain a directory of applications, systems, areas, and Wang OFFICE users in a Communication Network Services (CNS) network environment. For WSN, the directory contains

Wang OFFICE User Information -- Each system running Wang OFFICE and CNS is configured with a directory of all Wang OFFICE users in the network.

Network Information -- Each system running CNS in the network is configured with a list of systems and areas. CNS uses this list to determine the destination for files and mail transmitted throughout the network.

Application Information -- Each application that uses CNS on a system and requires network startup and access services must be entered in the WSN directory. Wang OFFICE applications are automatically added to the directory. Other types of applications such as customer-written, NAI-based applications, require you to enter the application ID as well as other necessary information. You enter this information using the WSN Applications Management utility (WSNAPPS). This information enables CNS to run the application. (Refer to Chapter 10 for information on using the WSNAPPS utility.)

Whenever a directory is modified to add or delete Wang OFFICE users on any system configured with Directory Services, the Directory Synchronization component of Directory Services is responsible for updating the directories on all the systems in the network. (Section 2.6 describes the process Directory Services uses to update directories.)

Distribution Services

Distribution services provide networks with the data delivering and receiving capabilities that are used to move processed information (e.g., data files, WP documents, electronic mail, etc.) through the network. Distribution services for the VS include

VS File Transfer Service -- Provides a basic file delivery mechanism that enables you to send and receive individual files and word processing (WP) documents between most Wang and certain non-Wang systems. This service uses a program called File Transfer Manager. Files are queued to individual destinations which may or may not be running CNS. (CNS is described in Chapter 2.)

Package Distribution Services -- Includes the File Transfer, Activity, and Store and Forward Managers. PDS enables Wang OFFICE users to send electronic mail to intermediate VS and IBM or plug-compatible mainframes for subsequent forwarding to destinations through the Store and Forward Manager. PDS also enables VS Software Manager users to distribute packages (e.g., software programs) through the capabilities of Store and Forward routing. Mail is submitted to the Store and Forward Manager from Wang OFFICE by a program called the Activity Manager. Software Manager packages are submitted to the Store and Forward Manager by the Store and Forward Programmatic Interface (SFSUBMIT).

For release specific information about File Transfer Service and PDS, refer to the *WSN VS File Transfer Service Customer Software Release Notice* and the *WSN VS Package Distribution Services Customer Software Release Notice*.

Programmable Network Interfaces

Programmable network interfaces are software products that enable users to write interfaces between their own applications and CNS or between their own applications and X.25 packet-switched networks. By using these interfaces in conjunction with other appropriate networking software, applications can be distributed among systems that share the network. WSN programmable network interface products include

Network Application Interface -- The NAI service is a group of subroutines that enable user-written applications and WSN services such as File Transfer to attach to CNS, thereby becoming a network user. NAI enables programmers to write network applications. Using basic program-to-program communications subroutines, NAI provides a set of presentation services including record and message delimitation, encryption, and compression. (For more information, refer to the *WSN VS Network Application Interface Programmer's Guide*.)

X.25 General Access Interface -- The X.25 GAI service provides applications with direct access to packet-switching networks. This service enables you to write your own high-level protocols to communicate with Wang and non-Wang systems that support the CCITT X.25 protocol. (For more information, refer to the *WSN X.25 General Access Interface Programmer's Guide*.)

1.2.4 WSN VS NETCORE

WSN VS NETCORE is the software that enables multiple systems to communicate over a wide variety of transports, independent of the network topology. The software includes Session Manager, Connection Manager, Communications Network Services (CNS), the WSNEDIT configuration editor, the CNSMGR program for controlling and monitoring CNS activity, the WSNAPPS program for managing applications in the WSN Directory, the WSNDIRM directory maintenance utility, the network logger, and diagnostic programs. For specific release-related information about WSN VS NETCORE, refer to the *WSN VS NETCORE Customer Software Release Notice*.

1.2.5 Link Servers

WSN transports, which function as link servers, enable WSN network services to exchange information between adjacent systems over a suitable physical connection. Using a variety of Wang and industry-standard protocols, WSN transports provide flexible choices for linking adjacent systems in both local- and wide-area geographically dispersed locations. The total number of active transports (up to a maximum of 50; 29 concurrently enabled for CNS) that a VS system can support depends primarily on the number of input/output controllers (IOCs) that can be supported. (The selection of which transport type is most appropriate and how many transports are required needs careful consideration.)

The collection of WSN transport products are continually being expanded and enhanced to include new features and protocols to support connections between Wang and multivendor environments. The present collection of WSN transport products are listed and described as follows:

- Multipoint
- Point-to-Point
- Wang Band
- IDS 3274 SNA and 3271 BSC
- IEEE 802.3
- X.25
- PC Local Communications

Multipoint

The WSN VS Multipoint transport supports communications between Wang systems equipped with synchronous modems over dedicated multidrop lines. Within a WSN multipoint environment, any combination of Wang secondary systems can access the resources of and exchange data with a primary VS computer. The primary VS controls network access by polling the secondary systems. Wang systems that can access the VS include other VS computers, Office Information Systems (OIS), Alliance® systems, 2200 computers, and Wang PC/APC systems.

A single transport from a primary VS can support up to 16 secondary systems. VS secondaries can communicate with other VS secondaries through the CNS services on the primary VS.

Point-to-Point

The WSN VS Point-to-Point transport supports wide-area communications between suitably equipped Wang systems over dedicated or switched communication lines. Within a dedicated point-to-point environment, any Wang VS, OIS, Alliance system, 2200 computer, or any of the full range of PC systems that include the Wang PC/APC, LapTop Computer, Wang Professional Computer 200/300 Series, and IBM Personal Computer AT/XT and compatible systems can be connected by a dedicated line to another Wang system.

Within a switched WSN point-to-point environment, any Wang system (or IBM Personal Computer AT/XT or compatible system) can use switched telephone lines to access and communicate with any other Wang system. Switched, point-to-point communications can use either manual or autodial capabilities.

Both switched and dedicated WSN VS Point-to-Point transports support the choice of synchronous or asynchronous protocols. Point-to-point synchronous communication is supported by all systems configured in a WSN point-to-point environment. Point-to-point asynchronous communication is supported between the VS and any of the full range of PC systems, previously described.

Wang Band

The WSN VS Wang Band transport provides a connection across the Wang Band multiple-access channel of the WangNet broadband cable local area network (LAN). This transport provides a peer-to-peer connection that allows suitably-equipped VS, OIS, and Alliance systems to share the capacity of this channel and thereby exchange data. The Cable Interface Unit (CIU) is the interface between the WangNet cable and each system that uses this transport.

Contention among the systems that use the Wang Band is resolved by the Carrier-Sense Multiple-Access with Collision Detection (CSMA/CD) access method. This access method is implemented in a distributed manner on all of the CIUs on the Wang Band. The failure of one or more CIUs will not affect the use of the network by other CIUs and the Wang processors that they support.

Information Distribution System (IDS) 3274 SNA and 3271 BSC

The WSN VS IDS 3274 SNA and IDS 3271 BSC transports support communications between VS systems equipped with the appropriate emulation and Information Distribution System components. These communications are routed through an IBM or plug-compatible host equipped with IDS host-based software.

The IDS 3274 SNA transport enables VS systems equipped with VS 3274 SNA emulation components to communicate in an SNA network. These systems communicate through an IBM or plug-compatible host, equipped with the appropriate IDS host-based software.

The IDS 3271 BSC transport enables VS systems equipped with VS 3271 BSC emulation components to communicate using IBM's Binary Synchronous Communication (BSC) protocol. These systems communicate through an IBM or plug-compatible host equipped with the appropriate IDS host-based software.

IEEE 802.3

The WSN VS IEEE 802.3 transport supports local area 802.3 communications, as defined by the Institute of Electrical and Electronic Engineers (IEEE) across a single-channel medium. This transport provides a peer-to-peer connection between VS systems, and also between VS and the Wang Professional Computer 200/300 Series, IBM Personal Computer AT/XT, and compatible systems. A communications rate of 10 Mbps is supported.

The WSN VS 802.3 transport uses the CSMA/CD network control access method.

X.25

WSN VS X.25 transports provide full-duplex, logical connections between Wang systems through public or private packet-switched data networks (PSDNs). The PSDNs must support the X.25 standard of the Consultative Committee for International Telephone and Telegraph (CCITT). These transports require a leased line between a TCB3 (or comparable TC controller) and the X.25 port to the network.

The X.25 transports control the exchange of data between a Wang VS system and the PSDN data circuit-terminating equipment (DCE). X.25 enables a VS computer to access a DCE through industry-standard modems, connectors, and leased telephone lines.

PC Local Communications

The VS Local Communications transport supports local direct communications between the VS and Wang PC/APC systems. Communications are made over standard dual-coaxial cable, which runs between a serial port connection on the VS and the port on the Local Communications Option card installed on the Wang PC/APC.

1.3 NETWORK HARDWARE

This section gives a conceptual overview of the relationship between the WSN networking software, specifically transports, and the VS system hardware. Chapter 4 describes specific VS system hardware options and explains the procedures that are used to configure system hardware for WSN communications. For a list of the system hardware that is used to support WSN communications for your VS, refer to your *WSN VS NETCORE Customer Software Release Notice*.

When a system uses a WSN transport to establish a connection with another system, it does so through a telecommunications input/output controller (IOC). A controller is configured with one or more data link processors (DLPs), depending on the type of controller and its function. For example, on an Extended Serial IOP Controller, you can configure several DLPs including TCB1s, TCB3s, or External CIUs. For an Internal CIU controller, if you configure the controller as a logical DLP, no further device configuration is necessary. When configuring a Multi-Line Telecommunications Controller (MLTC), you have a choice of either configuring the entire controller as a single logical DLP or of dividing it functionally into a group of logical DLPs, in which case, each individual group is supported by a separate transport (refer to the sections regarding MLTC line group configuration in Chapter 4).

Each controller has internal memory, a dedicated microprocessor, and capabilities for loopback and restart diagnostics. The VS CPU downloads transport microcode, which is included with the transport software package, to the controller when you perform an initial program load (IPL) procedure on the system with the transport enabled.

Depending on the type of VS, and the configuration desired, the DLP can be either an internal device housed in the main system chassis or an external device cabled to an IOC (also called an IOP on certain VS CP types). Other controllers that have logical DLPs configured, such as the MLTC, Internal CIU, and LAN Controller, are cabled directly to the VS system bus.

Figure 1-2 shows the physical relationship between the VS and the various system hardware components.

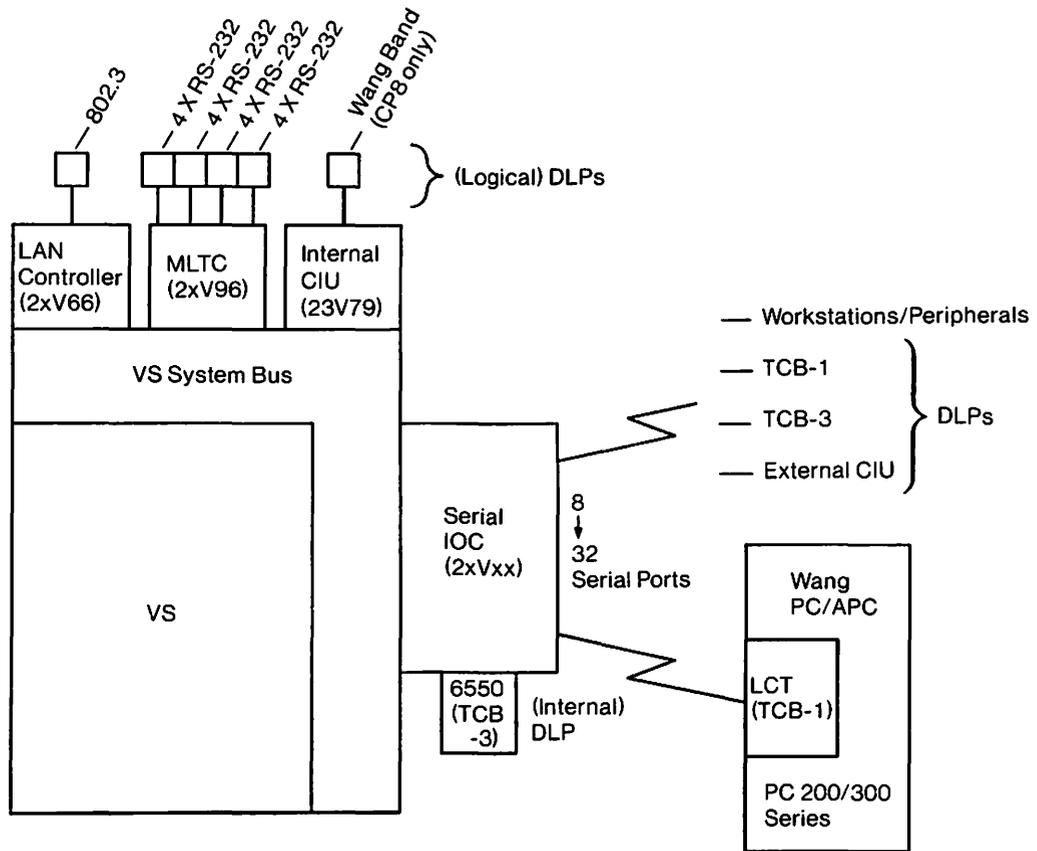


Figure 1-2. System Hardware Relationships

When two systems communicate in a WSN network, they establish a communication session. A session uses a logical connection or virtual circuit and is established between the applications running on the two systems. Therefore, if a remote workstation is logged on to a VS, it is logically connected to that system. Until that remote workstation is logged off, the session remains active and the workstation is, in effect, a local VS workstation. (For more conceptual information about sessions, refer to the chapter on Monitoring Applications and Sessions in the *WSN VS Network Control and Monitoring Guide*.)

Each DLP is assigned a certain number of logical device numbers from the system's logical device number pool when the system's hardware is configured. Communications sessions are mapped to these device numbers in the ratio of one session/one device number for non-CNS sessions or multiple concurrent sessions/one device number for CNS sessions. Session mapping depends on the particular system configuration and whether or not CNS is installed. Each controller path also requires a device number. DLPs are configured using the VS GENEDIT utility. The communications related aspects of this utility are described in Chapter 4.

The controller of a sending system is responsible for accessing the network, establishing contact with the controller of another system, packaging the data for transmission, and sending the data. The controller of a receiving system must recognize when another system is trying to establish contact, must receive the data, unpack it and check for transmission errors, and pass the data on to its system.

CHAPTER 2 INTRODUCTION TO NETWORK COMMUNICATIONS

2.1 OVERVIEW

This chapter introduces the procedure for configuring a network of Wang and certain non-Wang systems. It discusses configuration parameters and various networking terms and concepts that are used throughout this manual. You should read through this chapter to become familiar with the information necessary to configure and maintain your VS in a WSN network.

2.2 CONFIGURATION LEVELS

There are two configuration levels in a network of Wang systems and other systems using WSN products to communicate. These are

- Network level
- System level

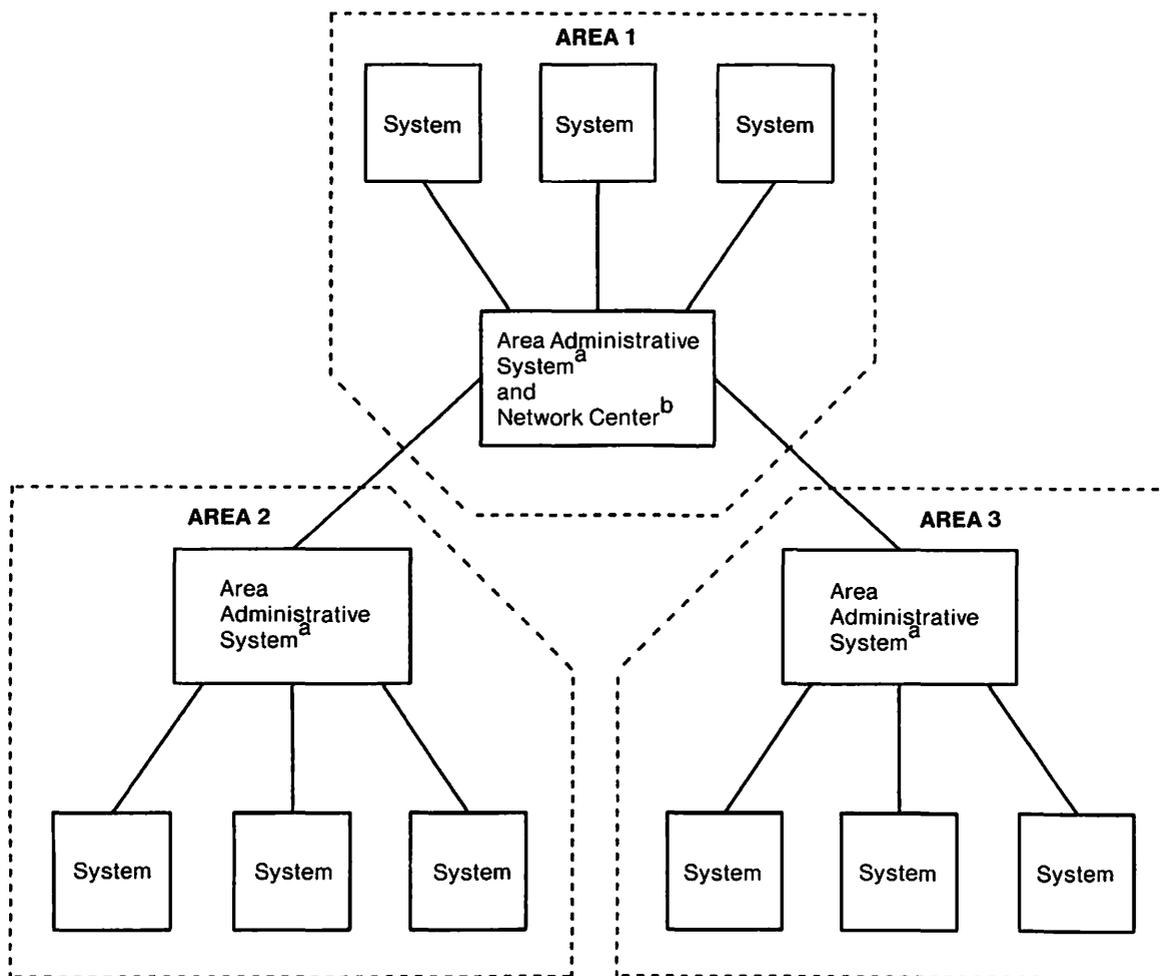
Each configuration level has certain parameters associated with it that are used to configure a VS system for networking.

2.2.1 Network Level

When a network is configured, the systems are assigned to areas and given names and IDs that are unique within the network. These names and IDs are kept in the network directory. An area is a logical grouping of systems, usually located in the same general location. One system, designated as the area Administrative System, is responsible for managing the network directory for all Wang OFFICE users in its area. If Distributed Management Facility (DMF) is used, the Administrative system (also called the Area Control Center (ACC)) performs DMF management functions for all of the systems (nodes) in its area. One Administrative system in the network, designated as the Network Center, has primary responsibility for managing the network directory for Wang OFFICE users. For DMF, this system is called the Network Control Center (NCC), and is given responsibility for DMF management functions over the entire network.

The aggregation of systems into areas, designation of the area Administrative system and the Network Center, and assignment of unique names and IDs constitute the network level of configuration. The network level (also called the network-view) configuration information is entered in the network directory installed on every system in the network. The process of creating and maintaining such a directory is also part of the network level configuration process. The network level configuration process is outlined in Chapter 3.

The network level of configuration is based on a hierarchy of systems, areas, and the area Administrative system and Network Center. An example of this hierarchy is shown in Figure 2-1.



^aArea Control Center (ACC) in Distributed Management Facility (DMF).

^bNetwork Control Center (NCC) in Distributed Management Facility (DMF).

Figure 2-1. Network Hierarchy

Basing network level configuration on the hierarchy in Figure 2-1 simplifies network management (for example, maintenance of directories) and allows designation of distribution points. With network partitioning, each individual system needs a minimum of network information, namely: the communications paths to other systems in its own area; and the communications paths to other areas. Partitioning also makes it easier for administrators to manage and monitor information flow through the network, since network traffic can be routed through distribution points.

2.2.2 System Level

When you configure individual VS systems for network communications, relationships are defined between various hardware and software elements that enable the systems to use the network. The system level (also called the local-view) configuration includes system hardware components, WSN transport and service definitions, and definitions of routes over which data is transmitted to destinations. The process for configuring these components and definitions is outlined in Chapter 3.

2.3 WSN COMMUNICATIONS NETWORK SERVICES

Communications Network Services (CNS) is the software component of WSN VS NETCORE that provides a common network access method for a variety of applications and services, such as Wang OFFICE and customer-written NAI-based applications, WSN VS Terminal Emulation, and the WSN File Transfer Service on the VS. CNS provides networked systems (called nodes) with the means for session establishment, maintenance, and termination. CNS also provides the means for data routing, data recovery due to system or network failure, network control, and network monitoring. Other systems that can run CNS and share these capabilities with the VS are

- Wang PC/APC
- Wang Professional Computer 200/300 Series and IBM Personal Computer AT/XT and compatible systems
- Information Distribution System (IDS) Host¹

¹ A subset of CNS is included with IDS Standard Components software that provides limited CNS capabilities for the IDS host. Also, the CNS capabilities that are supported vary according to which release level of IDS software is installed on the IDS host. (Refer to your *WSN Information Distribution System Host-Based Products Customer Software Release Notice* for details.)

Systems running CNS can establish sessions with directly connected systems that are not running CNS. However, systems that are not running CNS cannot use the extended routing or recovery capabilities. Non-CNS systems (that is, systems that cannot support CNS) include OIS, Alliance, Wang LapTop Computer, and 2200 systems.

Systems running CNS are given extended routing capabilities that include

Multihop -- Enables one system to communicate with another system through intermediate systems. Thus, all systems in the network need not be directly connected. The intermediate systems must also run CNS.

Multiprotocol -- Enables access to virtually all of the WSN VS transports. Data can be switched between several transports, if necessary, before reaching its destination. Multiprotocol support enables administrators to select the best communications media and transports for a given situation.

Alternate Routing -- Enables several communication paths between systems, providing automatic switching to alternate routes if one route fails. For example, two routes can be configured between the VS in New York and the VS in Denver -- one by way of the VS in Chicago and another by way of a VS in St. Louis. If the VS in Chicago has a failure, information can be routed to Denver via St. Louis.

2.3.1 WSN CNS Architecture

The WSN/CNS architectural structure consists of layers. These layers operate within the WSN product layering scheme and include

- Application
- Presentation
- End-to-End
- Switching
- Link Server
- Physical

The WSN/CNS architectural layers are described as follows and compared to the International Standards Organization (ISO) Open Systems Interconnection (OSI) model in Figure 2-2.

Application Layer -- Provides the interface to the network (that is, calendaring, messaging, electronic mail, document filing and retrieval). Applications access CNS by using the Network Application Interface (NAI) subroutines.

Presentation Layer -- Maintains the structure and integrity of the user data received from the application layer, and delivers it to the peer application layer as it was originally presented.

End-to-End Layer -- Provides services to establish, maintain, and terminate application sessions between systems. Maintains the integrity of the data (so that no data is lost or duplicated) and the order of the messages.

Switching Layer -- Selects the appropriate route for the data and sends the data on that route. This layer does not guarantee data delivery, nor does it guarantee that data arrives in the order it was sent.

Link Server Layer -- Ensures data integrity and delivery to the switching layer of the adjacent system through a WSN transport. If the adjacent system is not the destination, the data is forwarded by the adjacent system's switching layer through another transport. This process continues until the data reaches its destination.

Physical Layer -- Provides the physical connection between two systems (for example, WangNet cable, or a RS-232, RS-449, or RS-366 physical connection to a leased or dial-up (switched) telephone line).

Figure 2-2 shows a comparison of WSN/CNS layers with the Open Systems Interconnect (OSI) model.

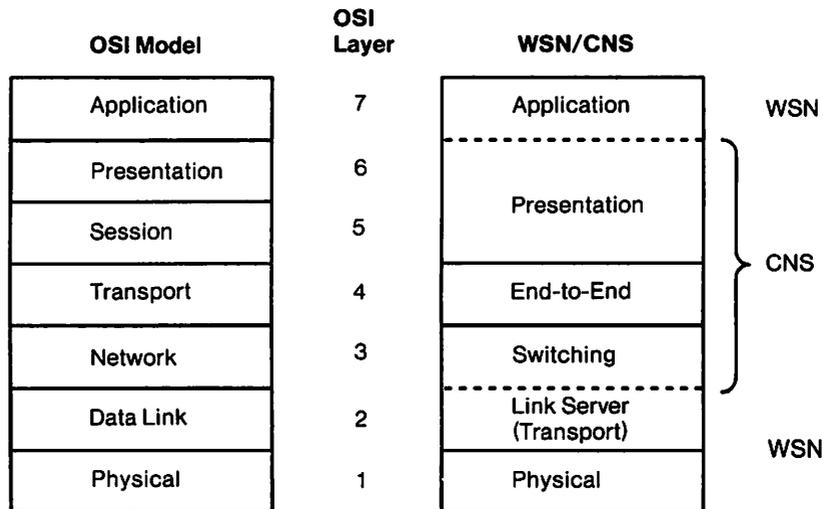


Figure 2-2. WSN/CNS Layers and OSI Comparison

The logical flow of data through the WSN/CNS layers is a controlled process. Outgoing data passes from the application through each layer until it is transmitted. Received data passes from the physical layer (DLP and line media) through the link server and other layers until it reaches the application.

As data from the application is transmitted, the WSN/CNS layers attach control information in the form of headers. The combination of headers and user data form a message. The maximum size for each network message is 1920 bytes (depending on which transport protocol is used). In some instances, messages may consist of control information only. When messages are received, the corresponding layers on the receiving system read and strip off the headers.

2.4 CNS ROUTING OVERVIEW

CNS provides applicable systems with extended routing capabilities, which are described in Section 2.3. To plan a network and the specific local-view configurations for the systems in the network, you must be familiar with CNS routing capabilities. To properly configure a network, you need to understand the parameters that are used by CNS to determine routing decisions. This section gives an overview on CNS routing concepts and describes the parameters that are used to configure routes.

The switching layer of CNS manages message routing throughout the network. Each message is routed independently. This layer routes each message and attaches a destination header to it. The header contains the network address (that is, the area ID and the system ID) of the message's destination. Area IDs and system IDs are entered in the network directory and must be known to each system in the network. (Refer to Chapter 5 for more information on directories.)

The destination for a message can be either an adjacent or a nonadjacent type system. The terms adjacent and nonadjacent are defined in the following sections.

2.4.1 Adjacent Systems

Two systems are considered adjacent when they are directly connected. Directly connected systems are characterized as systems that

- Share the same transport
- Exchange messages without having to route them through intermediate systems

For example, two systems that are connected by a WSN Point-to-Point transport are adjacent. Some other examples are all systems on X.25, 802.3, and Wang Band transports. Figure 2-3 illustrates examples of adjacent systems.

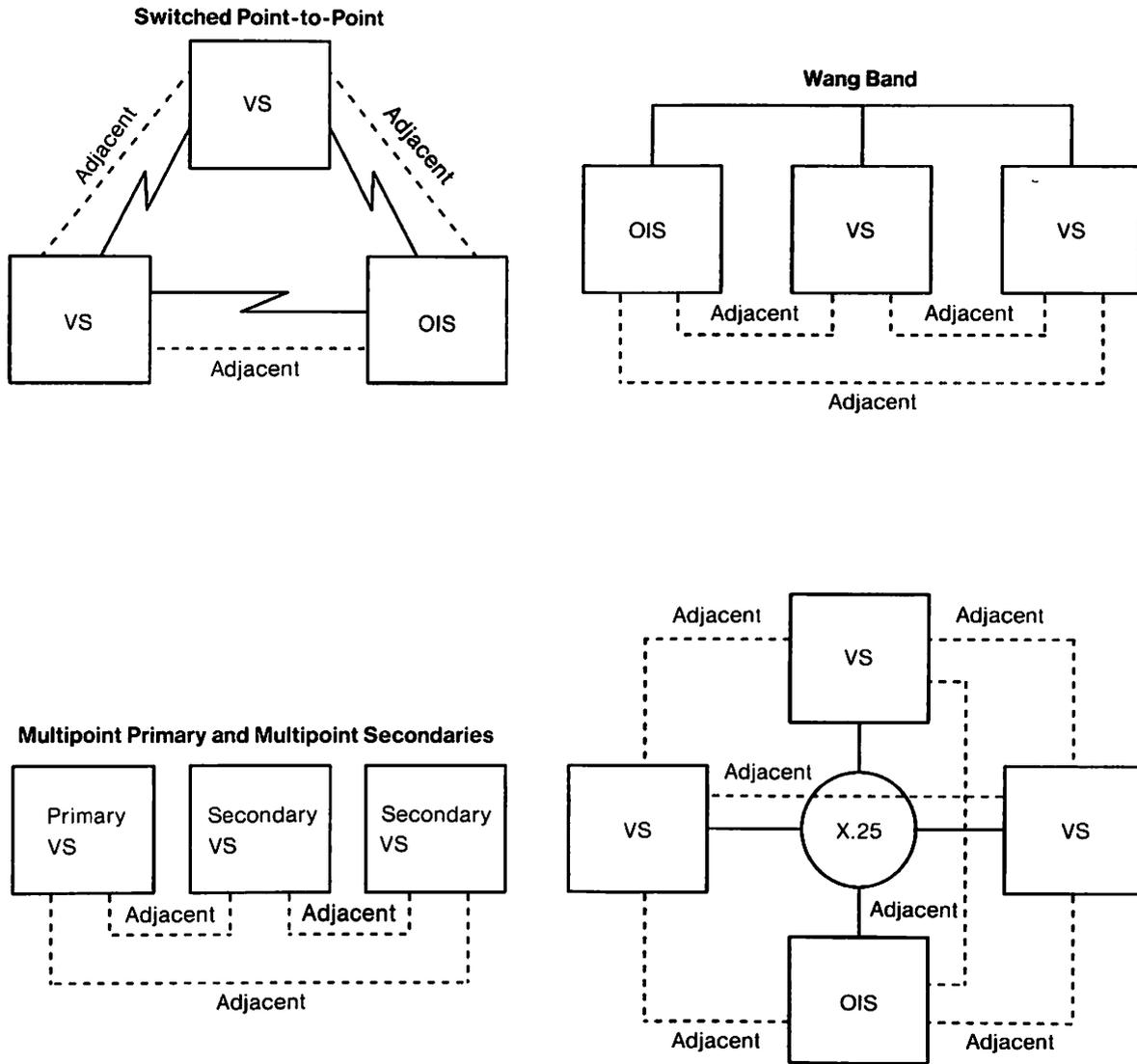


Figure 2-3. Adjacent System Examples

From the local system viewpoint, when creating a WSNEDIT configuration file, any system that you designate on a transport is considered adjacent. Thus, when you designate a system on the transport, you are specifying a direct connection to that system. (Refer to Chapter 6 for information on assigning adjacent systems to a transport.)

2.4.2 Nonadjacent Systems

Two systems are considered nonadjacent when they can communicate with each other only through intermediate systems. To communicate with a nonadjacent system, both the originating system and the intermediate system(s) must be running CNS. For example, two VS systems that are connected to an IDS host are considered nonadjacent. Figure 2-4 shows examples of nonadjacent systems.

From a local system viewpoint, when creating a WSNEDIT configuration file, nonadjacent systems do not appear on any transports; however, nonadjacent systems can appear as destinations within routing configuration that can be reached through one or more adjacent systems. Thus, a direct path cannot be configured to a nonadjacent system. (Refer to Chapter 7 for information on configuring paths to nonadjacent systems.)

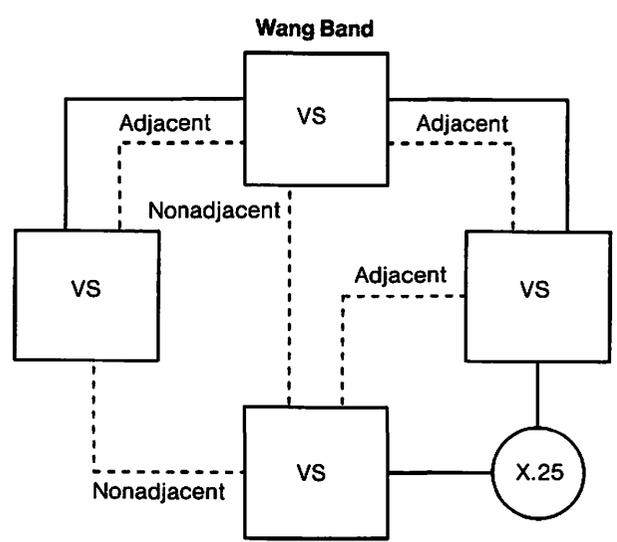
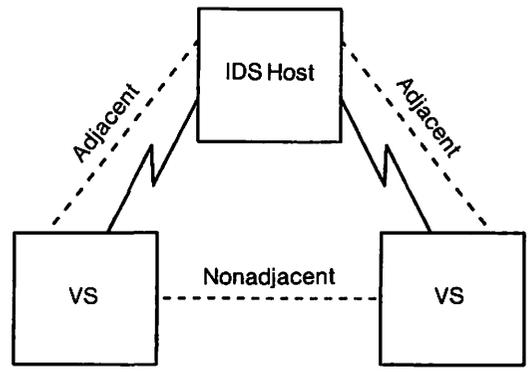
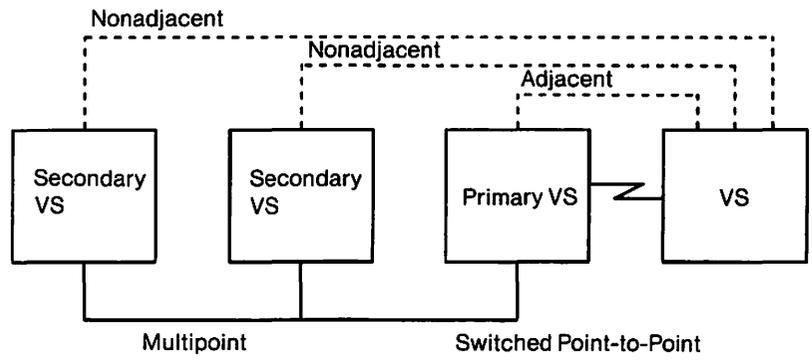


Figure 2-4. Nonadjacent System Examples

A message that is transmitted from one system to another travels across a path. A path is the course over which a message travels to reach a destination. The course may consist of a combination of systems and transports. Figure 2-5 illustrates a sample path.

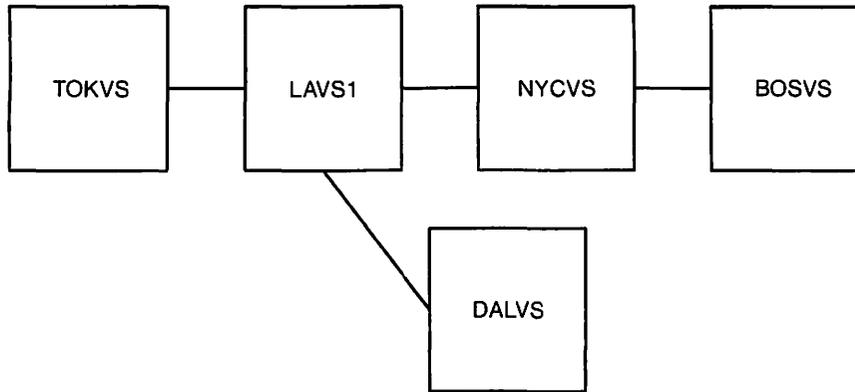


Figure 2-5. Sample Path Configuration

A message originating at TOKVS passes through LAVS1 and NYCVS to reach BOSVS. TOKVS is the originating system (source) and BOSVS is the destination system (destination). Systems LAVS1 and NYCVS are intermediate systems (hops). The message is sent over the transports connecting these systems.

An important reason for dividing a network into areas is to simplify message routing. To reach destinations in other areas, paths are defined between the source and an area, rather than the source and each system in the destination area. The message is routed to the area through an *adjacent* system. Once the message reaches the other area, the CNS switching layers on the systems in that area route the message to a specific destination. Figure 2-6 shows an example of a network with multiple areas.

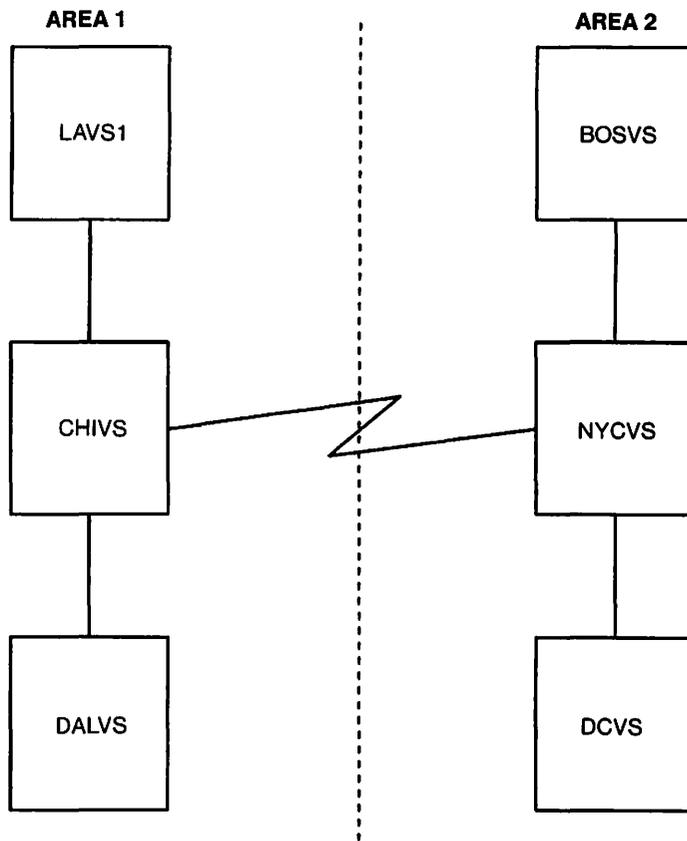


Figure 2-6. Sample Path Configuration Through Multiple Areas

For example, if LAVS1 needs to send messages to destinations in Area 2, it can be configured so that all messages are sent to CHIVS, which can then route these messages to their specific destinations. This capability simplifies inter-area network routing by reducing the amount of routing information that a system (in this instance, LAVS1) requires to communicate with other systems in the network.

2.4.3 Path Selection

CNS uses a distributed routing method. As a message travels along a path, the switching layer on the local system and each system through which the message passes makes a routing decision. This decision is called *path selection*. When a message passes through a system, the switching layer examines the network address in the destination header. The switching layer then compares the network address with information in its routing table to determine the path to the destination. Information in the routing table includes the network address for each destination, and the adjacent or "next-hop" system by way of which messages are routed to destinations. You enter routing table information through the WSNEDIT Manage Routing function (described in Chapter 7). There are several factors that contribute to how paths are selected and how CNS derives its routing information from WSNEDIT. These factors are described in Sections 2.4.4 through 2.4.7.

2.4.4 Path Cost

Path cost is a parameter that is significant only when multiple paths are configured between the local system and a specific destination. The number of paths that you can configure to a specific destination is limited to three. By configuring more than one path to a destination system, CNS can manage congestion more efficiently and provide backup support in the event that a primary path fails. CNS uses Path cost to decide which path to use to reach a particular destination. Paths are selected on the basis of the "least cost path." The least cost path is the adjacent system with the lowest Path cost. In WSNEDIT, the least cost path is represented as a next-hop system through which messages can be routed to a particular destination. (See Figure 7-1 in Chapter 7.)

When you define a path in WSNEDIT, you identify the next-hop system and assign a Path cost (see Figure 7-2). The value you enter may range from 1 to 99. When more than one path is configured between the local system and the destination, the following rules apply:

- If two or more paths exist to a destination system/area, the least cost path is chosen.
- The least cost path is the primary path and the higher cost path is the secondary path.
- When a primary path fails, a secondary path is selected.

Each time a message is sent, the switching layer checks for the least cost path. Thus, messages belonging together can be routed along different paths. These messages are then resequenced by the end-to-end layer at the destination.

When entering a value for Path cost, consider

- The costs of the transports along the path. Each transport has a value, called Base cost, which is a value you assign when configuring a transport in WSNEDIT. (Base cost is described in Section 2.4.8.)
- The size of the switching systems, the capacity at which they are operating, and the network load they are handling.
- The paths of other systems in the network. When determining a preferred path to a particular destination, you need to consider the costs of other paths for all of the intermediate systems between the source system and destination for a message.

2.4.5 Routing Records

Routing records are stored on each system in the network and define paths and Path costs. Routing records are created when you configure your network and define paths to other systems using WSNEDIT. In addition, some routing records are generated automatically by the network software. CNS can use several different types of routing records, either singly, or together, when sending a message to a destination.

Three types of routing records are

- Specific System
- General Area
- Default

Routing records are not displayed by the networking software; however, most of the information that is contained in the records for the local system can be accessed through WSNEDIT for configuration purposes, or through the Control/Monitor Routing function in CNSMGR for viewing current status. Routing information appears in WSNEDIT as paths defined to particular destinations and associated Path costs. The following sections describe these records from the local-system configuration viewpoint.

Specific System

A specific system routing record is one associated with a specific destination system. You define a specific system routing record through WSNEDIT when you specify that a path to a destination system exists by way of an adjacent system. Also, when you configure paths to nonadjacent systems in the same area as your local system, you define specific system routing records for these systems.

When configuring paths to *any adjacent systems, or to systems that share the same area as the local system*, the following rules apply:

- Specific system routing records are generated automatically by either WSNEDIT or CNS for adjacent systems. WSNEDIT generates specific system routing records for all adjacent systems that share the same area with the local system. CNS generates specific system routing records, kept in memory, for adjacent systems that do not share the same area with the local system. In contrast to the routing information contained in records generated by WSNEDIT, which is displayed in the WSNEDIT configuration file, the information contained in CNS-generated records can only be viewed through the Control/Monitor Routing function in the CNSMGR utility. (CNSMGR is described in the *WSN VS Network Control and Monitoring Guide*.)
- Additional specific routing records are necessary for routing to nonadjacent systems. Thus, to communicate with any nonadjacent system in your area, you must configure a path to that system in WSNEDIT. This action generates a specific system routing record on your local system that lists the nonadjacent system as a destination.

Figure 2-7 shows an example of paths requiring specific system routing records.

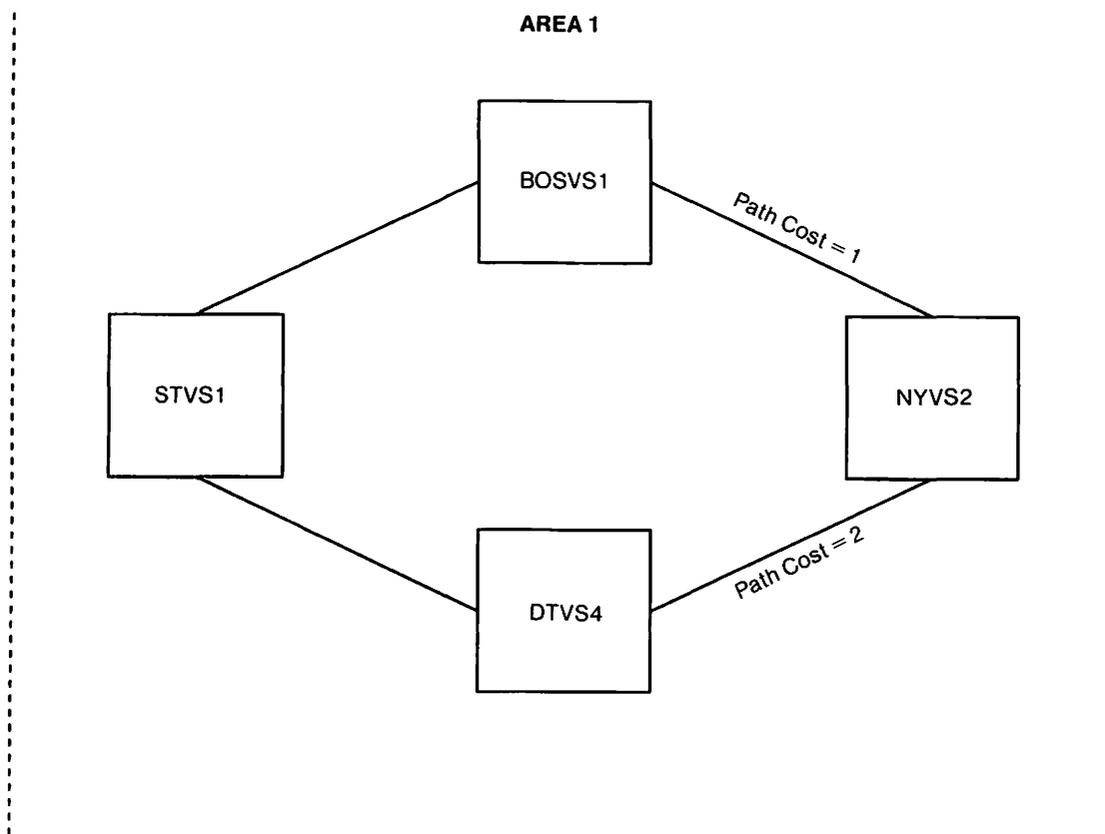


Figure 2-7. Paths Requiring Specific System Routing Records

When creating a configuration file on local system NYVS2, specific system routing records to adjacent systems BOSVS1 and DTVS4 are automatically generated by WSNEDIT. To reach STVS1, you must define a specific system routing record by configuring that system as a destination. For example, the specific system routing record on NYVS2 could be defined in WSNEDIT as "to STVS1" with a least cost path of adjacent system BOSVS1. (See Figure 7-1 in Chapter 7.) (Path costs are shown in Figure 2-7 to indicate that "BOSVS1 to STVS1" is the preferred path.)

General Area

A general area routing record is one associated with an area. You define a general area routing record through WSNEDIT when you specify that a path to all systems in a destination area exists by way of an adjacent system.

When configuring paths to *systems in other areas* (that is, areas not shared by the local system) the following rules apply:

- General area routing records are automatically generated by WSNEDIT for adjacent destination areas (that is, for areas that contain an adjacent system).
- Additional general routing records are necessary for routing to systems in nonadjacent destination areas (that is, areas that do not contain an adjacent system). Thus, to communicate with any system that is in a nonadjacent area, you must configure a path to that area in WSNEDIT. This action generates a general area routing record on your local system that lists the nonadjacent area as a destination.

Figure 2-8 shows an example of paths requiring general area routing records.

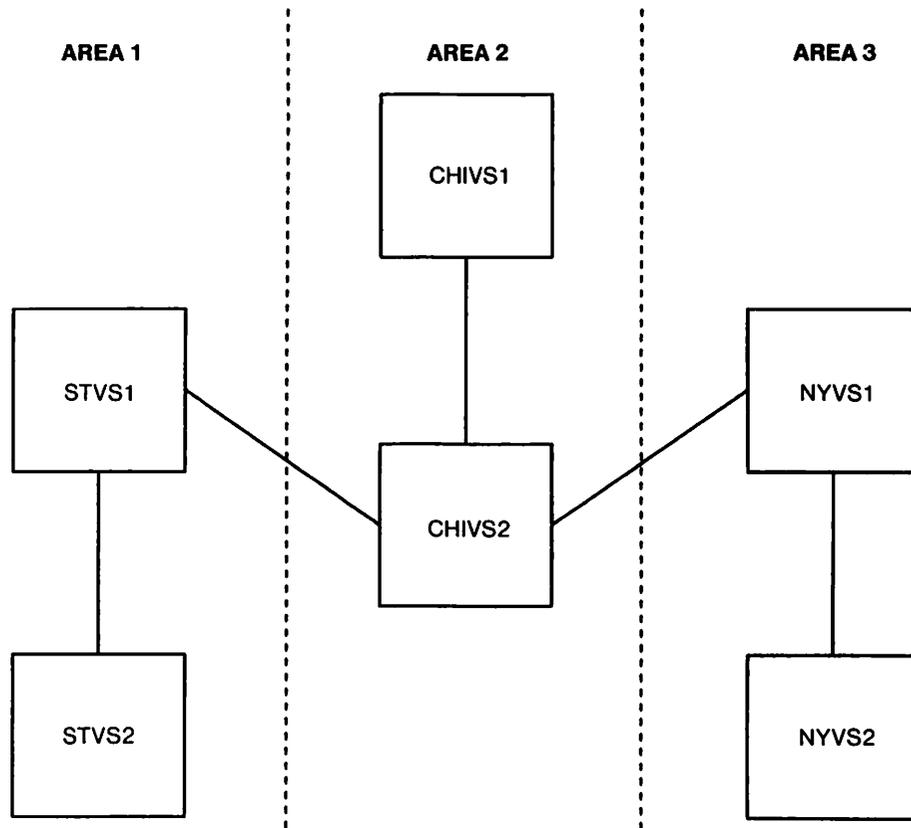


Figure 2-8. Paths Requiring General Area Routing Records

When creating a configuration file on local system STVS1, a general area routing record is automatically generated by WSNEDIT for all systems in adjacent Area 2. To reach destination systems in Area 3, you must define a general area routing record that specifies all systems within Area 3 can be reached via CHIVS2 (since this is the only system with a connection between Area 1 and Area 3). The general area routing record on STVS1 would be defined in WSNEDIT as "(all) systems within AREA3," with a least cost path of adjacent system CHIVS2. (See Figure 7-1 in Chapter 7.)

Default Routing Record

A default routing record is generated only when a default path is configured in WSNEDIT. A default path is a routing option you can use to simplify routing configuration at "end-point" systems and reduce the number of routing records stored on a system. "End point," used in this context, refers to any WSN system with CNS installed that has no routing knowledge of nonadjacent systems, except for one default path through a specified adjacent system (see NYVS2 in Figure 2-8).

Default path routing is also an option available to CNS systems that can serve as intermediate hops for network routing.

When configuring a default path on the local system, the following rules apply:

- A default routing record is not automatically generated. You must specifically define a default routing record through the WSNEDIT Routing function by selecting "(all) systems without an explicit path," with an adjacent system specified as the least cost path.
- A default routing record is only used by CNS when there are no specific or general routing records defined for the particular destination system/area.
- Only one default routing record can be defined on a system: there is no alternate default path.

For example, in Figure 2-8, a default routing record would be a desirable choice for end point NYVS2. The default routing record on NYVS2 would be defined in WSNEDIT as "(all) systems without an explicit path," with a least cost path of adjacent system NYVS1. (See Figure 7-1 in Chapter 7.)

Section 2.4.6 explains default routing in further detail and gives additional information for network planning considerations.

2.4.6 Network Design Considerations for Default Path Routing

Adding a default routing record to an end-point system entails no special planning considerations, since these systems do not serve as intermediate hops for routing messages to other systems. The guidelines for adding a default routing record to an end point are

- Only one system adjacent to the end point can serve as the default path.
- End points are the only systems that can make exclusive use of default paths to nonadjacent systems; no other routing records are necessary.

Although default path routing is primarily intended to simplify configuration of end points, it is also available to systems serving as intermediate hops. Adding a default routing record to an intermediate system requires careful planning to ensure that routing is efficient. The following rules are important when adding a default record to an intermediate system:

- Make sure that the intermediate system also has specific routing records defined to reach directly connected end-point systems. Do not define adjacent end-point systems as default paths.
- Make sure that the adjacent system you specify as the default path has the necessary combination of specific, general, or default routing records in its routing configuration required to reach nonadjacent destinations accessible by way of that adjacent system.
- If an intermediate system is connected to several adjacent systems, only one adjacent system can be associated with the default path.

Figure 2-9 gives a sample network diagram to illustrate how default path routing can be applied. The routing considerations for configuring systems in this diagram are described in the section that follows.

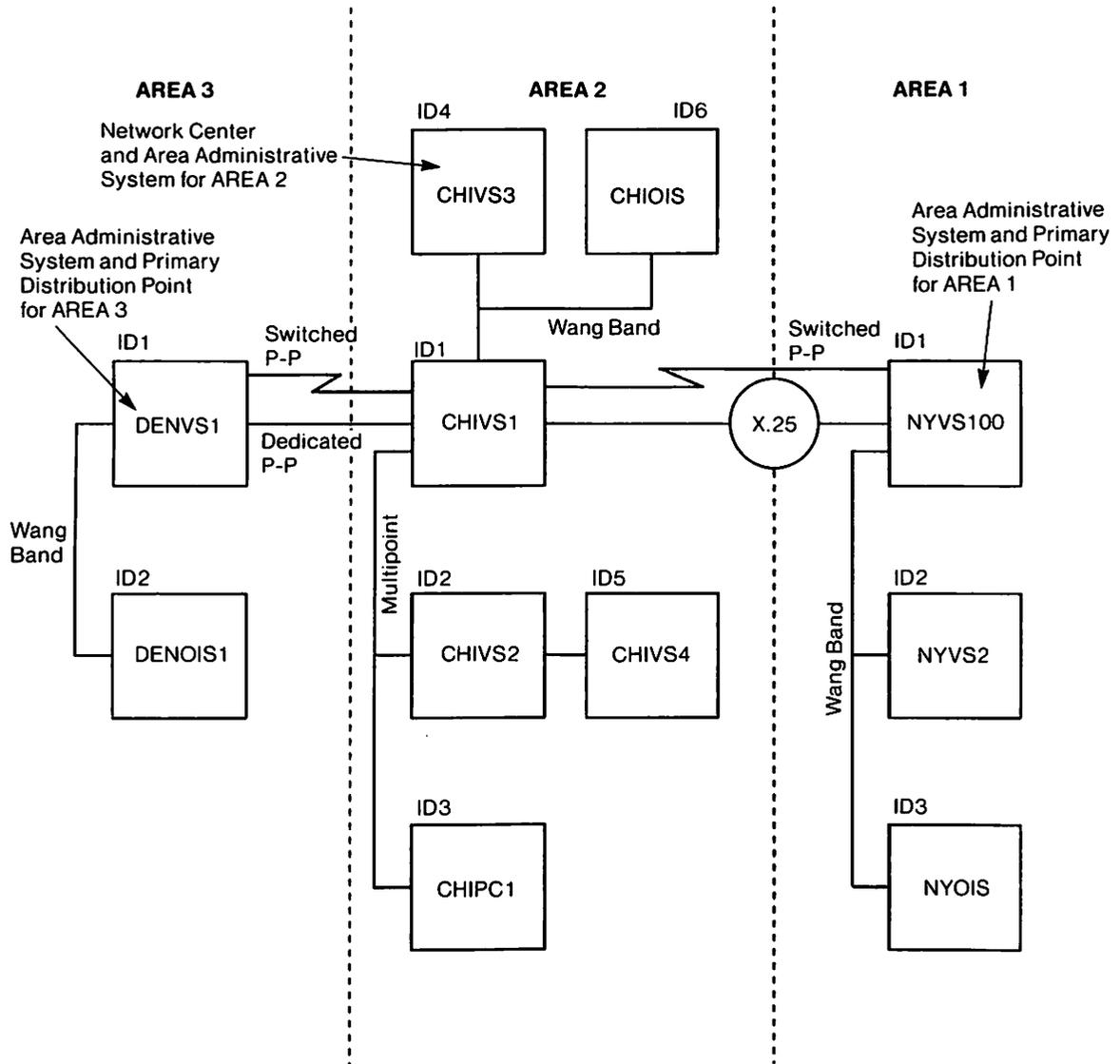


Figure 2-9. Sample Network Diagram

To configure a default path in the routing configuration on end point NYVS2, you must associate the appropriate adjacent system with the default path. In the case of NYVS2, the only appropriate adjacent system is NYVS100 (since NYOIS is an OIS system and does not contain the CNS software necessary for routing).

The default routing record specifies that all data originating from NYVS2 that is destined for nonadjacent systems will be routed by way of NYVS100. NYVS2 needs only the default routing record, not general area or specific system routing records, to route data to nonadjacent systems.

To define a default path for intermediate system CHIVS1, you have the option of specifying either NYVS100 or DENVS1 as the adjacent system associated with the default path. NYVS100 should be specified as the default path since no nonadjacent CNS systems are reached by way of DENVS1. CHIVS1's routing configuration should have specific systems records defined for all directly-connected end points, such as CHIPC1. It should also have a routing record defined for the adjacent intermediate system (DENVS1) that is not associated with the default path.

Note: Always check to be sure that the adjacent system associated with the default path has the necessary combination of specific system, general area, or default records required to reach other systems. For example, the CHIVS1 administrator should check the routing configuration of NYVS100 to verify through WSNEDIT that NYVS100's routing configuration has the necessary routing record required to route data to NYVS2.

2.4.7 Routing Record Selection Sequence

When CNS selects a path to a particular destination system, it uses the routing records in the following order:

1. CNS first looks for a specific system routing record. If one exists, CNS routes the message to the destination system by way of the associated adjacent system.
2. If no specific system routing record exists, CNS looks for the general area routing record. If one exists, CNS routes the message to the destination area by way of the associated adjacent system.
3. If neither specific system or general area routing records exist, CNS looks for a default routing record. If one exists, CNS routes the messages to all destination systems by way of the associated adjacent system.

2.4.8 Transport Selection

This section describes the process CNS uses to select a transport when more than one are configured between two adjacent systems. (Chapter 6 explains how you use the WSNEDIT Manage Transports function to configure transports.) Transport selection occurs on a decision level below path selection. WSN currently supports a maximum of two active transports between adjacent systems. This capability enables the following configurations:

- Alternate transport
- Load balancing

A CNS value, called Relative cost, plays a key role in determining how these configurations are executed.

Alternate transport, load balancing, and Relative cost are described in the sections that follow.

Alternate Transport

Two transports connecting two systems can be configured so that one is the primary transport. This means that the other transport is used only if the primary transport becomes disabled due to a DLP failure, line failure, or similar circumstance. Then, the alternate transport remains active until the reactivation timer on the primary transport expires. The primary transport then becomes enabled, if possible.

Load Balancing

CNS can balance network traffic between two transports connecting two systems. This capability is called load balancing. Two transports connecting two systems can be configured so that they are used interchangeably, or so that one is assigned priority. If one is assigned priority, the other is used only if the priority transport becomes disabled or significantly congested.

Relative Cost

Relative cost is a value that is calculated by CNS for every "enabled" transport.

Note: The term "enabled" (which means the transport can be activated) applies to transports that have their "Initial Status" set to "ENABLED" in WSNEDIT (see Figure 6-3 in Chapter 6). This parameter can also be set through the CNSMGR utility. (CNSMGR is discussed in the WSN VS Network Control and Monitoring Guide.)

If two transports are configured for load balancing, CNS selects the transport with the lowest Relative cost at a given time. Relative cost is dynamically updated, based on the number of messages in each part of the transport queue that is allocated to an adjacent system. Relative cost takes into account the parameters used in the following formula:

$$\text{Relative Cost} = \text{Base Cost} + \text{Congestion Level Factor} + \text{Connection Bias}$$

The parameters are described as follows:

Base Cost -- A constant that is entered through WSNEDIT (see Figure 6-3 in Chapter 6). This value is factored into the Relative cost formula as a *transport cost*. It is the primary factor for prioritizing the selection of one transport over another in an alternate transport or load balancing configuration. Its use in determining these configurations is explained as follows:

When configuring an alternate transport -- Separate Base costs on enabled transports by a wide margin (for example, 2 and 10). By separating Base costs sufficiently, none of the other parameters that are used to calculate Relative cost (i.e., Congestion Level factor and Connection bias) can override this configuration.

When configuring transports for load balancing -- Keep Base costs on enabled transports relatively close (for example, 2 and 4). This allows Congestion level factor to be used to switch between transports as messages that are bound for the adjacent system build up in the transfer queue. (Later in this section, a situation is given that shows how this occurs.)

Note: *Keep in mind that when you enter Base cost values for the transports on the local system, this only affects transport selection for that system. Thus, to configure alternate transport or load balancing to and from the adjacent system, the Base costs for the associated transports on that system must also be set appropriately. This same principle applies to all of the local-view parameters that affect routing and transport selection (i.e., Path cost and Congestion Level factor and Connection bias).*

Congestion Level Factor -- A variable that reflects the number of messages in the part of the transport queue allocated to a specific adjacent system. It accurately reflects the volume of traffic between adjacent systems across a transport.

Congestion levels determine the number of messages that can accumulate in the part of a transport queue allocated for a specific adjacent system before a factor is added to the Base cost. There are four congestion levels: Level 1, Level 2, Level 3, and Level 4. Each level is associated with a number of messages that can accumulate in the part of the queue allocated for a specific adjacent system. Once the level is reached or exceeded, a Congestion Level factor of one is added to the Base cost.

You specify through WSNEDIT the number of messages that are associated with each level. (See Figure 6-3 in Chapter 6.) In most cases the default values (2, 4, 6, and 8) provided by WSNEDIT are sufficient. The number of messages is always greater for each succeeding level: the number of messages associated with Level 2 is more than the number associated with Level 1; the number associated with Level 3 is greater than the number associated with Level 2, and so on.

For example, if the number of messages associated with Level 1 is 2 and two messages are in the part of the queue allocated for a specific adjacent system, CNS adds a Congestion Level factor of 1 to the Base cost. If the number of messages associated with Level 2 is 4 and two more messages reach the queue before the other two are sent (totaling four messages in the part of the queue allocated for a specific adjacent system), 1 is again added to the Base cost and so on up to Level 4.

Connection Bias -- If an enabled transport has not established a connection to an adjacent system, CNS adds a value (ranging from 0 to 2) to that transport's Relative cost. The value for Connection bias is entered in WSNEDIT.

If two transports are configured between two adjacent systems, Connection bias allows CNS to favor the use of the transport that has already established a connection. Connection bias increases the Relative cost of the transport that is not connected, which in turn minimizes the attempts that CNS will make to use that transport. Thus, Connection bias promotes efficiency by limiting use of an alternate transport to times when the primary transport is significantly congested.

You specify the value for Connection bias through WSNEDIT. (See Figure 6-3 in Chapter 6.) In most cases the default value (2) is sufficient.

Note: Remember that Relative cost is a dynamic value that changes based on traffic volume. This enables CNS to select the least congested transport to a given adjacent system by responding to the number of messages in the part of the queue that is allocated for that system.

Relative cost, Base cost, Connection bias, and Congestion Level factor can be monitored on-line through the Control/Monitor Routing function in CNSMGR. (Refer to the *WSN VS Network Control and Monitoring Guide* for details.)

The following situation describes how Relative cost is used in a CNS networking environment:

CHIVS and BOSVS are connected by a Multipoint transport and a switched Point-to-Point transport (see Figure 2-10). CHIVS is the primary on the Multipoint transport; BOSVS is a secondary VS. A load balancing configuration is desired. Since the Multipoint transport uses a higher line speed (96 Kbps) than the switched Point-to-Point transport (48 Kbps), the Multipoint transport is assigned priority.

Note: Generally, transports that use higher line speeds should be assigned priority since they can manage congestion better than transports that use slower line speeds. Also, leased lines are usually less expensive to use than switched lines.

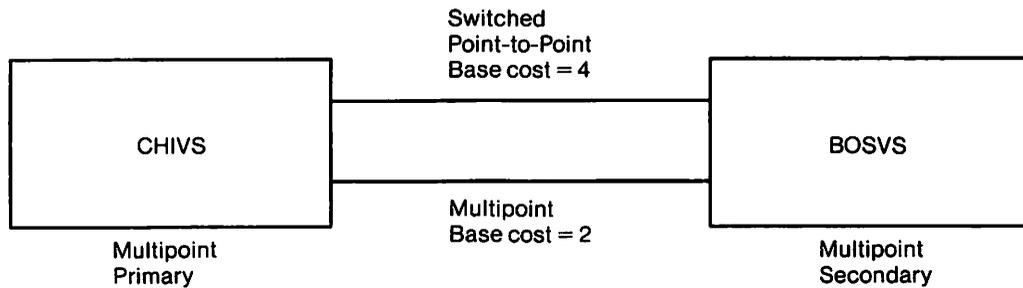


Figure 2-10. Load Balancing Configuration Example

The Multipoint transport is assigned a Base cost of 2 (the default value) through WSNEDIT on both systems. The switched Point-to-Point transport is assigned a Base cost of 4 through WSNEDIT on both systems. Thus, the Relative cost for the preferred Multipoint transport is two less than the Relative cost for the switched Point-to-Point transport at the time that WSN is started on the systems with the active configuration file. This assumes that no communications have yet taken place.

Relative cost determination at this stage is shown as

| Switched Point-to-Point | | Multipoint | |
|---------------------------|-----|---------------------------|-----|
| Base Cost | (4) | Base Cost | (2) |
| + Congestion Level Factor | (0) | + Congestion Level Factor | (0) |
| Relative Cost | (4) | Relative Cost | (2) |

A Connection bias, equal to 2 (the default value), is assigned to both transports in WSNEDIT. At this stage, assuming that a connection is established using the multipoint transport, the number of messages in the multipoint transport queue of either CHIVS or BOSVS must be sufficient to generate a Congestion Level factor of 4 before the switched Point-to-Point transport can be activated.

For the remainder of this situation, transport activity on BOSVS will serve as the example. If the Congestion Level factor of the Multipoint transport is 4, the Relative cost of both transports is equal. Relative cost determination at this stage is shown as

| Switched Point-to-Point | Multipoint |
|-------------------------------|-------------------------------|
| Base Cost (4) | Base Cost (2) |
| + Congestion Level Factor (0) | + Congestion Level Factor (4) |
| + <u>Connection Bias</u> (2) | <u>Connection Bias</u> (0) |
| Relative Cost (6) | Relative Cost (6) |

When the Relative costs of both transports are equal, CNS selects the transport listed first on the Transport List menu of WSNEDIT (see Figure 6-1). (Chapter 6 discusses transport listing in more detail.)

Assuming that the switched Point-to-Point transport is listed first on the Transport List menu, it can be activated when the Relative costs for both transports are equal. Thus, new messages will be routed over the switched Point-to-Point transport.

When both transports are active, Connection bias values on both transports go to zero. Since the Multipoint transport can manage congestion better than the switched Point-to-Point transport, messages will build up faster in the switched Point-to-Point queue than in the Multipoint transport queue once the switched Point-to-Point transport becomes activated. Thus, the Relative cost for the switched Point-to-Point transport will become greater than the Relative cost for the Multipoint transport, as follows:

| Switched Point-to-Point | Multipoint |
|-------------------------------|-------------------------------|
| Base Cost (4) | Base Cost (2) |
| + Congestion Level Factor (2) | + Congestion Level Factor (1) |
| + <u>Connection Bias</u> (0) | <u>Connection Bias</u> (0) |
| Relative Cost (6) | Relative Cost (3) |

At this point, CNS routes new messages to the Multipoint transport. It will continue to use the Multipoint transport until the Congestion Level factor increases to cause the Multipoint Relative cost to exceed that of the switched Point-to-Point Relative cost. If the switched Point-to-Point transport is not used for a certain period of time, that transport's inactivity timer will expire and CNS will terminate that transport connection.

2.5 CNS ROUTING DECISION SUMMARY

This section summarizes the routing decisions the CNS switching layer makes when it processes a message. These decisions are repeated at each system through which a message passes on its way to a destination.

1. The switching layer compares the network address in the message's destination header with information in its routing table to determine the destination of the message.
 - a. If the message is for the local system, the switching layer passes the message to the end-to-end layer.
 - b. If the message is for a remote system, the switching layer selects the next hop by way of which the message will be routed to the destination. The next hop could be the destination.
2. Once the next hop is selected, the switching layer selects the transport used to transmit the message to the next hop.
 - a. If only one transport connects the next hop and the local system, the switching layer queues the message for that transport.
 - b. If two transports connect the next hop and the local system, the switching layer will select the appropriate transport based on the Relative cost for the transports at that time.

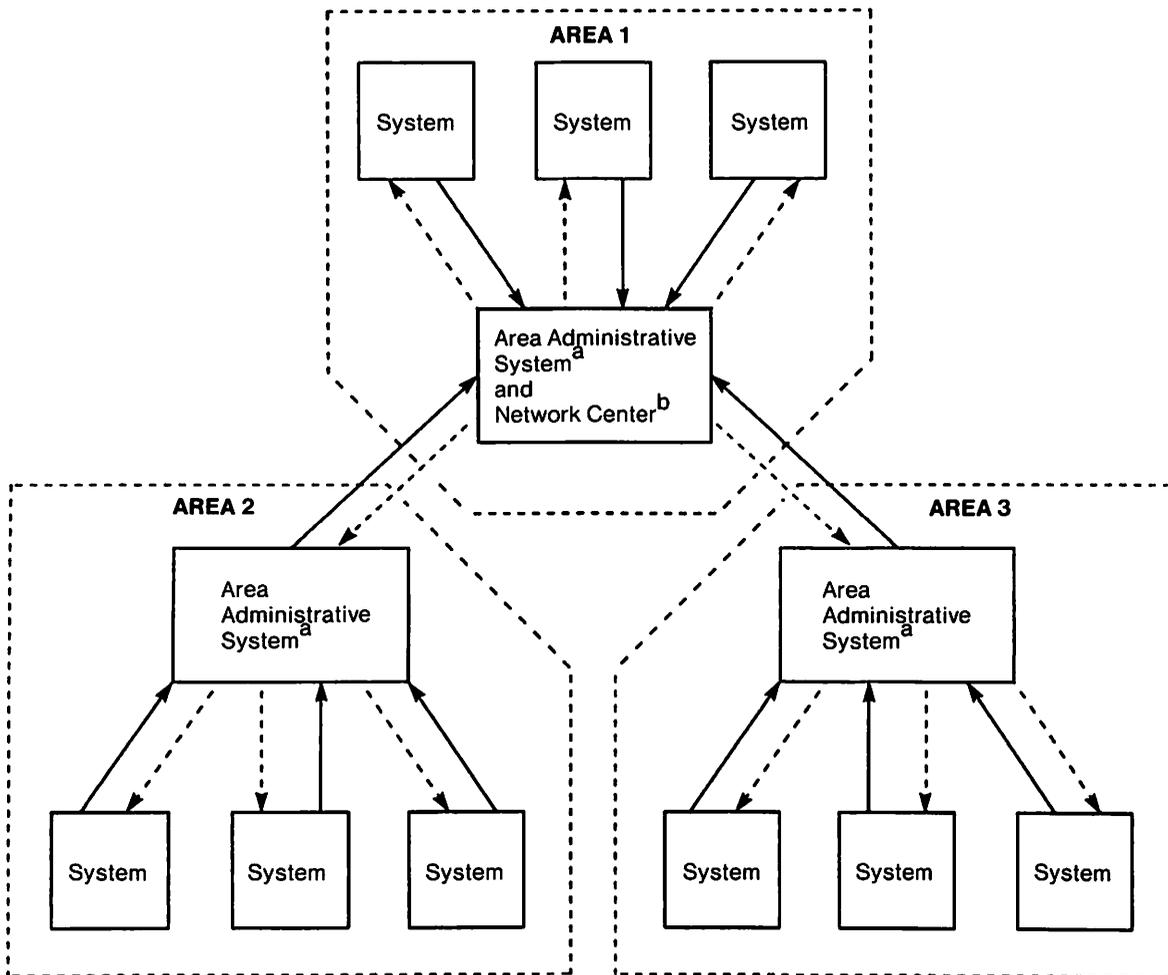
2.6 DIRECTORY SERVICES OPERATION

Directory Services enable a network administrator to build and maintain a directory of systems, areas, and Wang OFFICE users in a CNS network environment. For WSN, the directory contains Wang OFFICE user, network, and application information.

Whenever a new Wang OFFICE user is added to the network on any system configured with Directory Services, the Directory Synchronization component of Directory Services (DIRSYNC) is responsible for disseminating the change to directories throughout the network. DIRSYNC regularly updates directories.

DIRSYNC uses CNS routing capabilities to move directory information through the network. DIRSYNC manages information flow through the network based on a hierarchical topology of systems, area Administrative systems, and the Network Center.

Figure 2-11 illustrates how DIRSYNC manages information flow.



^aArea Control Center (ACC) in Distributed Management Facility (DMF).

^bNetwork Control Center (NCC) in Distributed Management Facility (DMF).

Figure 2-11. Sample DIRSYNC Information Flow

When a directory is modified on a system, DIRSYNC notifies the system designated as the area Administrative system of the directory change. DIRSYNC at the area Administrative system then updates the Administrative system's directory and the directories on each system in that specific area. DIRSYNC at the Administrative system ultimately notifies the Network Center of the directory change.

When the Network Center receives an update from an Administrative system, it notifies the remainder of the Administrative systems in the network of the directory change. The Administrative system in each area then updates its own directory and the directories of all the systems in their respective areas.

Each system in the network knows which systems are Administrative systems and which system is the Network Center. The Network Center is defined when the directory is created using WSNDIRM. For each area in the network, the area Administrative system is defined when WSNEDIT is run to enter directory information. On the VS, DIRSYNC runs without direct user intervention. (Refer to Chapter 5 for more information on creating and maintaining directories.)

2.7 STORE AND FORWARD ROUTING OVERVIEW

This section explains the concepts behind Store and Forward routing. It also provides information on how to plan and configure Store and Forward routing to achieve optimum networking benefits. Chapter 7 provides instructions for defining the Store and Forward paths using WSNEDIT.

Store and Forward routing is a feature provided with package distribution services (PDS). Other products, such as Wang OFFICE and Software Manager, use Store and Forward routing to deliver packages in a WSN network. Store and Forward routing enables these users to better control the flow of files through the network to control costs and improve performance (for example, avoiding peak hour congestion).

Store and Forward routing is based on the concept of Store and Forward next hops. A Store and Forward next hop is a Store and Forward system that you designate to store packages originating from your system before it is forwarded to a destination. Packages can consist of one or more WP documents, print files, software programs, and so forth. The destination can be a system in the same area, another area, or another Store and Forward next hop.

Do not confuse Store and Forward next hop and CNS next hop. CNS next hops are adjacent systems. A Store and Forward next hop may or may not be an adjacent system.

Store and Forward works like this: Store and Forward on the originating system establishes a CNS end-to-end session with the Store and Forward application on the Store and Forward next hop. Packages are then stored at the application level on the Store and Forward next hop. Store and Forward on the next hop establishes an end-to-end CNS session with another Store and Forward next hop or with the destination. CNS routing determines the physical path between these Store and Forward systems.

2.7.1 Rules Concerning Store and Forward Next Hops

Store and Forward next hops include

- Default next hops
- Override next hops

Default Next Hops

If no override next hop is defined, WSNEDIT assigns each Store and Forward destination a default next hop. (See Figure 7-4 in Chapter 7.) WSNEDIT assigns the default next hop according to the following rules:

- If the originating system is not the area Primary Distribution Point, the default next hop is always the area Primary Distribution Point for the originating system's area. (The Primary Distribution Point is defined when WSNEDIT is run to enter directory information.) In Figure 2-12, System A's default next hop is the Primary Distribution Point for System A's area (System B).

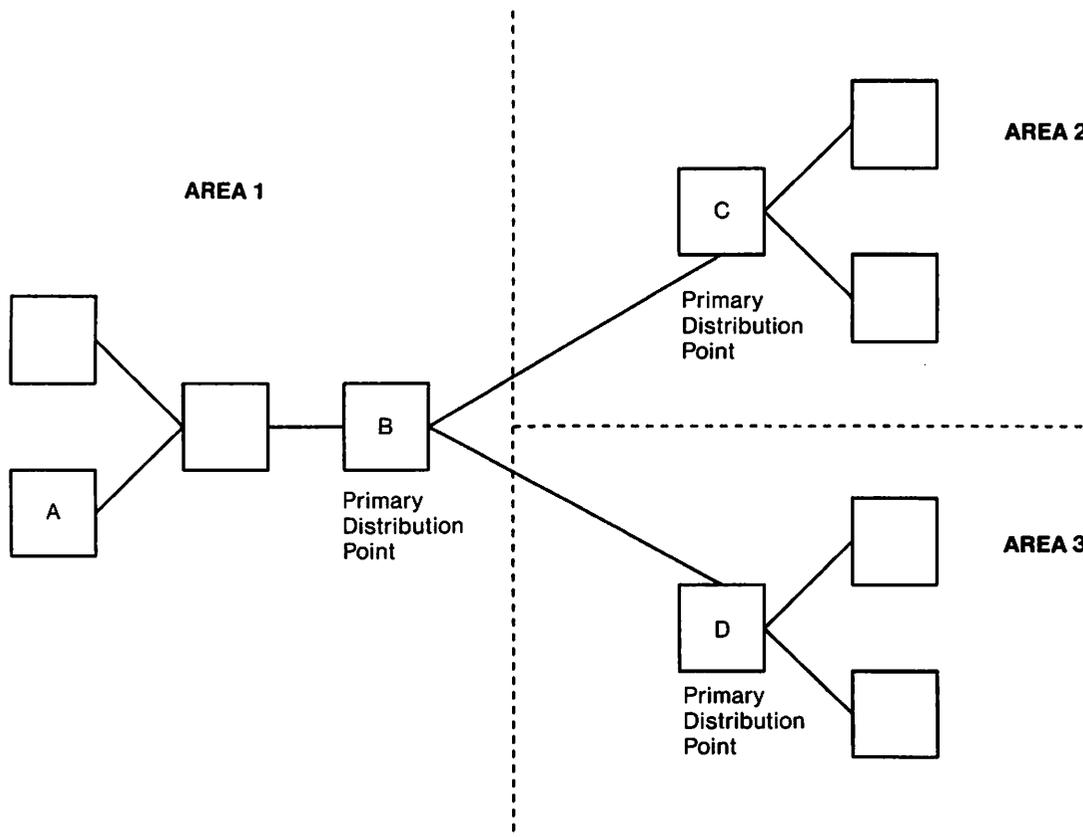


Figure 2-12. Default Next Hops

- If the local system is the area Primary Distribution Point and the destination system is any Store and Forward system in another area, the default next hop is the area Primary Distribution Point for the specific destination area. In Figure 2-12, System B's default next hop to systems in Area 2 is System C. System B's default next hop to the systems in Area 3 is System D.
- If the local system is the area Primary Distribution Point and the destination system is in the distribution point's own area, the default next hop is the destination system itself: System B's default next hop to System A is System A. (NYVS2 is the Primary Distribution Point for AREAL. Thus, the destination systems that share AREAL are also default next hops.) (See Figure 7-4 in Chapter 7.)
- If the Primary Distribution Point is defined as the default next hop for every Store and Forward system in it's own area, and it is also defined as the default next hop by other Primary Distribution Points in the network, all intra- and inter-area Store and Forward traffic passes through the Primary Distribution Point.
- The Primary Distribution Point handles CNS traffic on the switching layer level. If the Primary Distribution Point has insufficient storage capacity, this situation can cause serious network and system performance degradation at the Primary Distribution Point, especially in large networks (such as, 50 systems or more).

If the Primary Distribution Point is not sufficient, WSNEDIT enables you to assign an override next hop to each Store and Forward destination. You may also consider other options such as diverting non-Store and Forward CNS traffic away from the system by modifying your CNS routing configuration, improving system performance, or designating another (larger) system as the area distribution point.

Override Next Hops

Generally, the default next hop is acceptable for most systems in a network. Override next hops can be specified through WSNEDIT to divert network traffic away from heavily congested distribution points and other congested next hops. (See Figure 7-4 in Chapter 7.) Systems with only one connection to the network (that is, end-point systems) or with many connections benefit most from overrides.

Some rules for assigning override next hops are as follows:

- If the local system and the destination are in the same area, the override next hop that you assign should be in that area.
- If the local system is the distribution point (in Area A), and the destination is in another area (Area B), the override next hop should be in Area B.
- Never assign a CNS *end-point* system with Store and Forward as the override next hop to another Store and Forward destination.
- When an override next hop is not the destination system, make sure that the override next hop has the necessary Store and Forward routing information required to reach the destination.

For example, the override next hop for Store and Forward packages traveling from Area 2 to Area 1 in Figure 2-12 should have the Store and Forward knowledge required to forward packages to nondistribution point Area 1 systems either directly or via the Primary Distribution Point.

There is one other situation when it is useful to assign an override next hop: adjacent Store and Forward systems in the same area. Adjacent Store and Forward systems in the same area should send packages directly to each other. The packages should not be stored and forwarded from an intermediate system. The default next hop (that is, the Primary Distribution Point) for each adjacent system should be overridden. Specify the destination adjacent system as the override next hop.

Note: Make sure that regular CNS paths are appropriately configured when you configure Store and Forward paths. Remember that Store and Forward uses CNS, and CNS must have knowledge of network topology. CNS paths must be configured to define adjacent systems where messages are routed to destinations. The purpose of Store and Forward routing is to define Store and Forward systems along regular CNS paths where packages are stored before being forwarded to the destination.

2.7.2 Store and Forward Routing Options

Three Store and Forward routing options are available, as follows:

- Using the Primary Distribution Point as the Store and Forward next hop for inter-area (between areas) Store and Forward traffic only.

Specify a nondistribution point system in the area to be the override Store and Forward next hop for intra-area (between systems in the same area) traffic. (If the destination system is adjacent, specify the destination system itself as the override. Adjacent Store and Forward systems should send packages to each other directly.)

Thus, you divide the Store and Forward load between the Primary Distribution Point (for traffic between areas) and the other Store and Forward systems in the area (for traffic between systems in the same area). This configuration is illustrated in Figure 2-13.

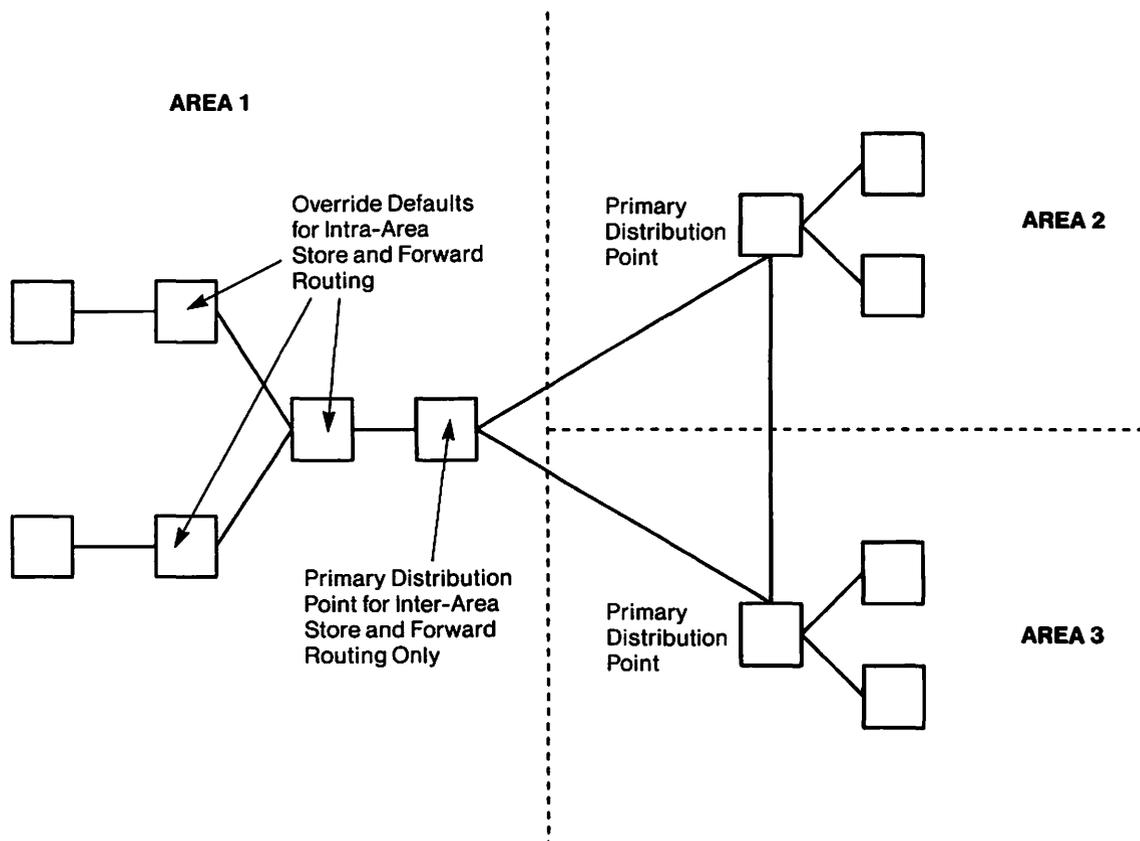


Figure 2-13. Intra-Area Routing Option

- Diverting some inter-area Store and Forward traffic away from the Primary Distribution Point.

When you configure Store and Forward routing on each nondistribution point system in your area, specify other nondistribution point systems in the area to be the override Store and Forward next hops to other areas.

When you configure Store and Forward routing on Primary Distribution Points in other areas, specify other Store and Forward systems in the area of the congested distribution point as the override Store and Forward next hop. These override next hops can be used to reduce the load on particular distribution points. Allow the area distribution point to handle the bulk of inter-area Store and Forward traffic and its own inter-area Store and Forward traffic (see Figure 2-14).

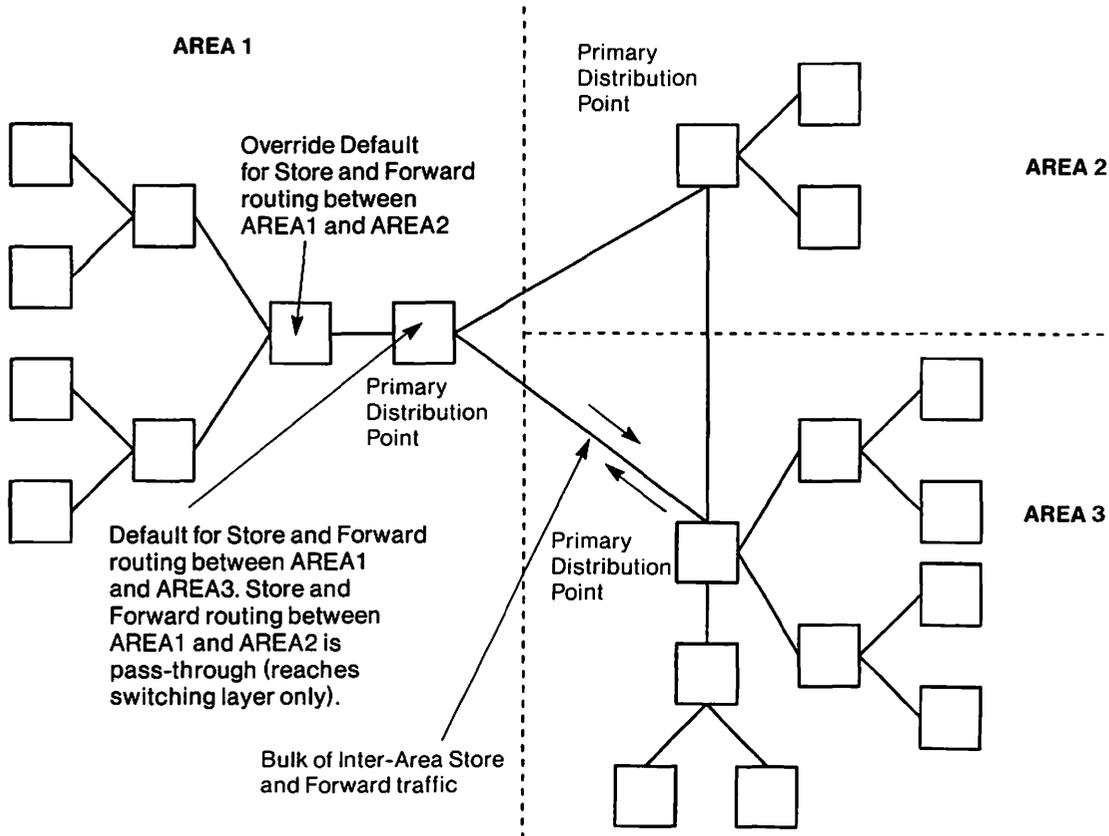


Figure 2-14. Inter-Area Routing Option

- Using a combination of the intra- and inter-area routing options.

Divide the overall intra- and inter-area Store and Forward traffic load between the Primary Distribution Point and other systems in the area. Allow the distribution point to handle the bulk of the inter-area load.

2.8 DESIGNING STORE AND FORWARD SERVICE WINDOWS

This section describes Store and Forward service windows and gives information on how to plan and configure service windows to achieve optimum networking benefits. Instructions on defining service windows are provided in Chapter 8.

A service window is a time interval when Store and Forward can establish a session with a peer application on a remote VS. For example, you can set up a window so that Store and Forward on one VS establishes sessions with a peer application on a specific remote VS from 9 a.m. to 12 a.m. on Mondays and from 1 p.m. to 4 p.m. on Thursdays.

Windows may also be assigned various priorities (for example, Low, Medium, or High) for various timeframes. These priorities correspond to the priority classification assigned to packages from an application such as Store and Forward. Priorities are discussed later in this section.

2.8.1 Service Window Functions

Through service windows, Store and Forward sessions can be initiated to serve one or both of the following purposes:

- To move packages from the local system to a destination or the Store and Forward next hop.
- To query (poll) a peer application (i.e., Wang OFFICE or Software Manager) on a remote system to check whether that application wants to send packages to the polling VS. The polling VS is the VS system that polls a remote system. This feature is useful in cases in which a VS system is on a switched line and cannot establish an outbound session automatically (for example, by means of an Automatic Calling Unit (ACU)). Thus, it requires intervention from a polling VS or manually by a user at the system to initiate a connection. Since it is not usually practical to have a user initiate a connection manually, the polling feature provides a solution for systems that must perform Store and Forward communications over switched lines but do not have ACU equipment.

Note: On a switched line, VS systems running Store and Forward can establish outbound sessions automatically only if they are equipped with automatic calling units (ACUs). VS systems with manual dial equipment can only accept inbound sessions from other VS systems automatically. Thus, any VS system that uses Store and Forward to poll other systems over a switched line should be equipped with an ACU.

2.8.2 Service Window Operation

Service windows enable a network administrator to regulate Store and Forward traffic through a Primary Distribution Point. For example, the administrator can set up the Store and Forward routing configuration in an area so that a group of designated Store and Forward systems route Store and Forward traffic by way of the Primary Distribution Point, which is the default for nondistribution point systems in WSNEDIT. The administrator can then set up the window configuration on each nondistribution point system so that each system sends packages to the Primary Distribution Point at different times. Or the administrator can make the Primary Distribution Point the polling VS and set up the window configuration so that each Store and Forward system in the group of designated systems is polled at different times, thereby preventing them from sending Store and Forward packages all at once.

When a request to send a package to a remote system is submitted, it is stored until an appropriate service window opens. When the designated window opens, the Store and Forward application attempts to contact the Store and Forward next hop. The information goes through a CNS session that provides a logical connection between two systems.

On your system, you have the following two options for configuring service windows:

- Defining a separate set of windows for each destination system on the network.
- Defining one set of windows for a subset of destinations on the network or several windows for several subsets.

One set of windows can serve the function of providing time frames for establishing outbound sessions and polling remote systems. For each set of windows and each destination or subset of destinations, you can use WSNEDIT to configure your system to "poll" or "turn around" an outbound session to receive packages or both.

2.8.3 Polling and Turn Around

Polling and turn around are service window features configured through the WSNEDIT Manage Services function that provide additional control over how Store and Forward packages are routed through the network. (See Figure 8-6 in Chapter 8.)

Polling

The Polling feature enables a system to contact the other systems, a few at a time, so that each of these systems can establish a session with it. This feature significantly reduces the risk of many systems simultaneously attempting to establish sessions with the same remote VS and exceeding the maximum number of concurrent inbound sessions that the Store and Forward application on the remote VS can support. When one system polls another, it can establish a session with the other system even if the polling system has nothing to send. After a session is established for the poll, the system that is polled can use that same session to forward a package to the polling system.

Turn Around

The Turn Around feature enables the local VS to poll a remote VS or send packages to the remote VS, and override the window configuration of the remote VS so that it can send packages to the local VS. Once the window configuration of the remote VS is overridden, the remote VS sends packages to the local VS according to the window configuration of the polling VS. The local VS incurs all the cost for the package.

Through WSNEDIT, you can configure the following situations:

| Poll | Turn Around | Result |
|------|-------------|--|
| YES | YES | Local system establishes an outbound session to poll other destinations. When the line is turned around, the local system will receive the packages according to the priority set by the local system. |
| NO | YES | Local system does not poll. It opens an outbound session only when there is a package to send to a remote system. After line turn around, the local system will receive packages according to the priority set by the local system |
| NO | NO | Local system does not poll. It opens a session only when there is a package to send to a remote system. After line turn around, the local system will receive packages according to the priority set by the remote system. |

Another option is to configure no service windows on the local system. The local system does not open any service windows to poll or to send packages with High, Medium, or Low priority to remote systems. It can only send Immediate-priority packages to remote systems. (Priority levels are discussed in the following section.)

Even though windows perform a dual function, windows on all systems on the network do not have to be coordinated for polling to be effective. For example, if System A is configured to poll System B on Thursday at 9 a.m., System B does not have to be configured to open a window at 9 a.m. to send any packages to System A. System A establishes the session, turns the line around, and accepts packages from System B if that system has any that it wants to send to System A. However, it is important to consider propagation time when establishing windows. For example, if Store and Forward routing is configured from System A to System C through System B and the window from System B to System C is from 11:00 to 12:00 and System B to System A from 12:00 to 13:00, then traffic from System A to System C will take 23 hours to be delivered.

For a majority of destinations on the network it may not be necessary to define a unique set of windows. In these cases, a *default window* exists with set parameters that will serve the needs of those destinations. Using a default window for the majority of systems in the network significantly reduces the amount of window information that must be configured and maintained. If the default window settings are acceptable, you may not need to perform any window configuration functions.

2.8.4 Window Priority Levels

Window priority levels is another feature providing control over how packages are routed to Store and Forward systems. You can define *priority levels* (High, Medium, or Low) when you define a window for each day of the week. (See Figure 8-5 in Chapter 8.) A priority level defines the classification (High, Medium, or Low) of packages that can be sent through a given window during a given period of time. When you define priority levels, remember that the level you assign to a window enables packages with that level of priority and higher to be sent through the window. For example, a window that is open for Medium-priority packages means that Medium-, High-, and Immediate-priority packages may be sent through the window. The terms High priority, Medium priority, and Low priority are defined as follows:

High Priority -- Assigned to a particular service window for a given period of time that specifies when High- and Immediate-priority packages only from an application such as Wang OFFICE will be delivered to the network through the window.

Medium Priority -- Assigned to a particular service window for a given period of time that specifies when Medium-, High-, and Immediate-priority packages from an application such as Wang OFFICE will be delivered to the network through the window.

Low Priority -- Assigned to a particular service window for a given period of time that specifies when Low-, Medium-, High-, and Immediate-priority packages from an application such as Wang OFFICE will be delivered to the network through the window.

Different priority levels may be assigned to a single window. For example, three time periods are assigned to a given window. These time periods are Monday through Friday between 8 a.m. and Noon, between 1 p.m. and 4 p.m., and between 4 p.m. and midnight. This means that the window may be used to send any packages to the systems assigned to it at these times. You can designate Monday through Friday, between 8 a.m. and Noon, as the time at which High-priority packages are sent, 1 p.m. to 4 p.m. as the time at which Medium-priority packages are sent (which means that both High- and Medium-priority packages are sent), and 4 p.m. to midnight as the time at which Low-priority packages are sent.

WSN also makes a provision for packages that require immediate priority from the network. A description of this capability, called Immediate priority, follows.

Immediate Priority

A capability that enables the network to grant immediate network access to a package that requires it. This type of package is designated as having Immediate priority by an application such as Wang OFFICE. Unlike High, Medium, or Low priority, Immediate priority is not defined through WSNEDIT.

You may want to think of Immediate priority as a window that the network always reserves for Immediate-priority packages and is always open. When packages assigned Immediate priority are queued for transfer, a session with the destination system is, in most cases, established at once. For example, a Wang OFFICE memo from the President of a corporation can be sent immediately to the appropriate destination.

Keep in mind that Immediate-priority (as well as Low-, Medium-, and High-priority) package delivery is subject to certain restrictions:

- There is a limit of four concurrent outbound Store and Forward sessions: depending on the size and number of packages, delays can occur, even for Immediate-priority packages.
- There is no preemptive processing of priority levels. This means deliveries that are in progress, regardless of their priority, are not overridden by higher priority items. For example, if a session is established from System A to System B and a Low-priority package is in the process of being sent, a higher priority item (i.e., Medium- or Immediate-priority) does not cause the interruption of the lower priority item being sent. If the Low-priority item is a very large package it could cause a significant time delay before the higher priority item is actually sent.

An Immediate-priority package can be queued for immediate transfer, or it can be delayed for a short time until a regularly scheduled High-, Medium-, or Low-priority window opens. This capability is called *Immediate Priority Postponement*. Immediate Priority Postponement is set through WSNEDIT and enables you to specify the maximum length of time that Immediate-priority packages are delayed prior to the opening of a regularly scheduled window. (See Figure 8-3 in Chapter 8.) This capability enables you to make efficient use of your set of configured windows and your network resources.

Some rules for configuring Immediate Priority Postponement times are

- If you assign an Immediate Priority Postponement time of 0 to a window, Immediate-priority packages will never be postponed. For example, if you assign an Immediate Priority Postponement time of 0 minutes to a specific window and the window is scheduled to be open for Medium-priority packages between Noon and 2 p.m., Immediate-priority packages will never be postponed, even if they are queued at 11:59 a.m.
- If you assign a valid Immediate Priority Postponement time other than 0 (for example, 5 minutes), all Immediate-priority packages that are queued for transfer at that amount of time or less before the window is scheduled to open will be delayed until that window opens. For example, if you assign a postponement time of 5 minutes to a specific Medium-priority window that is scheduled to open at Noon, Immediate-priority packages that are queued to a destination assigned to the window 5 minutes or less before Noon (such as, 11:56 a.m.) will wait until the window opens.
- If you assign a valid Immediate Priority Postponement time other than 0 (for example, 5 minutes), all Immediate-priority packages that are queued for transfer at an amount of time prior to the opening of the window that exceeds the Immediate Priority Postponement time will be sent immediately. For example, if you assign a postponement time of 5 minutes to a specific window that opens at Noon, Immediate-priority packages that are queued to a destination assigned to the window at an amount of time that exceeds 5 minutes before Noon (such as, 11:54 a.m.) will be sent immediately.
- If an Immediate-priority package is queued for transfer to a destination while a High-, Medium-, or Low-priority window is already open to that destination, the package will be sent through that window immediately.

2.8.5 Network Design Considerations for Configuring Service Windows

The combination of priority levels, the Immediate Priority Postponement capability, and the ability to define a separate set of windows for each destination enables you to determine when sessions are established with what destinations and to minimize network costs. Remember that the cost of communicating with one system may not be the same as communicating with another system and these costs may vary by time of day if systems are connected by dial-up telephone lines.

2.9 NON-CNS ROUTING OVERVIEW

Like CNS routing, non-CNS routing uses virtual circuits to provide the logical connection over physical media between systems. For non-CNS communications, virtual circuits can be established between systems that are directly connected by a WSN transport. During non-CNS communications, data is routed between two systems that are not CNS compatible (for example, OIS and Alliance) or between a CNS system and a non-CNS system (for example, VS and OIS). An example of non-CNS routing is given in Figure 2-15.

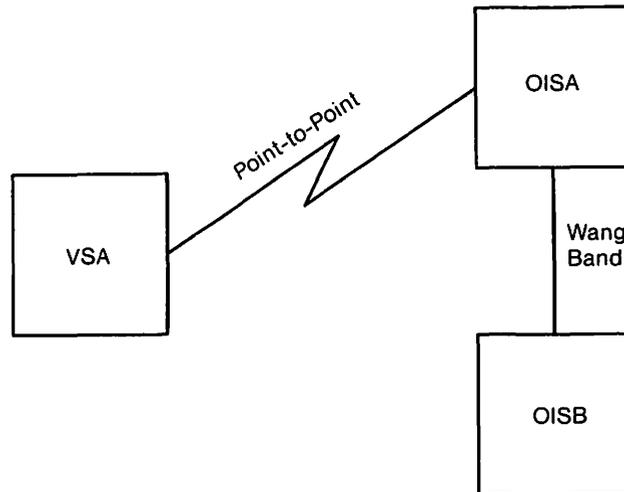


Figure 2-15. Sample Non-CNS Routing

In Figure 2-15, VSA and OISA are connected by a dial-up line using a switched Point-to-Point transport. OISA and OISB are connected over WangNet by a Wang Band transport. VSA cannot communicate directly with OISB; data must first be sent to OISA where an operator would be required to manually send the data to OISB.

For non-CNS communications, data routing is managed entirely by the transport software, which supports direct communications only. No higher level software exists to perform more sophisticated functions such as switching between different transport types or multihop communications.

In a non-CNS environment, each session is mapped to a single virtual circuit between systems that are directly connected. Non-CNS supported sessions exist between applications residing at systems that are not running CNS, or between an application residing at a CNS system and an application residing at a non-CNS system.

Note: *Non-CNS communications can also be accomplished between VS systems that are using CNS. The VSTE program, @Attach@, which is the most common implementation of non-CNS, VS-to-VS communications, is an example. (Refer to the Network User Guide for VS Systems for more information.)*

In a non-CNS environment, the application is responsible for establishing, maintaining and terminating sessions. On VS, OIS, Alliance, and 2200 systems, the applications submit input/output (I/O) open and close requests to the session manager to establish and terminate sessions. For example, the File Transfer handler is responsible for establishing, maintaining, and terminating file transfer sessions between OIS systems.

2.9.1 Parallel Transport Support for Non-CNS Routing

You can configure multiple WSN transports between two systems in non-CNS environments. Multiple transports between two systems are referred to as parallel transports. Parallel transports offer you greater configuration flexibility by providing backup support and more efficient use of data link processors (DLPs).

Non-CNS message routing supports parallel transport configurations for both inbound and outbound calls between the local system and appropriately configured adjacent destination systems.

When multiple transports are used for inbound call routing, as in a load balancing configuration, calls are accepted on any nonbusy line for switched Point-to-Point or any other transport.

When multiple transports are used for outbound call routing, WSN uses a "lowest session count" allocation scheme to select a transport to a particular destination system. This scheme enables services, which function in both CNS and non-CNS environments (such as, File Transfer and VSTE) to take advantage of parallel transports that are configured to an adjacent destination system. Using this scheme, a service that is attempting to establish an outbound call to a system requests a list of transports on which the system can be reached.

The list is ordered as follows:

- First, the transports with at least one active session to the destination system are listed. These transports are in descending order by number of active sessions.
- Last, the transports with no active sessions to the destination system are listed.

With this list, the service will attempt to establish an outbound call one transport at a time until it is successful. If all attempts are unsuccessful, as in the case when all the DLPs are busy, the service will either continue to retry or report that the destination system cannot be reached.

2.9.2 Network Design Considerations for Non-CNS Outbound Call Routing

Parallel transports must be configured to take advantage of non-CNS outbound call routing. Basically, this is accomplished by including a system on more than one transport.

Following are two examples (Figure 2-16 and Figure 2-17), illustrating the advantages and limitations of the two ways you can configure parallel transports for non-CNS outbound call routing over switched lines. Both figures show parallel transport configuration from the viewpoint of DLP usage.

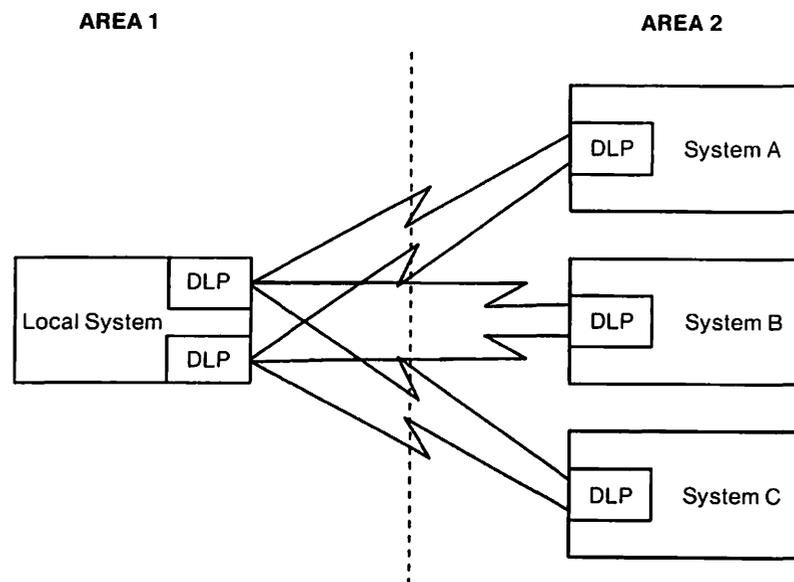


Figure 2-16. Configuring Parallel Links With the Same Destination Phone Numbers

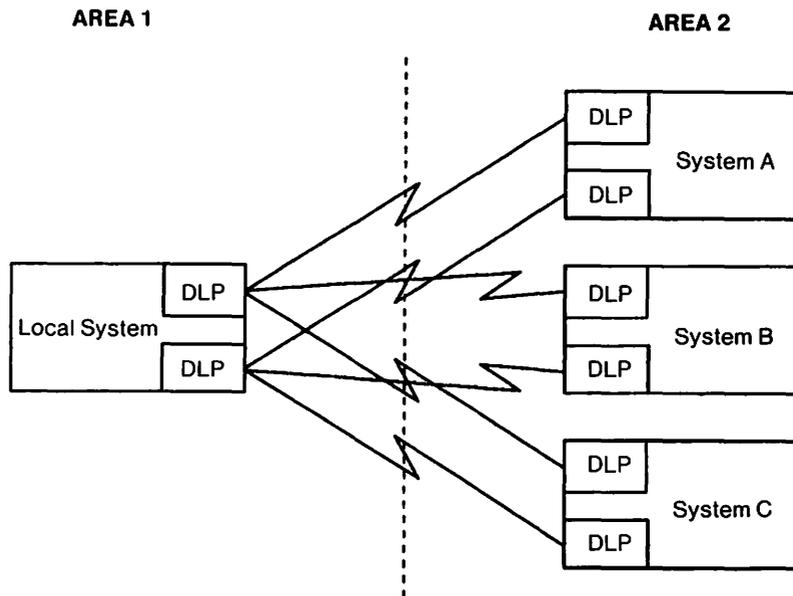


Figure 2-17. Configuring Parallel Links With Unique Destination Phone Numbers

In the first example, Figure 2-16, there are two WSN switched Point-to-Point transports (two DLPs) configured on the local system. Three destination systems, A, B, and C, are configured on each transport. The destination phone number for each system is the same on both transports (that is, one DLP on each remote system).

The transport configuration information for the two DLPs configured on the local system in Figure 2-16 is shown as follows:

| | | | | | | | |
|------------------------------|-------------|--------------|----------------|---------------------|---------|-------|-------------------------------------|
| Transport Name = PTTPTSW064A | | | | | ID 0001 | DLP 1 | |
| System | Type | Model | In Area | Phone Number | | | } Same Destination Phone Numbers |
| LOCAL | VS | 100 | AREA1 | 652-865-0421 | | | |
| SYSTEMA | VS | 65 | AREA2 | 1-367-456-1987 | | | |
| SYSTEMB | VS | 65 | AREA2 | 1-367-456-2345 | | | |
| SYSTEMC | VS | 65 | AREA2 | 1-367-456-4563 | | | |
| Transport Name = PTTPTSW065A | | | | | ID 0002 | DLP 2 | |
| System | Type | Model | In Area | Phone Number | | | |
| LOCAL | VS | 100 | AREA1 | 652-865-0421 | | | |
| SYSTEMA | VS | 65 | AREA2 | 1-367-456-1987 | | | |
| SYSTEMB | VS | 65 | AREA2 | 1-367-456-2345 | | | |
| SYSTEMC | VS | 65 | AREA2 | 1-367-456-4563 | | | |

In this example, by using the same destination phone numbers, any two of the three systems can always be reached concurrently from the local system. The DLPs on the local system are used efficiently, since either one can communicate with all three systems.

When configuring parallel transports, consider the following limitation, which results from using the same destination phone numbers: If a connection is made to a particular system on the first Point-to-Point transport, any attempt to reach the same system on a second Point-to-Point transport will be unsuccessful since the phone number is busy. This limitation may or may not be significant depending on your system operations.

Note: More than one session can be active to the destination system once a connection has been made. The limit depends on how many devices were configured in GENEDIT for the particular DLP.

In the second example, Figure 2-17, there are two switched Point-to-Point transports (two DLPs) configured on the local system. Three destination systems, A, B, and C, are configured on each transport. However, in this case, each system is given a *unique* destination phone number on both transports (that is, two DLPs are configured per remote system).

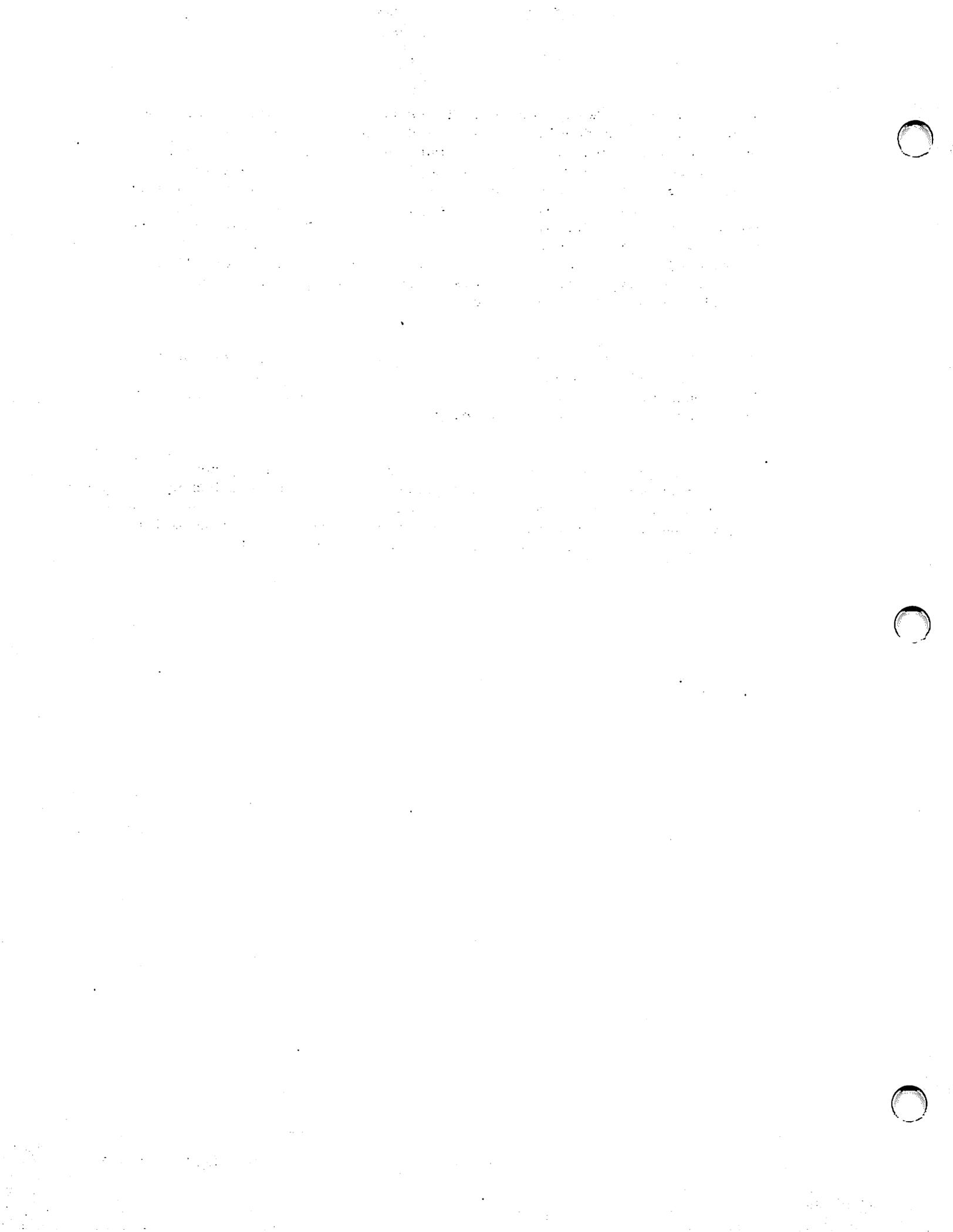
The transport configuration information for the two DLPs configured on the local system in Figure 2-17 is shown as follows:

| | | | | | | | | |
|------------------------------|-------------|--------------|----------------|---------------------|---------|-------|---------------------------------------|--|
| Transport Name = PTTPTSW064A | | | | | ID 0001 | DLP 1 | | |
| System | Type | Model | In Area | Phone Number | | | } Unique Destination Phone Numbers | |
| LOCAL | VS | 100 | AREA1 | 652-865-0421 | | | | |
| SYSTEMA | VS | 65 | AREA2 | 1-367-456-1987 | | | | |
| SYSTEMB | VS | 65 | AREA2 | 1-367-456-2345 | | | | |
| SYSTEMC | VS | 65 | AREA2 | 1-367-456-4563 | | | | |
| Transport Name = PTTPTSW065A | | | | | ID 0002 | DLP 2 | | |
| System | Type | Model | In Area | Phone Number | | | | |
| LOCAL | VS | 100 | AREA1 | 652-865-0421 | | | | |
| SYSTEMA | VS | 65 | AREA2 | 1-367-456-2367 | | | | |
| SYSTEMB | VS | 65 | AREA2 | 1-367-456-1473 | | | | |
| SYSTEMC | VS | 65 | AREA2 | 1-367-456-3961 | | | | |

In this example, again, any two of the three systems can be reached concurrently from the local system. However, under certain conditions, you are limited to communication with one system only. Because each transport uses a unique phone number to the same destination system, nothing prevents a connection to the same system on more than one transport. For example, in Figure 2-17, if a connection is made to SYSTEM A on both Point-to-Point transports, no other system can be reached until one of the transports to SYSTEM A is terminated. Under normal conditions, this occurs only when all the devices are busy on the first transport to the system, requiring a second transport to be activated.

Note: This limitation can be minimized by configuring a reasonable number of devices on each of the DLPs controlling these transports. This would prevent all the available circuits on one DLP being used to reach one system, then trying the next DLP.

The advantage to configuring parallel transports with unique destination phone numbers is that you are provided with a backup should a transport either fail or exhaust its supply of devices. This backup capability is particularly beneficial when you need to maintain a connection to a system that is critical to your operations.



CHAPTER 3 GETTING STARTED

3.1 INTRODUCTION

Before you configure a WSN network, you must determine what networking components are required, their associated usage demands and costs, and how these components should be configured in order to provide network users with the most efficient means for sharing resources. Planning your network and installing hardware and software requires assistance from a Wang customer service representative. In addition, you need to consult other system and network administrators who share the system or networking resources that you will be configuring.

As described in Chapter 2, configuration is performed on two levels: the network level and the system level or local-view. To help you get started in this process, the major considerations for planning and configuring your network are summarized in this chapter.

Note: WSN network capabilities such as, number of systems supported, number of areas supported, and numbers of transports and services, etc., are restricted by several factors, including release levels of WSN VS NETCORE and VS Operating Systems, as well as other software and hardware components. For a list of these restrictions (including those that are mentioned in this guide), check your WSN VS NETCORE Customer Software Release Notice.

Figure 3-1 gives an overview of the steps used to plan and configure a VS in a WSN network. Some of these steps are tasks that are performed initially by the Wang installer. Other steps, such as planning the system and network level configuration, are tasks that are done in consultation with a Wang customer service representative. Figure 3-1 also serves as a general guideline to follow when you later modify your local system's configuration, (such as when reconfiguring a DLP or adding systems that share services with the local VS).

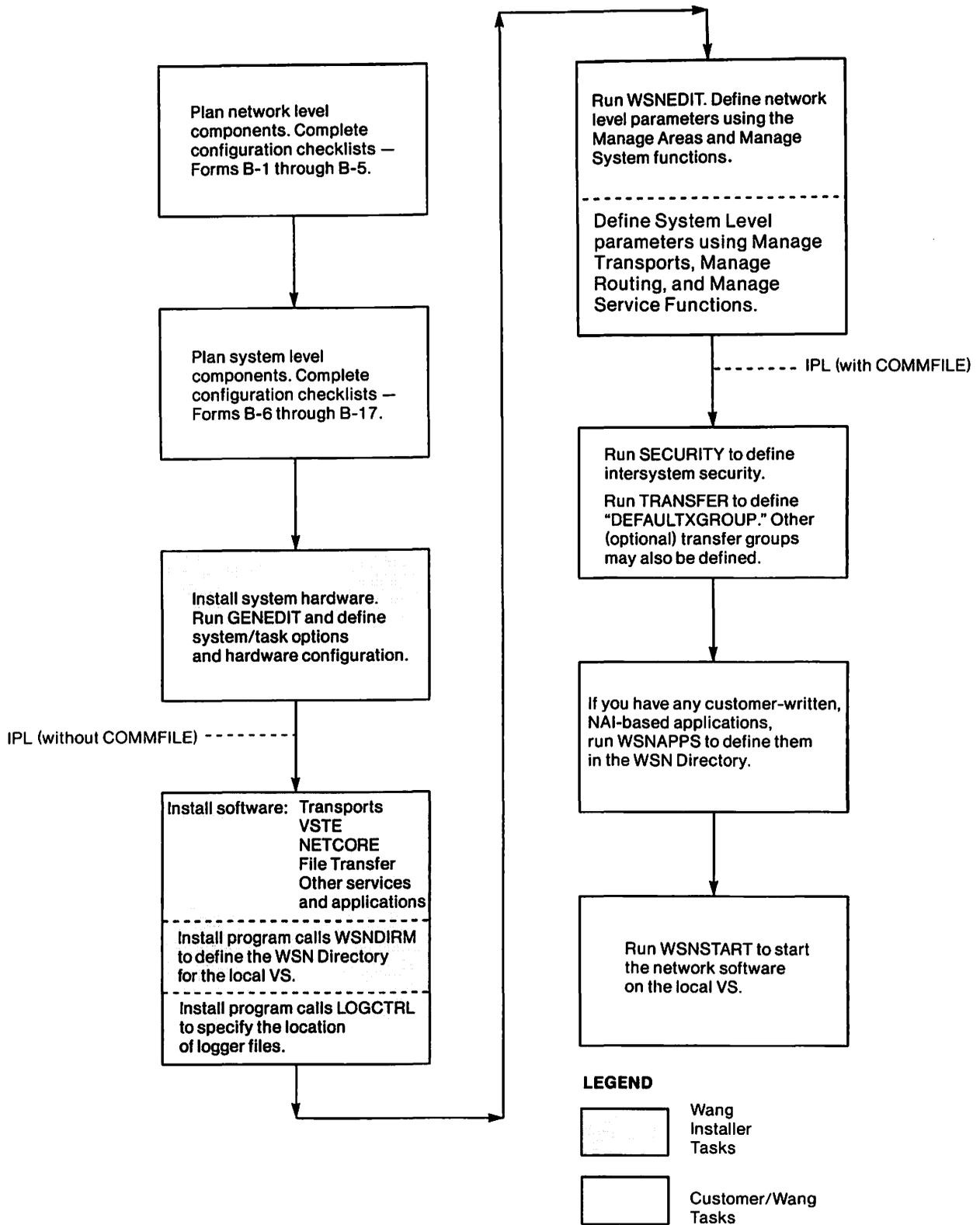


Figure 3-1. WSN VS Configuration Overview

3.2 NETWORK LEVEL CONFIGURATION

When a network of Wang and certain non-Wang systems is planned and configured, the network is partitioned into areas and the constituent systems are assigned unique names and IDs. These actions establish the network level of configuration. Network level configuration must exist prior to system level (local-view) configuration.

Remember, an important reason for dividing a network into areas is to simplify CNS message routing. To reach destination systems in other areas, paths are defined between the source or intermediate system and an area, rather than the source or intermediate system and a specific destination system.

It is acceptable to define the entire network as one area. This choice is recommended for a small network (for example, 10 or 20 systems).

Some rules concerning areas are as follows:

- Each system in the network must reside in one and only one area.
- Each system in an area must be able to reach every other system in the area without going outside of the area.
- Each transport in the network can be exclusively in one area, or can link two or more areas together (that is, individual systems on the same transport can reside in different area).
- Each area must have at least one transport connecting it to the rest of the network.

Other considerations for network level configuration are as follows:

- One CNS system in each area must be designated as the Administrative system if Wang OFFICE or DMF is installed. (For DMF, this system is called the Area Control Center (ACC).) The Administrative system is responsible for network administrative and control functions relating to its area (for example, the consolidation of logging records in the area for DMF).
- One CNS system in each area must be designated as the Primary Distribution Point if you are using PDS Store and Forward Services. The Primary Distribution Point functions as a switching system that is responsible for distributing all Store and Forward packages received from remote areas to all systems in the local area that the information was destined for. The Primary Distribution Point need not be the area Administrative system.

- One Administrative system in the network must be designated as the Network Center. The Network Center is responsible for network-wide administrative and control functions (for example, managing the list of Wang OFFICE users, organizations, and logons). *The Network Center must be the Administrative system in its own area.*
- For two systems to communicate, each requires certain information about the other. Proper sharing and distribution of this information is the responsibility of the network designer and administrators throughout the network. Each VS system in the network must know the name and ID of every other system in the network. Each VS system in the network must also know the name and ID of the area in which each system has been defined. The area ID and the system ID make up the network address for a particular system.
- Area and system names and IDs are stored in the directory file at each VS system in the network. When CNS applications on two systems in the network communicate, these network parameters are used to define the destinations of messages.

Each Wang OFFICE user in the network is also listed in the directory. Each user is uniquely identified by the combination of area ID, system ID, and Wang OFFICE User ID.

- Messages can be routed to destinations only through systems that are running CNS. In order to route messages to destinations through intermediate systems, each intermediate system must have CNS running. The directory file indicates which systems in the network have CNS installed. This file indicates whether or not the WSN File Transfer Service on a particular system can use CNS for network communications.

3.2.1 Network Level Configuration Planning Summary

Plan network level configuration before directory information is entered on systems in the network and local-view configurations are defined. The appropriate Wang personnel should already have been consulted to determine the best combination of systems and WSN products for meeting the usage demands of the network. This section presents a procedure for summarizing the configuration plan for your network.

First, draw a schematic diagram of the network (see Form B-3 in Appendix B). A sample schematic diagram is shown in Figure 3-2.

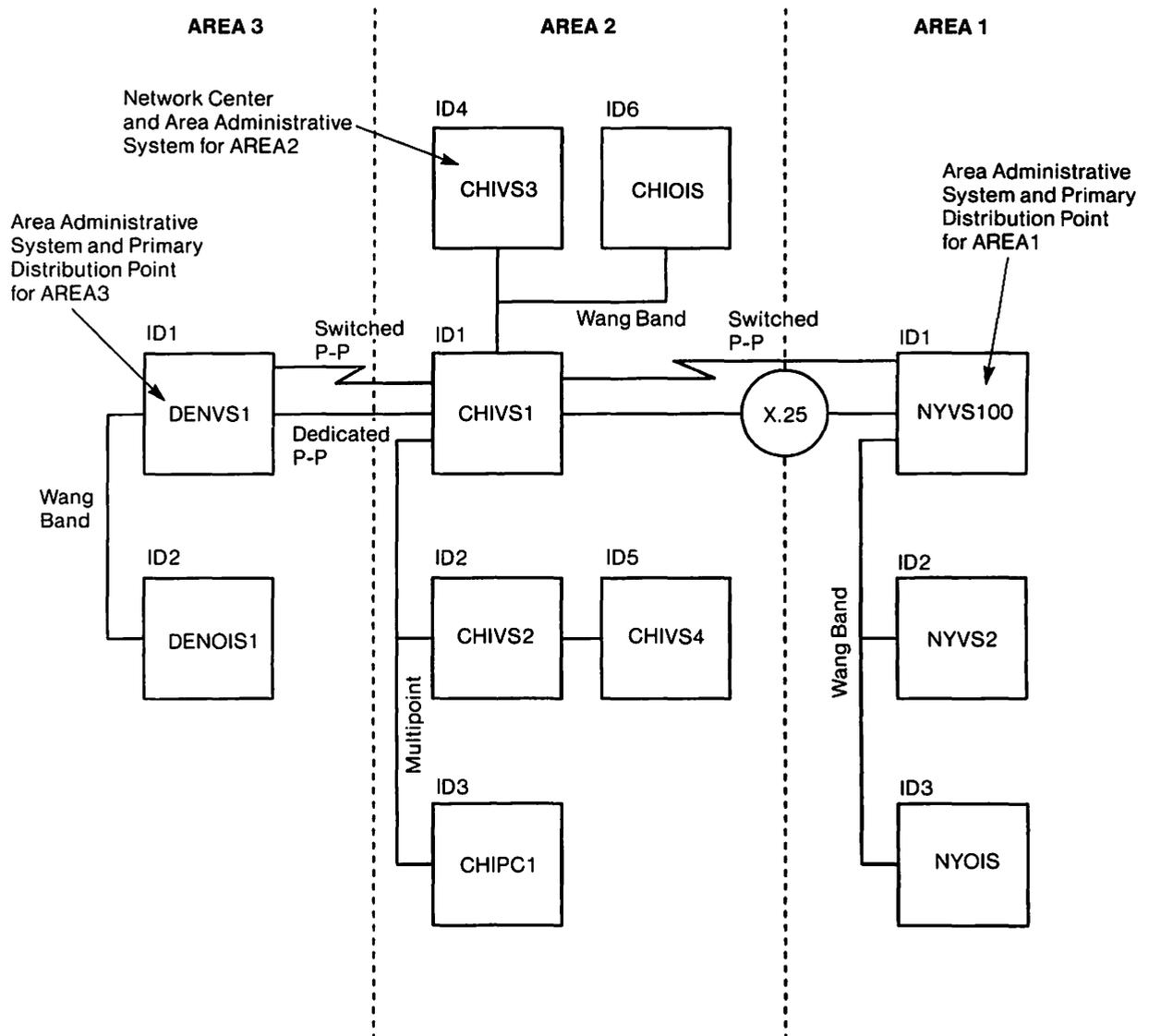


Figure 3-2. Sample Schematic Diagram of a Network

The schematic diagram shows a network partitioned into three areas. Each area has a unique name and ID. Each system has a name that is unique within the network and an ID that is unique within the area. The Network Center, area Administrative system, and Primary Distribution Point should be labeled.

The diagram also shows the transports that support communications between various systems and areas. For example, a Wang Band transport connects all the systems in Area 1. Systems in Area 1 can communicate with systems in Area 2 through an X.25 network.

The network configuration is consistent with the hierarchy described earlier in this chapter. Store and Forward information in the network flows from individual systems through the Primary Distribution Points. Two transports are configured between Primary Distribution Points, where network traffic is expected to be heaviest.

At network configuration time, the selection of transports to connect systems in the network should already have been determined in consultation with the appropriate Wang personnel. Although transports and the systems they connect are configured on the system level, they should be planned during network level configuration planning. However, the specific parameters that are entered when a transport is defined should be identified when the system level configuration is planned.

Systems in the network that cannot run CNS should be identified. These systems can communicate with systems that are CNS compatible, but they cannot serve as intermediate nodes between systems that are running CNS. These non-CNS systems must only be end points in the network.

When the schematic diagram has been completed, the area and system information should be recorded on area checklists (see Forms B-4 and B-5 in Appendix B). Each area checklist allows you to record the following information for an area in the network:

- Local system name and ID
- Network Center name and ID
- Location of the Directory file
- Area name and ID
- Area Administrative system
- Primary Distribution Point
- Alternate Distribution Points
- Name and ID of each system in area
- Systems that are running CNS
- Systems that are not running CNS for VSTE logon and FTM
- Systems that have PDS Store and Forward installed

You can also record items on the checklist (such as transports and their associated parameters) for use later when you configure the system level parameters.

3.2.2 Using CNFGAID for Network Level Configuration

CNFGAID is a configuration aid tool that guides you through both the network configuration and the local-view configuration processes. However, CNFGAID is not required. For network level configuration, CNFGAID allows you to perform the several configuration functions, including

- Creating a directory manually
- Creating a directory from a starter kit
- Defining the Network Center
- Maintaining the existing directory
- Defining the areas and systems in the directory

An initial step toward configuring a VS for WSN is installing the network directory. You can either create a directory manually (that is by entering all of the necessary information) or acquire the directory through a starter kit. You can also merge a starter kit with your present directory if you have one already configured. (Merging directories is discussed in Chapter 5.)

Manual Directory Creation

If you choose to manually create a directory, you must enter the information required for directory creation, including the location of the directory file. You must enter information in the appropriate fields on a screen that is accessed through the procedure WSNDIRM, which can be run from CNFGAID. CNFGAID resides in the NETCORE library and volume. This screen and the fields it contains are described later in Chapter 5. After you manually create a directory, you can run WSNEDIT through CNFGAID to enter area and system names and IDs, as well as other parameters that CNS systems require to communicate.

Directory Creation From a Starter Kit

A starter kit is a collection of network records extracted from another directory. The records contained in the starter kit are required to be installed on each new system before it can participate in the network. These records are stored in a file that can be transferred to new systems in the network via diskette or through the WSN VS File Transfer Service. WSNDIRM allows directory creation for new systems by accessing a starter kit when it is resident on the particular system, or when it is stored on a diskette if that diskette has been identified to the system as a mounted volume. If you create a directory from a starter kit, you need not run WSNEDIT to enter area and system names and IDs. You still have to run WSNEDIT to configure transports, routes, and services.

Define Network Center

CNFGAID also enables you to access the WSNDIRM function that defines the Network Center. The Network Center has primary responsibility for updating the directories on all the systems in the network.

Maintain Existing Directory

Several additional directory functions are provided through WSNDIRM. These functions allow you to correct errors in an existing directory and to create a new directory.

Define Areas and Systems in Directory

CNFGAID allows you to run WSNEDIT to define network (as well as system) level parameters. Network level parameters are entered in the network directory file.

Running CNFGAID

To run CNFGAID, press PF1 from the VS Command Processor screen. Then enter CNFGAID in the PROGRAM field (CNFGAID should reside in the NETCORE library and volume). The first screen that appears is shown in Figure 3-3.

13:08:23

CNFGAID - Version 01.03.06
(c) Copr. Wang Laboratories, Inc. 1987

04/02/88

Please select a Configuration function from the list below

- (1) GENEDIT - Configure System Name (WangNet ID) & DLPs
- (2) WSNEDIT - Define Network and System level configurations
- (3) WSNDIRM - Select directory maintenance functions
- (4) SNAEDIT - Configure SNA 3274 Transport
- (5) EDITOR - Configure BSC 3271 Transport
- (6) SECURITY- Define inter-system access for File Transfer
- (7) TRANSFER- Define default File Transfer groups
- (8) LOGCNTRL- Define location of CNS logger files
- (9) WSNAPPS - Manage applications in the WSN Directory
- (13) Hide Help Text
- (16)Exit

Figure 3-3. CNFGAID Menu

The CNFGAID menu lists all the programs you can run through CNFGAID that are currently installed on your system. These programs can also be run independently from CNFGAID, if you wish, through the VS Command Processor screen. Programs that are not installed on your system when you access CNFGAID do not appear on the CNFGAID menu.

The two network level configuration utilities that appear on the CNFGAID menu are WSNEDIT and WSNDIRM. You perform WSNDIRM functions before WSNEDIT functions. Instructions for running these programs are available through an on-line help utility. These programs and the on-line help are summarized as follows:

WSNDIRM

Directories are created through this facility. A directory must be created through WSNDIRM before WSNEDIT is run; otherwise, it is called by WSNEDIT or INSTALL if no directory has been defined. You access WSNDIRM by pressing PF3 from the CNFGAID menu.

WSNEDIT

WSNEDIT is run to define areas and systems in the network. This information is entered in the directory. You access WSNEDIT by pressing PF2 from the CNFGAID menu.

On-line Help

Each program in CNFGAID comes with on-line help that summarizes its purpose and identifies the parameters you are to enter. The on-line help also includes specific information you should remember while running the program and points out potential problems. This information appears after you press the appropriate PF key to run a particular program. When you are finished reading the on-line help, you can press ENTER to continue. If you do not wish to use the on-line help, press PF13 (Hide Help Text) before you press the PF key to run a program.

3.3 SYSTEM LEVEL CONFIGURATION

The system level configuration defines the relationships between the various hardware and software elements that work together to send and receive data.

3.3.1 System Level Configuration Planning Summary

The system level or local-view configuration for each system in the network should be planned after the network level configuration has been planned. When the local-view configuration is planned for each system in the area, the area administrator and all the system administrators in the area should share information about the area as a whole and information concerning specific systems. Those involved in planning the local-view configuration for a system should be familiar with the schematic diagram of the network.

Note: The system for which the local-view WSNEDIT configuration is being defined is called the "target" system. The target system is the local VS that you are configuring, unless you are exporting the WSNEDIT configuration file to another VS system, hence the name target. When you first access WSNEDIT, a screen appears that enables you to specify the target system.

The first step in planning the local-view configuration for a target system is to determine the parameters required to define a transport and systems that share the transport. (Chapter 6 explains these parameters in detail.)

After the appropriate transport information has been recorded, the routing configuration for the target system can be planned. The purpose of planning the routing configuration is to determine which systems are adjacent to the target system and to determine the destinations for messages that originate from or pass through the target system. Routing parameters need to be planned for the network as a whole. (Chapter 7 explains these parameters in detail.)

For example, CHIVS1 is considered adjacent to CHIVS2 and CHIPC1 in the schematic diagram given in Figure 3-2. CHIVS1 is the primary system; the other two are secondary systems, which are adjacent to each other. Both systems on the Wang Band transport in area 3 are adjacent and of these systems, DENVS1 is adjacent to CHIVS1. Likewise, NYVS100 and CHIVS1 on the X.25 (Telenet) transport are adjacent.

Note: The DLP only establishes contact with the DLP on an adjacent system. If a nonadjacent system is the destination, messages from the DLP of the sending system are routed through intermediate systems where CNS switches data through the appropriate transports until the destination is reached.

The programs that you run to define the parameters required to configure network hardware and software include

- GENEDIT
- WSNEDIT
- SNAEDIT
- EDITOR
- TRANSFER

You can also use CNFGAID to run these programs for system level configuration or to only display the on-line help for each program. If you only wish to view the on-line help, you can exit the help at any time by pressing PF16 without accessing the actual program.

Following is a summary explaining the purpose and function of each of these programs. A reference is given to the respective part of this guide that explains how to use the program to configure the local system.

GENEDIT

GENEDIT, the VS system generation utility, configures a VS system's hardware. When you run GENEDIT, you enter the system name of your VS as its System WangNet ID. This is the same system name that you enter when you run WSNEDIT to define areas and systems in the network. Each system name uniquely identifies a VS system in the network.

You also use GENEDIT to configure data link processor (DLP) addresses. A DLP address associates a DLP with a physical port on the VS system. You enter the DLP address when you run WSNEDIT to configure transports. (Refer to Chapter 4 for information on how to run GENEDIT to configure network hardware.)

WSNEDIT

WSNEDIT is the WSN VS communications configuration utility. For system level configuration, you run WSNEDIT to define

- WSN transports and systems on the transports
- Paths over which a VS CNS system routes messages to destinations
- WSN services

When you run WSNEDIT to configure transports, the parameters you enter vary based on the transport type. However, for each transport, specify the DLP address the transport will use to send and receive data. When you designate systems on the transport, enter information that identifies them as unique entities on the transport. For example, you assign a unique cable address to each system on a Wang Band transport. (Refer to Chapter 6.)

When you define a path to a destination, specify the adjacent (that is, next hop) system by way of which data can be routed to the destination. (Refer to Chapter 7.)

To define WSN services, you define all the systems in the network with which a particular system shares these services. For the File Transfer Service, enter the transfer group information and the file types the system can send and receive. You may define send and receive passwords that the file transfer programs exchange when establishing communication sessions before sending files to each other. System administrators must agree on these names. (Refer to Chapter 8.)

Through WSNEDIT, you can also configure Store and Forward service windows to regulate the time intervals when you want to send and receive electronic mail.

SNAEDIT

SNAEDIT defines the VS 3274 SNA emulator parameters that the IDS 3274 SNA transport requires to send and receive data in an SNA environment. This program is described in the *VS 3274 SNA Administrator's Guide*.

EDITOR

EDITOR can create a procedure that runs the IDS 3271 (BSC) Master Control Program (MCP) as a background task. This program is described in the *VS 3271 Emulation User Guide*.

TRANSFER

The VS TRANSFER utility defines transfer groups. VS systems use transfer groups to control the disposition of files and WP documents and to protect files and WP documents received from remote systems. For example, when local VS users make requests to retrieve files or documents from a remote system, they can enter the name of the transfer group that is to control the disposition of the requested file or document. When remote system users make requests to send documents or files to your VS, they can also use a transfer group to have your system control the disposition of the sent file or document.

When a transfer group controls the disposition of a received file, it assigns the file prefix, library, and volume to that file you specified when you created the transfer group. When a transfer group controls the disposition of a received WP document, it places that document in the WP library you named when you created the transfer group. However, when you define a transfer group, you can specify that remote users have the option of overriding the assignments for that transfer group. Transfer groups also provide an owner and file class assignment for all incoming files. (Refer to Chapter 9 for instructions on creating transfer groups.)

A VS recognizes three types of transfer groups

- User-defined
- Remote System
- Default

The only one that you are required to define is the default transfer group for your VS. The other two types are optional. These groups are defined as follows:

User-Defined Group -- Created on the local VS, this group controls the disposition of files and documents received from remote systems. Any local VS user (with security rights) can create a user-defined group. For example, if you create a transfer group named MYGROUP, you can use that name when you make a retrieve document request. Thus, if you request a document from a remote VS and enter the name MYGROUP in the appropriate field, the received document is stored in the WP document library you specified when you created MYGROUP. If remote system users want to send documents to your WP library, they can enter the name MYGROUP in the appropriate field when they make the send request. When your VS receives the documents, it assigns them to the library that you defined in MYGROUP.

Remote System Group -- Enables you to assign a transfer group to a remote system when you modify a File Transfer Service definition for that system. For example, if a user on a remote system sends a document to your VS and does not name a user-defined transfer group, your VS uses the remote system's transfer group to assign the document to the WP library named in that transfer group definition. A remote system group applies only to those documents and files that your VS receives from a specific remote system.

Default Transfer Group -- Controls the disposition of all files and documents received by your system that are not under the control of a remote system group or a user-defined group. When you define the File Transfer Service for your system, you assign it a default transfer group.

VS SECURITY

VS SECURITY provides logon rights for users during remote logon sessions. When a user is logged on to a remote system, the user gains access to the system only through a logon ID and password. Run SECURITY at a remote system to allow user access.

SECURITY also defines intersystem security privileges that establish the file classes remote systems can access during file transfer sessions. Run SECURITY to specify these file classes. (Refer to Chapter 9.)

LOGCNTRL

LOGCNTRL enables you to specify the volume where CNS log files reside. These files record CNS activity. LOGCNTRL is only run at WSN NETCORE installation or any other time the logging parameters are to be changed. It must be run prior to running the CNS log task, which is started by running WSNSTART. The procedure for running LOGCNTRL is described in the *WSN VS Network Control and Monitoring Guide*.

WSNAPPS

WSNAPPS is a utility that allows you to manage certain user-written network applications for inclusion in the WSN directory. Applications that are defined in the WSN directory can be automatically started on the local VS by remote users or applications that have access to the WSN network. (Chapter 10 describes how to use the WSNAPPS utility.)

3.3.2 Using CNFGAID for System Level Configuration

The CNFGAID menu (see Figure 3-3) allows you to run the programs previously mentioned.

The CNFGAID menu lists the programs you run for system level configuration in an order in which they can be run, and displays the PF keys to run them. However, instances exist in which not all the programs are required. For example, you run SNAEDIT only to configure an IDS 3274 SNA transport; run EDITOR only to configure an IDS 3271 BSC transport.

CHAPTER 4 CONFIGURING SYSTEM HARDWARE

4.1 OVERVIEW

This chapter describes the general procedure for using the VS GENEDIT system generation utility to set certain system options and configure the VS system's communications controllers and data link processors (DLPs). Configuring the VS system hardware requires special knowledge about system and networking relationships. For additional information or assistance, consult your Wang customer engineer or systems analyst.

When you configure a DLP, you assign it to a port on a communication controller attached to the VS. In addition, you assign two or more logical devices to the DLP. These logical devices provide the virtual circuits that the File Transfer, Wang OFFICE, and VS logon sessions between your VS and the remote system(s) use. During this configuration process, you also assign a network name to your system. The network name identifies the VS to the remote systems on the data link.

The VS system generation configuration is *not* identical to its network configuration, which the program WSNEDIT defines.

Even if you do not run GENEDIT yourself, it is helpful to know and understand your system's configuration so that you can operate your part of the network. This chapter deals with GENEDIT from a WSN communications perspective. For further information about the VS system generation process, refer to the *VS System Administrator's Reference*. In addition, you will need to discuss certain hardware configuration issues with your Wang customer engineer or systems analyst before you can configure all of the system-related parameters.

Note: *The VS system configuration description contained in this chapter is for systems using VS Operating System, Release 7.13, and earlier. If using a later VS Operating System release, refer to the appropriate VS documentation for specific VS system configuration information.*

4.2 CONTROL PATHS, VIRTUAL CIRCUITS, AND SESSIONS

When a VS and a remote system establish a VS Terminal Emulation, File Transfer, PDS Store and Forward, or Directory Synchronization session, a logical connection is made over a virtual circuit. This connection maps the session to one of the device numbers in the VS device table. If no device number is available, the VS rejects the session.

The set of device numbers is assigned during the GENEDIT process as device numbers on an input/output controller (IOC) (alternatively called an input/output processor (IOP) on CP4 type systems, and device adapter (DA) on CP5 and CP7 type systems). These device numbers represent a portion of the system-wide logical device load.

Note: This section introduces the concept of line groups for WSN Point-to-Point communications using a Multi-Line Telecommunications Controller (MLTC). Support for line groups begins with Release 3.0 of the MLTC Point-to-Point transport.

Some considerations for assigning device numbers in GENEDIT are as follows:

- Each VS DLP requires one control path. A WSN VS transport uses a control path to determine if a virtual circuit is available, to assign the circuit, and to establish a session on it. The control path uses the lowest device number assigned to the DLP on which the virtual circuits for the transport are configured.
- In general, when you configure a serial controller, such as a 22V27 Extended Serial IOP, each transport on your system represents one physical line, which is configured as a DLP. This relationship changes when you configure a Multi-Line Telecommunications Controller (MLTC) for Point-to-Point communications. In the case of the MLTC, each transport can represent one or more physical lines; however, the line group remains configured as a single DLP in GENEDIT.
- An Extended Serial IOP supports 32 logical device numbers distributed as desired for any combination of supported DLPs including: external CIU, VS-TC, VS-TC1, and other devices. In addition, each external CIU, VS-TC, or VS-TC1 can utilize up to 25 VS device numbers, including 24 virtual circuits and one device number allocated for the control path that the DLP uses.

- An MLTC supports 64 VS device numbers on CP4 and CP8 type systems, and 32 VS device numbers on CP5 and CP7 type systems. These device numbers can be distributed among 16 lines. Using line groups, the MLTC can be configured as 1 to 16 (logical) DLPs in GENEDIT depending on your networking requirements. Keep in mind that an MLTC is represented as a single entity in GENEDIT but can have multiple DLP addresses in WSNEDIT (that is, one per transport).
- A LAN Controller (for 802.3 communications) supports 64 VS device numbers on CP4 and CP8 type systems, and 32 VS device numbers on CP5 and CP7 type systems. The LAN Controller only supports one line (one 802.3 connection).

4.2.1 Determining Logical Device Load Requirements

This section describes how to determine the logical device load that a VS requires to support WSN communications. Initially, when WSN software and associated system hardware is installed, a Wang systems analyst is consulted to calculate logical device load requirements for the VS and assign device numbers for networking functions through GENEDIT. You should know your system's current logical device capacity and how to determine logical device load requirements before adding to, or changing, its hardware or networking software options.

Logical device load is measured by the number of logical devices, also referred to as "device numbers" or "virtual circuits." It represents the portion of a system's total logical device capacity that is assigned to perform specific I/O operations through controller hardware. The number of logical devices that are reserved on a VS depends on its operating capacity, and the network load it is handling.

General Considerations

A VS must be configured within the bounds of the number of devices and tasks it can support. For example, a VS85 can support up to 64 device numbers (although not concurrently) and 46 tasks (including background, system, and workstation tasks). A DLP with 20 virtual circuits and its control path uses 21 device numbers of the pool of 64. In addition, each active VS Logon uses one of the 46 available tasks. The WangNet Workstations parameter under system options allows you to control the number of workstation devices you want configured for inbound remote logon sessions. Thus, you would make sure that the total number of device numbers you configure does not exceed 64 on a VS85. For a VS85, you would also make sure that no more than 46 tasks become active.

WSN Considerations

Table 4-1 gives formulas for determining the portion of a system's total logical device load requirements used to support WSN networking hardware and software functions. From this table, you can determine the number of logical devices that a VS requires to support specific types of communications sessions over the WSN transports. (Section 4.4 describes how to use the GENEDIT utility to reserve these logical devices on a DLP assigned to a communications controller.)

Use the following key to interpret the logical device load formula in Table 4-1. The key is divided into two categories:

- General Definitions
- Special Definitions for X.25

General Definitions

- C** -- Number of CNS-using systems among simultaneously-supported adjacent systems
- S** -- Among adjacent systems not using CNS, number of logical devices for non-CNS traffic [equivalent to *maximum* number of *simultaneous* non-CNS sessions (i.e., inbound and outbound non-CNS remote logons and/or non-CNS transfers) with adjacent systems]
- M** -- Additional device number (usually one) for use of network monitoring and diagnostic tools (e.g., LWNMON for WangNet/Wang Band functions)

Special Definitions for X.25

- P** -- Number of simultaneously supported VS PAD sessions
- G** -- Number of logical devices/tasks for X.25 General Access (refer to the algorithm given in the *WSN VS X.25 General Access Interface Programmer's Guide*)
- A** -- Number of logical devices/tasks for SNA/X.25 (usually two for SNAMCP)

Table 4-1. Logical Device Load Formulas

| WSN Protocol/Transport | Logical Device Load Formula |
|---|---|
| Wang Band Point-to-Point ^a (Sync/Async) Multipoint Primary | $1 + C + S + M$ |
| Multipoint Secondary (non-CNS use) | $1 + S + M$ |
| Multipoint Secondary (CNS use) | $2 + M$ |
| IEEE 802.3 | $\text{Sum of: } \left\{ \begin{array}{l} 1 \text{ (constant)} \\ 2 \text{ (if CNS is used)} \\ 2 \text{ (if CNS also used} \\ \text{for VS-to-PC)} \\ 2 \text{ (if TCP/IP is used)} \\ 2 \text{ (if ISO transport} \\ \text{is used)} \end{array} \right.$ M |
| IDS/SNA | $2(S) + M$ |
| IDS/BSC | $2(S) + M$ |
| ^a Does not apply to MLTC line groups. For logical device load determination when using line groups, consult your Wang systems analyst. | |

Note: The logical device load values from the formulas given in Table 4-1 include only virtual circuits (as well as control path and any diagnostic tools). Other logical devices needed by the local VS, including those required for interactive workstation units -- reserved for inbound remote VSTE logon sessions (and called "WangNet Workstations" in the GENEDIT system options (see Figure 4-2)) -- are not included here, and must be accounted for in the system-wide logical device load.

4.3 RUNNING GENEDIT

Before you configure your VS, you must decide on the number of logical devices for each DLP and select a network ID for your VS.

To run GENEDIT, display the Command Processor screen and press PF1 (Run Program or Procedure). Enter GENEDIT in the field provided for the program name and press ENTER. The Configuration File Specification menu enables you to either edit an existing configuration file or create a new one. To edit an existing file, enter the file, library, and volume names in the appropriate fields. To create a new file, leave the fields blank. Next, specify the VS model for your system by entering one of the VS model numbers listed on the menu in the appropriate CP field. After you enter the VS model number, press ENTER. The GENEDIT main menu appears (see Figure 4-1).

GENEDIT

Main Menu
Model VS711

Select the function you wish to perform by pressing the corresponding PFkey:

- (2) Examine/Modify System options
- (3) Examine/Modify the IOC and device configurations
- (4) Display summary and Save/Create/Print the modified CONFIG file

PRESS: (16) to edit a new CONFIG file
(32) to exit GENEDIT

Figure 4-1. GENEDIT Main Menu

The GENEDIT main menu lists the three primary GENEDIT functions and the PF keys that allow you to access them. Press PF2 to examine and/or modify system options. The System Options screen appears (see Figure 4-2).

```

GENEDIT                                     System Options
                                           Model VS711
-----
System Name: ████████████████████████████
System WANGNET ID: ████████████████████

Will the system support: Word Processing?   YES (YES/NO)
                          Mailway?          YES (YES/NO)
                          DMS/TX?          YES (YES/NO)
                          Wang Office?     YES (YES/NO)
                          WILS             NO (YES/NO)
Clock rate in Hz:          60 (50/60)
Number of total DBMS tasks: 0 (0-3)
Wangnet Workstations:    0██ (0-127)
Maximum length of user ID: 3 (3 or 8)
Interrupt WSO for OPERATOR messages? YES██(YES/NO)
Allow Program Priorities? NO (YES/NO)
VTOC Cache size in pages: 0 (0=none, or 5-255)
"program-name" file for FASTLINK option _____

-----
PRESS: (ENTER) to set System Options
        (3) to set Task Options
        (4) to set National Defaults
        (5) to set Sharer Options
        (16) or (11) go to Main menu

```

Figure 4-2. System Options Screen

Enter the correct System Name and System WangNet ID for your system on the network. The System Name can consist of up to 16 alphanumeric characters. The System WangNet ID can consist of up to eight alphanumeric characters. The System WangNet ID is the name that is entered in the directory through the Manage Areas function of WSNEDIT, identifying the local system in the network. (Refer to Chapter 5 for information on the Manage Areas function.)

You should give special consideration to the WangNet Workstations parameter on the System Options screen. The WangNet Workstations parameter allows you to control the number of workstation devices that you want configured for inbound remote logon sessions. Each inbound remote logon session takes up one device number out of the pool of device numbers for your VS. (Each inbound remote logon is also considered an open file that should be considered when setting the Maximum Open Files parameter.)

You should also give special consideration to the Maximum Open Files and User Modifiable Data Areas parameters. These parameters are listed under Task Options (PF3). (Refer to your *WSN VS NETCORE Customer Software Release Notice* or consult your Wang systems analyst for information on configuring these options.)

Change the System Options menu as necessary and press ENTER. Then press PF16 to display the GENEDIT main menu and PF3 to configure your system's controllers and devices.

4.4 COMMUNICATIONS CONTROLLER SELECTION AND CONFIGURATION

The General Controller Selection menu replaces the GENEDIT main menu after you press PF3. Depending on what CP type your system is, the menu is modified to reflect the kind of device controllers your system uses. For example, if you are configuring a VS CP5 or CP7 type system, the Device Adapter (DA) Selection menu is displayed. For CP4 and CP8 type systems, the term Device Adapter is replaced by IOP and IOC, respectively. These changes reflect the different types of device controllers that are supported by these systems. For each type of controller, the procedure you use to configure a particular DLP is slightly modified.

The remainder of this section takes you through the procedure for configuring an Extended Serial IOP on a VS CP4 type system. If you are configuring a comparable type of serial controller (such as, a Serial Device Adapter or TC Device Adapter) on a different CP type system, you can use this section as a general guideline and refer to your VS System Administrator's Reference for supplementary information, as needed. Sections 4.5 through 4.7 in this chapter describe the procedures for configuring an MLTC, LAN Controller, and Internal CIU on a VS CP8 type system.

Defining the Communications Controller

Figure 4-3 shows a sample IOP Selection menu that appears for a VS85 (CP4 type system).

Enter the IOPs on your system:

| | 1st | | |
|-----|------|----------|---------------------|
| IOC | Dev# | IOP Type | IOP Description |
| 2 | 0 | 22V27 | Extended Serial IOP |
| 0 | 32 | 22V28 | Large Disk IOP |
| 1 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

TAB to an IOP and PRESS:

(ENTER) to edit the devices on the IOP

(9) to show valid IOPs for the slot

(11) to copy the IOP and all its defined devices to a new slot

(12) to move the IOP and all its defined devices to a new slot

or PRESS: (13) to modify the IOP types

(14) to modify device numbers

(16) to return to the main menu

Figure 4-3. VS85 IOP Selection Menu

The VS85 IOP Selection menu displays a 22V27 Extended Serial IOP and a 22V28 Large Disk IOP. You can configure DLPs (such as, VS-TCs, VS-TCIs, and so forth) on the 22V27 Extended Serial IOP for a VS85, VS90, or VS100 (CP4 type systems). For a VS85, VS90, or VS100, you can also configure DLPs on a 22V47 or 22V67 Extended Serial IOP. The 22V27, 22V47 and 22V67 Extended Serial IOPs support 3271 BSC, 3274 SNA, 2780/3780, X.25, Multipoint, Point-to-Point, and Wang Band communications.

In addition to the Extended Serial IOPs, there are other types of serial controllers such as, a TC-IOP (for SNA communications on a CP4 type system) and a TCDA (for 3271 BSC, 3274 SNA, 2780/3780, X.25, Multipoint and Point-to-Point communications on a CP5 or CP7 type system) that support WSN communications on these systems. For a complete list of the controllers and devices (DLPs) that support WSN transports, refer to your *WSN VS NETCORE Customer Software Release Notice*.

Note: To view a list of the types of controllers that are supported on your system, move the cursor to each of the slots shown on the General Controller Selection menu and press PF9. A screen appears listing all of the controllers that are supported for the slot selected.

Two frequently used functions that you can perform from the IOP Selection menu are

- Modify IOP types
- Modify device numbers

To add IOPs or modify existing IOPs, press PF13. Afterwards, you can assign a set of device numbers and ports associated with the DLP you want to configure.

To change the number of logical devices available on each IOP, press PF14. When you do this it also changes the starting device number of the next IOP on the list.

The remainder of this configuration example illustrates the configuration process for a VS-TC (for 3271, 3274 SNA, 2780/3780, Multipoint and Point-to-Point communications) on a 22V27 Extended Serial IOP. You can use the same procedure to configure a VS-TC1 or VS-6550, (for additional support of X.25 communications), or an External CIU (for Wang Band communications).

Configuring a Data Link Processor on the Communications Controller

Position the cursor at 22V27 in the IOP Type column and press ENTER. The Extended Serial IOP screen appears (see Figure 4-4).

| GENEDIT | | Devices on IOP Model VS85 | | | |
|---------|---------------------|---------------------------|----------------------|-----|--|
| 22V27 | Extended Serial IOP | IOP# 2 | | | |
| DEV# | Port# | Type | Description | WP? | |
| 0 | 0 | 2246C | Combined Workstation | N | |
| 1 | 1 | TCB1 | TCB1 Device | N | |
| 2 | | | For TCB1 - port 1 | N | |
| 3 | | | For TCB1 - port 1 | N | |
| 4 | | | For TCB1 - port 1 | N | |
| 5 | | | For TCB1 - port 1 | N | |
| 6 | | | | N | |
| 7 | | | | N | |
| 8 | | | | N | |
| 9 | | | | N | |
| 10 | | | | N | |
| 11 | | | | N | |
| 12 | | | | N | |
| 13 | | | | N | |
| 14 | | | | N | |
| 15 | | | | N | |

TAB to a Device type and PRESS: (ENTER) Reserve cluster devices (12) Shift or PRESS: (5) Next (9) Valid devices (13) Modify (16) Return (11) Main menu

Figure 4-4. Extended Serial IOP Screen

To configure a VS-TC (DLP), press PF13. (GENEDIT refers to DLPs as "devices.") The Extended Serial IOP screen appears in modify mode. Enter the name TCBl under the Type column heading at the first available device number on the Extended Serial IOP. (The VS recognizes a VS-TC by the name TCBl.) The port number that appears next to the TCBl designates the actual physical port to which the DLP (TCBl) is connected. Press ENTER. The Extended Serial IOP screen appears in display mode, listing the TCBl along with the other device types.

Reserving Device Numbers

To reserve device numbers for the TCBl, position the cursor at TCBl in the Type column and press ENTER. The Device Designation screen appears (see Figure 4-5).

| GENEDIT | | Reserve Devices for Cluster | |
|---|-------------|-----------------------------|------------|
| TCBl | TCBl Device | Port # 1 | Model VS85 |
| Enter a non-blank character next to each device number you wish to reserve for the processor above: | | | |
| | 0 | ■ 16 | |
| X | 1 | ■ 17 | |
| X | 2 | ■ 18 | |
| X | 3 | ■ 19 | |
| X | 4 | ■ 20 | |
| X | 5 | ■ 21 | |
| | ■ 6 | ■ 22 | |
| | ■ 7 | ■ 23 | |
| | ■ 8 | ■ 24 | |
| | ■ 9 | ■ 25 | |
| | ■ 10 | ■ 26 | |
| | ■ 11 | ■ 27 | |
| | ■ 12 | ■ 28 | |
| | ■ 13 | ■ 29 | |
| | ■ 14 | ■ 30 | |
| | ■ 15 | ■ 31 | |

PRESS: (ENTER) to update reserved device numbers; (16) return to device screen

Figure 4-5. Device Designation Screen

To reserve a device number, enter a nonblank character next to it. Reserve enough device numbers to handle the control path and the number of virtual circuits that you want the device to support. (See Table 4-1.) Press ENTER when you have finished specifying device numbers. The Extended Serial IOP screen appears. You can then configure other devices.

Configuring Additional DLPs on the Same Communications Controller

If your system contains more than one VS-TC or other type of DLP, you must enter each "device" separately.

Table 4-2 lists some of the DLPs for WSN and gives their corresponding names that appear in the GENEDIT device type lists.

Note: To view a list of the types of devices (such as, DLPs, workstations, printers, and so forth) that are supported by a particular controller, press PF9 from the General Controller screen (see Figure 4-4).

Table 4-2. DLP/GENEDIT Names

| DLP Name | GENEDIT Name |
|----------------------|--------------|
| VS-TC | TCB1 |
| VS-TC1 ^a | TCB3 |
| VS-6550 ^a | TCB3 |
| External CIU | CIU |
| LCT | TCB1 |
| 25V76 (-1, -2) | TC4 |

^a These DLPs can be validly defined as TCB1s in certain special configurations. Consult your Wang analyst for details.

Guidelines for configuring additional DLPs on the Extended Serial IOP are as follows:

- Each additional DLP that you enter is configured on a different port, using the same procedure as the first.
- To configure an LCT (for use by the PC local communications option), follow the same procedure for configuring a VS-TC.
- To configure a VS-TC1 or VS-6550, follow the procedure previously described, but enter the name TCB3.
- To configure an External CIU, follow the procedure previously described, but enter the name CIU.

Press ENTER after you enter your system's DLPs. The screen changes to show the type, description, and port assignment for each DLP that you entered.

Figure 4-6 illustrates a sample Extended Serial IOP menu that contains three DLPs, a CIU and two VS-TCs. (Remember that VS-TCs are entered as TCB1s.)

| GENEDIT | | Devices on IOP Model VS85 | | |
|---------------|-------|------------------------------|----------------------|-----|
| 22V27 DEV# | Port# | Type | Description | WP? |
| 0 | 0 | 2246C | Combined Workstation | N |
| 1 | 1 | TCB1 | TCB1 Device | N |
| 2 | | | For TCB1 - port 1 | N |
| 3 | | | For TCB1 - port 1 | N |
| 4 | | | For TCB1 - port 1 | N |
| 5 | | | For TCB1 - port 1 | N |
| 6 | 2 | CIU | CIU Device | N |
| 7 | | | For CIU - port 2 | N |
| 8 | | | For CIU - port 2 | N |
| 9 | | | For CIU - port 2 | N |
| 10 | 3 | TCB1 | TCB1 Device | N |
| 11 | | | For TCB1 - port 1 | N |
| 12 | | | For TCB1 - port 1 | N |
| 13 | | | For TCB1 - port 1 | N |
| 14 | | | | N |
| 15 | | | | N |

| | | |
|---------------------------------|-----------|-------------------------------|
| TAB to a Device type and PRESS: | or PRESS: | (5) Next |
| (ENTER) Reserve cluster devices | | (9) Valid devices (16) Return |
| (12) Shift | | (13) Modify (11) Main menu |

Figure 4-6. Completed Extended Serial IOP Menu

For the configuration shown in Figure 4-6, the first VS-TC (TCB1) is connected to Port 1 and uses device number 1 for its control path on the Extended Serial IOP. Each of the virtual circuits assigned to it is listed as a separate device number. In this example, the virtual circuits appear as device numbers 2 through 5.

The CIU is device number 6 on Port 2. Again, each of its virtual circuits is listed as a device number. The last VS-TC (TCB1) is device number 10 on Port 3. Like the CIU, it has three virtual circuits assigned to it.

Determining the DLP Address

Write down the device numbers and the physical port number of each DLP connected to the Extended Serial IOP communications controller. Make a note of the lowest device number on the IOP (the IOP base address). Combine the IOP base address and the DLP port number to assign a device name to a DLP. You use the DLP's device name when you run WSNEDIT to define a transport served by that DLP. This name is called the "DLP Address." (See Figure 6-3 in Chapter 6.)

To assign a device name (DLP address) to a DLP, convert its port number (the number of the physical port to which the DLP is connected) to a letter and combine that letter with the IOP base address.

The procedure for converting port numbers to letters is given in Table 4-3.

Table 4-3. Port Number to Letter Conversion

| Port | Letter | Port | Letter | Port | Letter |
|------|--------|------|--------|------|--------|
| 0 | = A | 5 | = F | 10 | = K |
| 1 | = B | 6 | = G | 11 | = L |
| 2 | = C | 7 | = H | 12 | = M |
| 3 | = D | 8 | = I | 13 | = N |
| 4 | = E | 9 | = J | 14 | = O |
| | | | | 15 | = P |

Using this conversion, the DLP address of the first TCBI in Figure 4-6 is 000B (where 000 is the base address and B stands for Port 1). The DLP address of the CIU is 000C (base address = 000, and Port 2 = C), and the DLP address of the second TCBI is 000D (base address = 000, and Port 3 = D).

Write down the DLP address for every DLP you configured. You need these names when you run WSNEDIT to configure transports.

Completing the System Hardware Configuration

After you define your DLPs, configure the rest of your system. After you configure your system, press PF16 to return to the GENEDIT main menu. Then press PF4 to display the configuration summary for your system. After viewing the completed General Configuration menu, specify your configuration file in the appropriate fields on the Completed General Configuration menu. Enter the file, library, and volume names of the configuration file and press ENTER to complete your hardware configuration.

Before you run WSNEDIT to define your network-level and system-level configuration, you should IPL your VS with the configuration file you just created. If you do not IPL with the configuration file, WSNEDIT will not be able to associate the DLP addresses you enter during transport configuration with the data link processor hardware. IPL is necessary before WSNEDIT is run because the System WangNet ID must be entered as the system name of your system when you define your network-level configuration. (See Figure 3-1 in Chapter 3.)

The remainder of this chapter describes the steps that you use to configure an MLTC (for Point-to-Point communications), a LAN Controller (for 802.3 communications), and an Internal CIU (for Wang Band communications). These communications controllers have advanced functions and are configured differently from those previously explained. For information about these controllers and their functions, refer to the following data sheets:

- *Multi-Line Telecommunications Controller*
- *802.3 Local Area Network Overview*
- *WangNet Cable Interface Unit*

4.5 MLTC CONFIGURATION INSTRUCTIONS

Perform the following steps to add the MLTC to the GENEDIT configuration file:

Note: The following steps describe MLTC configuration on a VS7150 system and can be used as a general guideline for how this is done on other systems that support an MLTC. When configuring an MLTC on a different model VS, your GENEDIT screens will be slightly different from those described here.

1. Run GENEDIT and access the GENEDIT main menu.
2. Press PF3 (Examine/Modify the IOC and device configurations). The VS7150 IOC Selection menu appears. A sample menu is shown in Figure 4-7. The WangNet Controller IOC (23V97W) and the large disk IOC (23V98) are the minimum configuration defaults for the VS7150.

Enter the IOCs on your system:

| 1st | | | 1st | | | | |
|-----|------|----------|----------------------|-----|------|----------|-----------------|
| IOC | DEV# | IOC Type | IOC Description | IOC | Dev# | IOC Type | IOC Description |
| 3 | 0 | 23V93W | WANGNET Controlr IOC | 9 | 48 | 23V79 | 911 CIU IOC |
| 1 | 32 | 23V98-4 | SMD Disk IO Controlr | 10 | | | |
| 2 | | | | | | | |
| 4 | 36 | 23V96 | MultiLine TC IOC | | | | |
| 5 | 45 | 23V66 | LAN Controller | | | | |

| | |
|---|--|
| TAB to an IOC type AND PRESS: (ENTER) to edit the devices on the IOC (9) show valid IOCs for the specified slot (11) copy IOC and its devices to a new slot (12) move IOC and its devices to a new slot | or PRESS: (13) modify the IOC types (14) modify starting device #s (16) return to the main menu |
|---|--|

Figure 4-7. VS7150 IOC Selection Menu

- Press PF13 (modify the IOC types) to add the MLTC to the list of IOC types or move the cursor to the slot where you want to place the MLTC and press PF9. The screen appears in modify mode. The MLTC must be added to a slot that allows sufficient device numbers for your purpose, the maximum being 64.
- Type 23V96 in the IOC Type field and press ENTER. The IOC Description for the MLTC is added to the screen. The VS7150 IOC Selection screen shows that the MLTC has been entered at slot 4 where the first device number is 36.

After you add the MLTC to the list of IOCs, you need to select the dependent devices, and assign a set of device numbers and ports associated with the MLTC.

- Position the cursor at 23V96 (the MLTC) and press ENTER. The Devices on Multiline TC IOC screen appears, as shown in Figure 4-8.

The MLTC supports up to 16 ports (for WSN Point-to-Point communications). With 16 ports configured, each port can have several device numbers, which collectively can not exceed 64. Therefore, 64 device numbers can appear on this screen, beginning with the first device number of 36. (Next/Previous functions (PF4 and PF5) are enabled.)

Note: An MLTC can support up to 64 device numbers (on a CP8 type system) mapped in any fashion to 1 through 16 lines. These lines can function either as individual (logical) DLPs, or as one or more line groups, each configured as a single DLP (if using MLTC Point-to-Point transport, Release 3.0 or later). The sample configuration shown in Figure 4-8 indicates the former function.

| GENEDIT | | Devices on TC IOC Model VS715 | | | | |
|---------|-------|----------------------------------|---------------------------------|---------------------|--------------|--|
| Dev# | Port# | 23V96 Type | Multiline TC IOC Description | IOP# 4 Line name | Routing addr | |
| 36 | 0 | WSN | Wang Systems Network | PTPTSWITCH1 | 0 | |
| 37 | 0 | WSN | Wang Systems Network | | 0 | |
| 38 | 0 | WSN | Wang Systems Network | | 0 | |
| 39 | 0 | WSN | Wang Systems Network | | 0 | |
| 40 | 2 | WSN | Wang Systems Network | PTPTSWITCH2 | 0 | |
| 41 | 2 | WSN | Wang Systems Network | | 0 | |
| 42 | 2 | WSN | Wang Systems Network | | 0 | |
| 43 | 2 | WSN | Wang Systems Network | | 0 | |
| 44 | 2 | WSN | Wang Systems Network | | 0 | |
| 45 | | | | | 0 | |
| 46 | | | | | | |
| 47 | | | | | | |
| 48 | | | | | | |
| 49 | | | | | | |
| 50 | | | | | | |
| 51 | | | | | | |

| | | |
|-------------------------------|-----------|-------------------------------|
| TAB to a TC type and PRESS: | or PRESS: | (5) Next |
| (ENTER) Set Async options | (8) Async | (9) Valid devices (16) Return |
| (12) Shift devices up or down | | (13) Modify (11) Main menu |

Figure 4-8. Devices on Multiline TC IOC Screen

Figure 4-8 shows an MLTC configured with two lines: each associated with its own transport (and thus, not configured for line groups). The first line (assigned to port 0) is used for a WSN Point-to-Point switched transport, and has four virtual circuits reserved (device numbers 36 through 39). Port 1, which does not appear, is reserved for the RS-366 autodialer connection. The second line (assigned to port 2) is used for a second WSN Point-to-Point switched transport, and has five virtual circuits reserved (40 through 44). (Port 3 is reserved for the RS-366 autodialer connection.) The total number of virtual circuits on the MLTC is then nine. Two of these virtual circuits (one per line) are required for control paths.

- For each device that you define (up to 64 devices), enter the following information:

Port# -- The first device number (36) coincides with the first port (Port# 0).

Note: Switched lines using RS-366 autodialers must be configured on even-numbered ports and have the odd-numbered ports that follow reserved for the associated RS-366 connectors. (For example, in Figure 4-8, a Point-to-Point switched transport is configured on port 0, with port 1 reserved for its associated RS-366 autodialer.

Type -- WSN.

Description -- Wang Systems Networking.

Line name -- An optional field, but it is helpful to enter the transport name (link name) that you enter in the Transport Name field of the General Transport Definition screen of WSNEDIT (see Figure 6-3).

Routing addr -- This field is not used.

Remember that the lowest device number on the IOC (36 in Figure 4-8) is the IOC base address. Combine the IOC base address and the port number, converted to a letter, to assign a device name that you enter in the DLP Address field of the WSNEDIT General Transport Definition screen. For example, the DLP address for the first transport (first line) in this configuration is 036A. The second transport (second line) in this configuration is 036B.

7. Exit from GENEDIT and save the configuration file that you have created.
8. IPL the VS7150 with the new configuration file.

After you have defined the MLTC configuration in GENEDIT, you can run WSNEDIT and configure the transports that use the MLTC. (Refer to Chapter 6 for details.)

4.6 LAN CONTROLLER CONFIGURATION INSTRUCTIONS

Perform the following steps to add the LAN Controller to the GENEDIT configuration file:

Note: The following steps describe a LAN Controller configuration on a VS7150 system and can be used as a general guideline for how this is done on other systems. When configuring a LAN Controller on a different model VS, your GENEDIT screens will be slightly different from the ones described here.

1. Display the VS7150 IOC Selection menu (see Figure 4-7).

2. Press PF13 (modify the IOC types) to add the LAN Controller to the list of IOC types or move the cursor to the slot where you want to place the LAN Controller and Press PF9. The screen appears in modify mode. The LAN Controller must be added to a slot that has sufficient device numbers for your purpose, the maximum being 64.
3. Type 23V66 in the IOC Type field and press ENTER. (The LAN Controller is known to GENEDIT as a 23V66.) The IOC Description is added to the screen.

After you add the LAN Controller to the list of IOCs, you must select the dependent devices and assign device numbers associated with the LAN Controller.

4. Position the cursor at 23V66 (the LAN Controller) and press ENTER. A screen appears that enables you to assign device numbers to the LAN Controller (see Figure 4-9) starting with device number 45. (Next/Previous functions (PF4 and PF5) are enabled.)

The LAN Controller currently supports one port only (for one 802.3 connection).

| GENEDIT | | | | | Devices on TC IOC Model VS715 | |
|---------|-------|---------------|-------------------------------|---------------------|----------------------------------|--|
| Dev# | Port# | 23V66 Type | LAN Controller Description | IOP# 5 Line name | Routing addr | |
| 45 | 0 | 802.3 | 802.3 Communications | IEE802.3 | 0 | |
| 46 | 0 | 802.3 | 802.3 Communications | | 0 | |
| 47 | 0 | 802.3 | 802.3 Communications | | 0 | |
| 48 | | | | | | |
| 49 | | | | | | |
| 50 | | | | | | |
| 51 | | | | | | |
| 52 | | | | | | |
| 53 | | | | | | |
| 54 | | | | | | |
| 55 | | | | | | |
| 56 | | | | | | |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | | | | | | |
| 60 | | | | | | |

TAB to a TC type and PRESS: or PRESS: (5) Next
 (9) Valid devices (16) Return
 (12) Shift devices up or down (13) Modify (11) Main menu

Figure 4-9. Devices on LAN Controller Screen

Figure 4-9 shows a LAN Controller configured for one 802.3 connection. It supports a WSN IEEE 802.3 transport and has three virtual circuits reserved (45 through 47). One of these virtual circuits is required for the control path.

5. For each device that you define (up to 64 devices), enter the following information:

Port# -- The first device number (45) coincides with the first port (Port# 0).

As only one line is supported, you must use Port# 0 for each device number you assign.

Type -- 802.3

Description -- 802.3 Communications.

Line name -- An optional field, but it is helpful to enter the transport name (link name) that you enter in the Transport Name field of the General Transport Definition screen of WSNEDIT (see Figure 6-3).

Routing addr -- This field is not used.

Remember that the lowest device number on the IOC (45 in Figure 4-9) is the IOC *base address*. Combine the IOC base address and the port number, converted to a letter, to assign a device name that you enter in the DLP Address field of the WSNEDIT General Transport Definition screen. For example, the DLP address for this configuration is 045A. This is the only DLP address for the entire 23V66 controller.

6. Exit from GENEDIT and save the configuration file that you have created.
7. IPL the VS7150 with the new configuration file.

After you have defined the LAN Controller configuration in GENEDIT, you can run WSNEDIT and configure the 802.3 transport that uses the LAN Controller. (Refer to Chapter 6 for details.)

4.7 Internal CIU Configuration Instructions

Perform the following steps to add the Internal CIU to the GENEDIT configuration file:

Note: The following steps describe an Internal CIU configuration on a VS7150 system and can be used as a general guideline for how this is done on other systems that support an Internal CIU. When configuring an Internal CIU on a different model VS, your GENEDIT screens will be slightly different from those described here.

1. Display the VS7150 IOC Selection menu (see Figure 4-7).
2. Press PF13 (modify the IOC types) to add the Internal CIU to the list of IOC types or move the cursor to the slot where you want to place the Internal CIU and press PF9. The screen appears in modify mode. The Internal CIU must be added to a slot that has sufficient device numbers for your purpose, the maximum being 64.
3. Type 23V79 in the IOC Type field and press ENTER. (The internal CIU is known to GENEDIT as a 23V79.) The IOC Description is added to the screen.

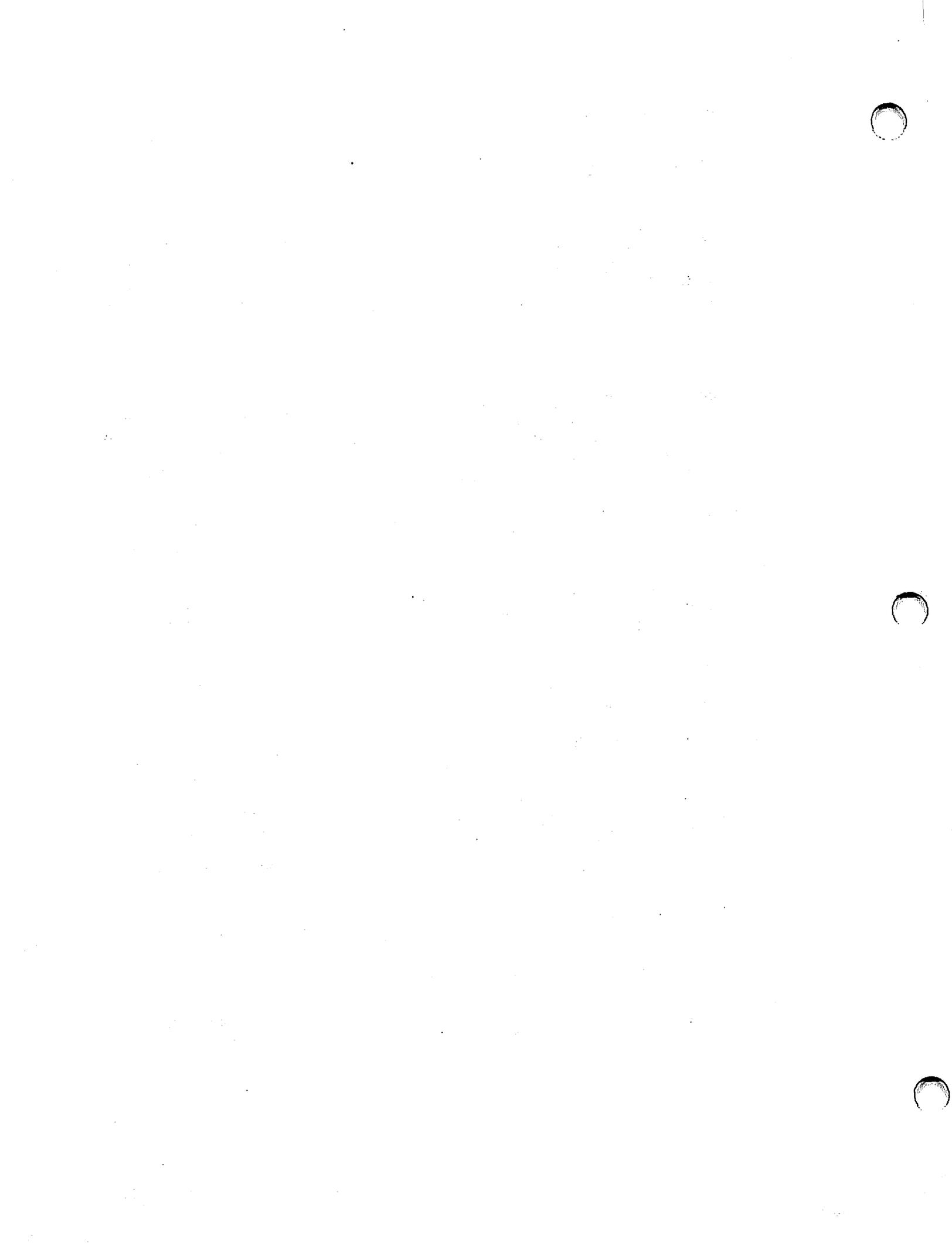
After you add the Internal CIU to the list of IOCs, you must select the dependent devices and assign device numbers associated with the Internal CIU.

4. Position the cursor at 23V79 (the Internal CIU) and press ENTER. A screen appears that enables you to assign up to 64 device numbers to the Internal CIU.
5. In response to the query, specify the appropriate number of device numbers, and press ENTER. This action displays your entry.

The Internal CIU is always assigned to port #0. Therefore, the DLP address for an Internal CIU is always the lowest device number on the CIU (the IOC base address) followed by an A. For example, if the lowest device number on the Internal CIU IOC is 48, the DLP address for the CIU is 048A.

6. Exit from GENEDIT and save the configuration file that you have created.
7. IPL the VS7150 with the new configuration file.

After you have defined the Internal CIU in GENEDIT you can run WSNEDIT and configure the WSN Wang Band transport. (Refer to Chapter 6.)



CHAPTER 5 CREATING AND MANAGING DIRECTORIES

5.1 INTRODUCTION

This chapter describes how to use the WSNDIRM and WSNEDIT utilities to create and manage network directories. Each system in the network must have a directory of all the systems in the network. The directory contains the area and system names and IDs for each system in the network, as well as other parameters that CNS systems require to communicate. CNS uses the network addresses of systems in the directory to determine the destinations for messages. If Wang OFFICE is installed on the system, the directory must also include all the Wang OFFICE users in the network.

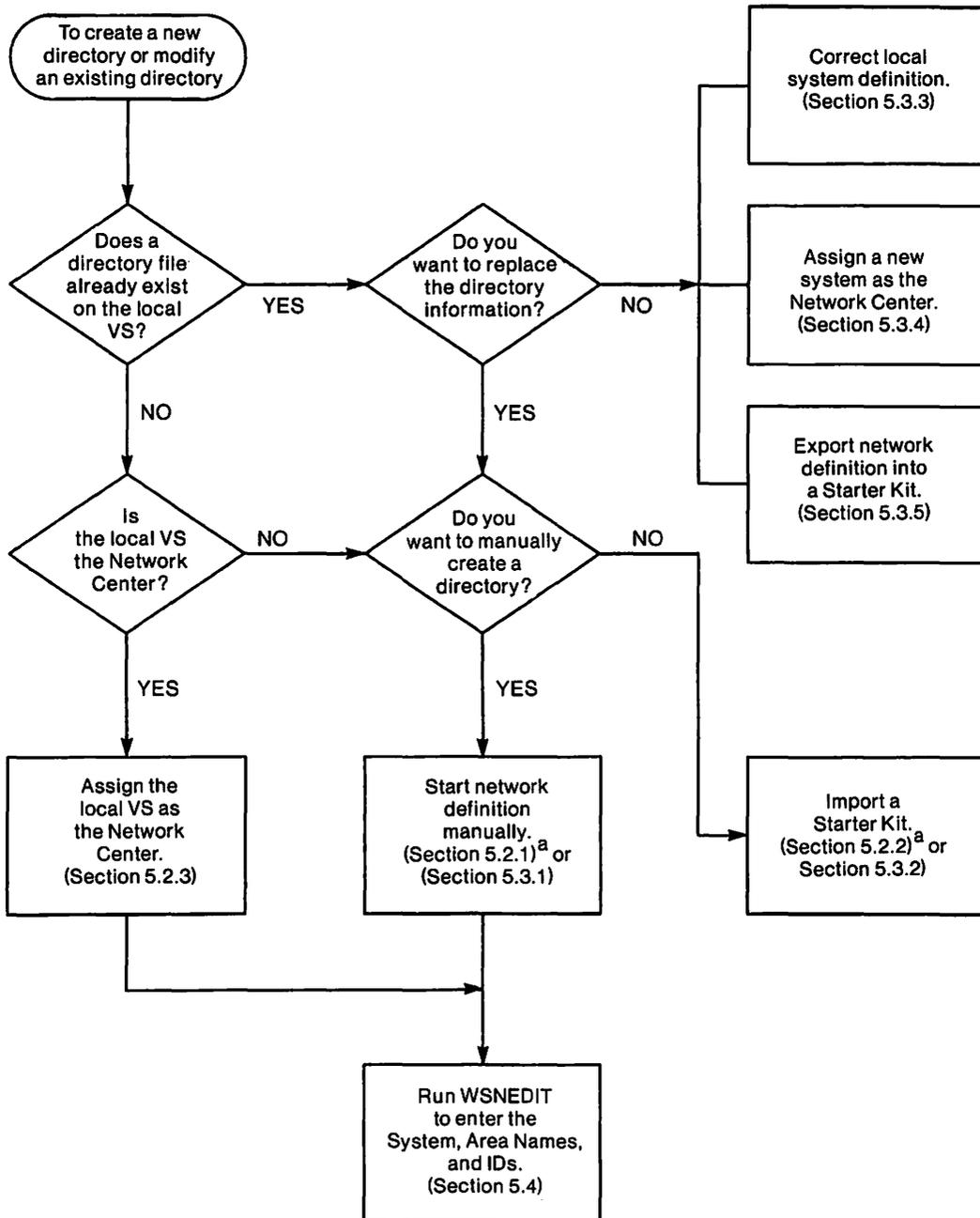
You create a directory through the WSNDIRM utility, which is accessed through CNFGAID or automatically called when you run the INSTALL program if the directory has not been defined. The WSNDIRM utility enables you to

- Create a directory either manually or by importing the network definition using a starter kit. When you create a directory, you define the file in which the names, network addresses, and other parameters pertaining to systems in the network reside.
- Assign the Network Center. During directory creation, you designate the system that serves as the Network Center. For directory synchronization, the Network Center has primary responsibility for updating directories on all the systems throughout the network.

- Perform maintenance functions for existing directories. Both existing and new directories can be modified to reflect changes to the network.
- Export a network definition into a starter kit. After a directory is created on the local system, you can export the network definitions it contains into a starter kit for use by other systems in the network.

Once the file in which the directory is to reside is defined, you run the WSNEDIT utility. WSNEDIT enables you to enter area and system names and IDs and other parameters in the directory. If you have imported all of the network definitions through a starter kit, then you do not need to run WSNEDIT for this purpose. (However, you can use WSNEDIT to add or change any of the parameters for remote systems.) If you attempt to run WSNEDIT and the file has not been defined, the procedure WSNDIRM, which allows you to define the file, is automatically called. You can then define the file. WSNDIRM is also automatically called if you attempt to run WSNEDIT, and errors exist in the directory. (Refer to Appendix A for a description of these error messages.)

Figure 5-1 summarizes the procedures that are described in this chapter for creating or modifying the WSN directory.



^aFor systems with no current directory.

Figure 5-1. Directory Creation and Maintenance Overview

5.2 CREATING DIRECTORIES

Since the WSNEDIT program automatically calls WSNDIRM if no directory has been defined, you need not run CNFGAID to access WSNDIRM unless you create or update a directory from a starter kit or you want to recreate a directory. Starter kits are discussed later in this section.

Press PF3 (WSNDIRM) from the CNFGAID menu to create a directory. The Directory Maintenance menu appears (see Figure 5-2).

```
13:52:02  ** WANG Systems Networking Directory Maintenance ** 06/02/88
          Copyright, Wang Laboratories, Inc. 1986
          Version 02.02.03

          Please select one function from the list below

          Create a new directory and:
          (6) Start network definition manually
          (7) Import network definition from a starter kit
          (8) Assign local system as the network center

          (16)Exit                                     (32)Menu
```

Figure 5-2. Directory Maintenance Menu

From the Directory Maintenance menu, you can choose manual directory creation (using either PF6 or PF8 depending on whether the local system is the Network Center or not) or directory creation from a starter kit (PF7).

Note: The Directory Maintenance menu only appears when an existing directory is not found. When an existing directory is found, the Modified Directory Maintenance menu appears (see Figure 5-6), which gives additional functions that can be used to replace or modify the existing directory as necessary.

The functions that you can perform from the Directory Maintenance menu are described in Sections 5.2.1 through 5.2.3.

Note: The following procedures refer to directory creation and maintenance on the local VS. If you are creating a directory to export to another system, and wish to take that system's configuration into account, you may do so. For example, if the system you are creating a directory on is the Network Center, and you want to export a starter kit to another system (e.g., an end point), you can enter the appropriate definitions for the end point in this directory and send it to that system.

5.2.1 Manual Directory Creation

To create a directory manually, you must enter all of the information required for directory creation. After you create a directory manually and define the Network Center, you run WSNEDIT to enter area and system names and IDs, as well as other parameters that CNS systems require.

Note: If the local system is the Network Center, it is simpler to use the procedure described in Section 5.2.3 to create the directory manually.

To create a directory manually

1. Press PF6 from the Directory Maintenance menu. The Start Network Definition screen appears (see Figure 5-3).

09:11:12

**** Start Network Definition ****
Copyright, Wang Laboratories, Inc. 1986

08/16/88

Please ENTER the definition of the local system

System NETVS (SID 2)
in Area AREATWO (AID 2)

plus the definition of the network center

Network RDALPHANETWORK
System ATLAS (SID 1)
in Area AREASEVEN (AID 7)

which will be defined in the Directory named below

File @DIRECT@ in Library @SYSTEM@ on Volume SYSTEM
Initial Record Allocation 100

(16)Exit

(32)Menu

Figure 5-3. Start Network Definition Screen

2. Enter the appropriate information on the Start Network Definition screen. The fields on the screen are divided into three sections:

Local System Definition Section -- Complete this section to define the system ID of the local system, and the name and area ID of the area in which the system resides. The local system is the system on which you are running the WSNDIRM utility. You should have already decided on system names and IDs as well as area names and IDs when you planned your network level configuration -- or the network administrator has given you this information. The information entered in the fields in the local system definition section must be *unique to each local system* in the network.

All directories in the network must contain the same information for the systems to communicate properly. The information entered for the local system must correspond to the information entered in these fields on all the other systems in the network. The fields in the local system definition section are

System -- The name defaults to the System WangNet ID that was entered in the GENEDIT configuration file at the time of the last IPL. This field cannot be modified.

Area -- Enter the name of the area in which the local system resides. The name can be from 1 to 16 alphanumeric characters long.

SID -- Enter the system ID for the local system. The system ID can be any valid 5-decimal number from 1 to 9999.

AID - Enter the area ID for the local system. The area ID can be any decimal number from 1 to 9999.

Network Center Definition Section -- Complete this section to identify the Network Center to the local system. For directory synchronization, the Network Center has primary responsibility for updating the directories on all the systems in the network. The fields in the Network Center Definition section include

Network -- Enter the name of the network. The name can be from 1 to 16 alphanumeric characters long.

System - Enter the name of the system that will serve as the Network Center. The name should correspond to the System WangNet ID that was entered in GENEDIT file for that system at the time of the last IPL.

Area -- Enter the name of the area in which the Network Center resides. The name can be from 1 to 16 alphanumeric characters long.

SID -- Enter the system ID for the Network Center. The system ID can be any valid 5-decimal number from 1 to 9999.

AID -- Enter the area ID for the Network Center. The area ID can be any decimal number from 1 to 9999.

Directory File Definition Section -- Complete this section to define the file in which the directory will be stored as well as the number of records allocated to the file. The fields in the Directory File Definition section include

File -- Specify the name of the file in which the directory will reside. Use the default name @DIRECT@ or specify another valid file name.

Library -- Specify the library in which the directory file will reside. The file defaults to the @SYSDIR@ library. You may enter the default setting or specify another existing library.

Volume -- Specify the volume on which the library described above will reside. The Volume field defaults to the system volume. Enter the system volume or another mounted volume.

Initial Record Allocation -- Specify the initial number of records allocated to the file. The default setting 100 should be sufficient if the local system is not part of a Wang OFFICE network. If the local system is part of a Wang OFFICE network, you may use a rough estimate of one additional record per Wang OFFICE user in the network. For example, you would specify a value of 150 if there were 50 Wang OFFICE users in the network. For more information on Wang OFFICE administration, refer to the *VS Office Administrator's Guide*.

If you want to exit the Start Network Definition screen *without creating a directory*, press one of the following keys:

PF16 -- Returns you to the Directory Maintenance menu.

PF32 -- Returns you to the CNFGAID menu if you accessed WSNDIRM through CNFGAID. Otherwise, this key returns you to the Command Processor screen if you accessed WSNDIRM through the Run Program or Procedure function, or to WSNEDIT if WSNEDIT called WSNDIRM.

3. To complete your directory creation, press ENTER after you have specified the appropriate information on the Start Network Definition screen. The Directory Maintenance menu appears, enabling you to access other directory maintenance functions (see Figure 5-1 for an overview of these functions).

5.2.2 Import Network Definition From a Starter Kit

You can import a directory from a starter kit. In cases where you have a large network to configure (e.g., 40 or 50 systems), this is a much simpler alternative to manually creating your directory and reduces the possibility of mistakes when assigning area and system IDs, which must be the same in each directory.

The starter kit is a collection of network records extracted from another directory. These records are stored in a file that can be transferred to other systems in the network via diskette, WSN File Transfer Service, or other supported file distribution means. (For instructions on how to create a starter kit, refer to Section 5.3.5.) CNFGAID allows these systems to access a starter kit when it is resident on the particular system, or when it is stored on a diskette if that diskette has been identified to the system as a mounted volume. If you create a directory from a starter kit, you do not have to run WSNEDIT to enter area and system names and IDs. You still must run WSNEDIT to configure transports, routes, and services.

Note: The local system (that is, the system to which the starter kit is transferred) must be defined in the starter kit before it is transferred. If it is not defined prior to transfer, the message "Local System not Defined" appears when you attempt to create a directory from it at the local system.

To create a directory with a starter kit

1. Press PF7 from the Directory Maintenance menu. The Starter Kit Definition screen appears (see Figure 5-4).

```
09:11:37          ** Import Network Definition **          09/16/87
                  Copyright, Wang Laboratories, Inc. 1986

                  Please ENTER the definition of the Starter Kit

                  File STARTKIT in Library @SYSCOM@ on Volume ROY■■■■
                  which will replace or be added to the network records
                  in the directory named below

                  File @DIRECT@ in Library @SYSTEM@ on Volume SYSTEM

(16)Exit          (32)Menu
```

Figure 5-4. Starter Kit Definition Screen

2. Specify the location of the starter kit as follows:

File -- Enter the name of the starter kit file. This field defaults to STARTKIT. If the name is not STARTKIT, type in the correct name.

Library -- Enter the library in which the starter kit was filed. The library defaults to the library in which the network software is installed. If the library in which the starter kit was filed is not the library in which the network software is installed, enter the name of the library in which the starter kit was filed.

Volume -- Enter the volume on which the starter kit was filed. The volume defaults to the volume on which the network software was installed.

3. Specify the location for the directory file as follows:

File -- Enter the name of the directory file. The name defaults to @DIRECT@. You may enter the default setting or type in another valid file name if no directory file exists.

Library -- Enter the name of the library in which the directory file resides. The Library field defaults to the system library.

Volume -- Enter the name of the volume on which the library described above resides. The Volume field defaults to the system volume.

4. Press ENTER after you have specified the appropriate information on the Starter Kit screen. This action is refused if the local system has not been defined in the starter kit. If the action is refused, an error message is displayed indicating that the local system has not been defined.

5.2.3 Assigning the Local System as the Network Center

When you manually create a directory at the Network Center, you need only define the local system as the Network Center and define the name of the directory file. For directory synchronization, the Network Center has primary responsibility for updating the directories on all the systems in the network.

To manually create a directory at the Network Center

1. Press PF8 from the Directory Maintenance menu. The Network Center Assignment screen appears (see Figure 5-5).

09:35:52 ** Assign Local System as the Network Center ** 06/16/88
 Copyright, Wang Laboratories, Inc. 1986

Please ENTER the definition of the network center

```
Network  RDALPHANETWORK■■■  
System   NETVS                (SID 2■■■ )  
in Area  AREATWO■■■■■■■■■■ (AID 2■■■ )
```

which will be defined in the Directory named below

```
File @DIRECT@ in Library @SYSTEM@ on Volume SYSTEM  
Initial Record Allocation 100■■■■
```

(16)Exit

(32)Menu

Figure 5-5. Network Center Assignment Screen

2. Define the local system as the Network Center as follows:

Network -- Enter the name of the network. The name can be from 1 to 16 alphanumeric characters long.

System -- View the name of the local system. This name corresponds to the System WangNet ID that was entered in the GENEDIT file for the local system at the time of the last IPL. This field cannot be modified.

Area -- Enter the name of the area in which the local system resides. The name can be from 1 to 16 alphanumeric characters long.

SID -- Enter the system ID for the local system. The system ID can be any valid 5-decimal number from 1 to 9999.

AID -- Enter the area ID for the local system. The area ID can be any decimal number from 1 to 9999.

Note: Other system and network administrators who are responsible for systems in the network should be consulted before designating system and area IDs. This information should be recorded in the network planning form provided in Appendix B.

3. Specify the location of the directory file as follows:

File -- Enter the name of the file in which the directory will reside. Use the default name @DIRECT@ or specify another valid file name.

Library -- Enter the library in which the directory file will reside. The file defaults to the system library. You may enter the default setting or specify another existing library.

Volume -- Enter the volume on which the library described above will reside. The Volume field defaults to the system volume. Enter the system volume or another mounted volume.

Initial Record Allocation -- Enter the initial number of records allocated to the file. The default setting 100 should be sufficient if the local system is not part of a Wang OFFICE network. If the local system is part of a Wang OFFICE network, you may use a rough estimate of one additional record per Wang OFFICE user in the network. For example, you would specify a value of 150 if there are 50 Wang OFFICE users in the network. For more information on Wang OFFICE administration, refer to the *VS Office Administrator's Guide*.

4. Press ENTER when you have completed the Network Center Designation screen. The Directory Maintenance menu appears, enabling you to access other directory maintenance functions.

5.3 MAINTENANCE FUNCTIONS FOR EXISTING DIRECTORIES

If a directory exists on a system, the Directory Maintenance menu is modified to display several functions in addition to the directory creation functions previously described. The modified Directory Maintenance menu appears whenever you access WSNDIRM and a directory already exists, or if you attempt to run WSNEDIT and directory errors exist (e.g., incorrect system name or Administrative system name). (Refer to Appendix A for a description of directory error messages.) The Modified Directory Maintenance menu is illustrated in Figure 5-6.

09:10:12 ** WANG Systems Networking Directory Maintenance ** 06/16/88
 Copyright, Wang Laboratories, Inc. 1986
 Version 02.02.03

Please select one function from the list below

Use the existing directory and:

- (1) Start network definition manually
- (2) Import network definition from a starter kit
- (3) Correct local system definition
- (4) Assign a new system as the network center
- (5) Export network definition into a starter kit

Create a new directory and:

- (6) Start network definition manually
- (7) Import network definition from a starter kit
- (8) Assign local system as the network center

(16)Exit

(32)Menu

Figure 5-6. Modified Directory Maintenance Menu

The additional functions displayed on the Modified Directory Maintenance menu and the PF keys you press to access them are as follows:

PF1, PF2, and PF4 perform the same functions as PF6, PF7, and PF8, but with some exceptions. PF1, PF2, and PF4 delete and replace network information without disturbing Wang OFFICE information in the directory. PF3 shows the definition of the local system. PF5 enables you to export a directory into a starter kit.

The screens accessed through PF6, PF7, and PF8 are similar to those described in Section 5.2. The default settings on these screens display the file name, record allocation, area and system information found in the existing directory. You must change the file name, library, or volume if you are creating a new directory. You cannot replace the existing directory file because the necessary Wang OFFICE information in the existing directory will be lost.

The additional functions listed on the Modified Directory Maintenance menu are explained in Sections 5.3.1 through 5.3.5.

5.3.1 Start Network Definition Manually

From the Modified Directory Maintenance menu you can manually create a new directory when there is an existing directory by using the "(1) Start network definition manually" function. This function displays a modified Start Network Definition screen. When you use this function, the old or existing network information in the directory is deleted. The local system area and system IDs cannot be changed through this function. Wang OFFICE information depends on these IDs. Except for these differences, you enter the information in the remaining fields for this screen as described in Section 5.2.1.

5.3.2 Import Network Definition From a Starter Kit

From the Modified Directory Maintenance menu you can replace network information in an existing directory with network information from a starter kit by using the "(2) Import Network Definition from a Starter kit" function. You will not be able to complete this operation if the area and system names and IDs of the local system entered in the starter kit do not correspond to the area and system names and IDs of the local system entered in the existing directory.

The differences between this function and the one called by PF7 are the requirement for an existing directory and the addition of a merge facility. These changes are reflected by the Starter Kit menu (see Figure 5-6), which appears after you complete the Starter Kit Definition screen (see Figure 5-4). The Starter Kit menu allows for the contents of the starter kit to

- Replace the entire network definition in the directory with the network definition contained in the starter kit
- Add only new network definitions from the starter kit into an existing directory
- Add new network definitions and replace duplicate network definitions in an existing directory

To import a starter kit when an existing directory exists

1. Press PF2 from the Modified Directory Maintenance menu. The Starter Kit Definition screen appears (see Figure 5-4). Press ENTER after you have specified the appropriate information on the Starter Kit screen (refer to Section 5.2.2). The Starter Kit menu appears (see Figure 5-7). This action is refused if the local system has not been defined in the starter kit. If the action is refused, an error message is displayed indicating that the local system has not been defined.

09:11:47

**** Import Network Definition ****
Copyright, Wang Laboratories, Inc. 1986

05/16/88

File STARTKIT in Library @SYSCOM@ on Volume ROY■■■
which will replace or be added to the network records
in the directory named below

File @DIRECT@ in Library @SYSTEM@ on Volume SYSTEM

Please position cursor at the appropriate tabstop and
press ENTER to make your selection

- Replace all network records with starter kit
- OR
- Merge starter kit with network records:
- Retain directory record if duplicate found
- Replace directory record if duplicate found

(16)Exit

(32)Menu

Figure 5-7. Starter Kit Menu

2. The starter kit menu provides a choice of three functions. Choose one of the functions associated with steps 5a, b, or c.

Note: Before you select a function from the Starter Kit menu, you should read the following section called "Special Considerations."

- a. To replace an entire existing directory with the starter kit, select the first option: "Replace all network records with starter kit," and press ENTER.
- b. To merge the starter kit with an existing directory and retain original records in the existing directory that are duplicated in the starter kit, select the second option: "Retain directory record if duplicate found," and press ENTER.
- c. To merge the starter kit with an existing directory and replace original records in the existing directory that are duplicated in the starter kit with those in the starter kit, select the third option: "Replace directory record if duplicate found," and press ENTER.

Special Considerations

Following are a list of special considerations for using the import starter kit function to merge an existing directory with a starter kit:

- Duplicate network definitions are system or area records in the existing directory and the starter kit that share all of the same characteristics, including
 - System name
 - Area name
 - System ID
 - Area ID
- Conflicting records is another situation that can occur during a merge operation. Conflicting records are not merged into the directory. A conflicting record occurs under the following conditions:
 - The area or system name from the record in the existing directory matches the area or system name from a record in the starter kit, and the area or system IDs associated with these area or system names do not match.
 - The area or system IDs from the record in the existing directory matches the area or system IDs from a record in the starter kit, and the area or system names associated with these area or system IDs do not match.

Note: The merge facility is not intended to modify area or system names and IDs. These modifications can be performed on the local system by using the GENEDIT "Examine/Modify System Options" function, described in Chapter 4. If the modifications are for a remote system, you can run WSNEDIT and resolve the conflicts by deleting the appropriate area or system names and IDs. After you resolve the conflicting records, you can run WSNDIRM again and repeat the merge operation.

When one or more conflicting records are detected during a merge operation, a "Conflict" screen appears that enables you to select one of the following options:

- Cancel the merge operation entirely.
- Merge only the nonconflicting records.

The Conflict screen also provides a function that allows you to view (and print) the conflicting records. After viewing these records, you can decide which records you want to resolve and of these, what form of correction is required.

- If you intentionally resolve only a portion of the conflicting records, you can later go back into WSNDIRM and perform the merge operation by selecting "Merge nonconflicting records only" from the Conflict screen. This will merge new records and the records that were resolved, and omit the records that were intentionally not resolved. This process can be repeated as often as necessary.

5.3.3 Correct Local System Definition

The Correct Local System Definition function displays the local system definition in the context of the WSN directory. You can use this function primarily to view directory errors. Any corrections that are necessary must be performed by exiting this function and using the appropriate means (such as GENEDIT to correct the system name or WangNet ID). (The only exception is the area name for the local system. If a directory error occurs, the field for specifying the area name on the Correct Local System Definition screen is modifiable.) After you make any necessary corrections (and re-IPL), you can access the Correct Local System Definition function to ensure the corrections are accepted. If you access this function when no directory errors exist, all fields showing the local system data are protected.

The consistency and accuracy of information entered in the directory by Wang OFFICE can be adversely affected if bad data is entered in the directory or the system generation (that is, GENEDIT) file during or after directory initialization. Errors in the information stored in the network directory generally occur under the following conditions:

- Standalone Wang OFFICE is being converted to networked Wang OFFICE. The area and system IDs in the directory do not match what was expected by the individual who created the starter kit.
- The system name for the local system in the directory does not correspond to the System WangNet ID entered in the system generation (GENEDIT) file.

To use the Correct Local System Definition function

1. Press PF3 from the Modified Directory Maintenance menu. The Correct Local System Definition screen appears (see Figure 5-8).

09:11:51

** Correct Local System Definition **
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06/16/88

The local system information is correctly defined
The System Configuration defines the local system as:

System NETVS
in Area AREATWO

The directory header defines the local system as:

System NETVS (SID 2)
in Area AREATWO (AID 2)

The Network Configuration defines the local system as:

System NETVS (SID 2)
in Area AREATWO (AID 2)

The current directory is:

File @DIRECT@ in Library @SYSTEM@ on Volume SYSTEM

(16)Exit

(32)Menu

Figure 5-8. Correct Local System Definition Screen

Figure 5-8 shows an example of a Correct Local System Definition screen with no errors (i.e., all of the information in the three sections matches). If there are no errors, you can only view this screen.

2. Examine the information that is displayed in the fields on the screen to determine if any errors exist. The fields on the Correct Local System Definition screen are divided into the following four sections:

Correct Definition Section -- Allows you to correct errors in the directory if they exist. The fields for this section appear immediately below the phrase "The System Configuration defines the local system as:". The fields in this section are

System -- This field displays the system name for the local system. It cannot be modified. It corresponds to the System WangNet ID defined in the system generation (GENEDIT) file at the time of the last IPL. If this name is not correct, you must run GENEDIT to change the System WangNet ID so that it matches the name in the System field.

Area -- This is the only field on the screen that can be modified when a directory error is detected. Enter the correct area name for the area in which the system resides in this field. The name can be from 1 to 16 alphanumeric characters long.

SID -- The system ID in this field is dictated by the directory. Wang OFFICE information depends on this system ID. If the information in this field is incorrect, you must use one of the PF6, PF7, or PF8 keys on the Modified Directory Maintenance menu to create a new directory.

AID -- The area ID in this field is dictated by the directory header. Wang OFFICE information depends on this area ID. If the information in this field is incorrect, you must use PF keys 6, 7, or 8 on the Modified Directory Maintenance menu to create a new directory.

Directory Header Section -- Displays the directory information that was entered when the directory was created. The fields in this section represent the CNS view of the local system. The fields in this section are mapped to network information entered manually through WSNDIRM, through WSNEDIT, or through a starter kit. When you view the fields in this section, compare them with the fields in the Network Configuration section and note any discrepancies that exist. The fields in the Directory Header section include

System -- Displays the name of the system that was entered when the directory was created on the local system. The name could have been entered manually through WSNDIRM, through WSNEDIT, or through a starter kit.

Area -- Displays the name of the area that was entered when the directory was created on the local system. The name could have been entered manually through WSNDIRM, through WSNEDIT, or through a starter kit.

SID -- Displays the system ID entered when the directory was created on the local system that maps to the system name described above.

AID -- Displays the area ID entered when the directory was created on the local system that maps to the area name described above.

Network Configuration Section -- Displays directory information related to the System WangNet ID entered in the system generation (GENEDIT) file at the time of the last IPL. This section maps the System WangNet ID to network information entered manually through WSNDIRM, through WSNEDIT, or through a starter kit. When you view the fields in this section, compare them with the fields in the Directory Header section and note any discrepancies that exist. The fields in the Network Configuration section are

System -- Displays the System WangNet ID entered in the system generation file.

Area -- Displays the name of the area that was entered when area and system information was entered in the directory.

SID -- Displays the system ID that maps to the System WangNet ID.

AID -- Displays the area ID that was entered when area and system information was entered in the directory.

Directory File Definition Section -- Displays the file in which the directory is stored. The fields in the Directory File Definition section are

File -- Displays the name of the file in which the directory is stored.

Library -- Displays the library in which the directory file resides.

Volume -- Displays the volume on which the library described above resides.

3. Press ENTER to complete the local system definition initialization procedure or PF16/PF32 to exit. If you press ENTER, the directory records that are in error will be deleted from the file. To correct these records in the directory, you must perform the appropriate action (for example, change the system name or WangNet ID in GENEDIT or create a new directory) and re-IPL the system in order for changes to take effect. If you accessed the function through the Modified Directory Maintenance menu, the Modified Directory Maintenance menu appears after you press ENTER. If the Correct Local System Definition screen appeared after you attempted to run WSNEDIT, the WSNEDIT main menu appears after you press ENTER.

5.3.4 Assign a New System as the Network Center

From the Modified Directory Maintenance menu you can specify a new system as the Network Center by using the "(4) Assign a new system as the network center" function. When you specify a new Network Center, the existing Network Center definition is deleted. The screen and fields for this function are the same as for the "(8) Assign Local System as the network center" function. (Refer to Section 5.2.3 for a description.)

5.3.5 Export Network Definition Into a Starter Kit

From the Modified Directory Maintenance menu you can create a starter kit from the network records in your directory. This starter kit can then be sent to other systems in the network. The fields in which you must enter information are the same as the ones you use to import a directory from a starter kit. The only difference is that the text on the screen in Figure 5-4 indicates that a directory will be created from a starter kit. The text on the screen accessed through PF5 indicates that a starter kit will be created from a directory.

You only specify the file, library, and volume in which the network records are to be stored. When you press ENTER, the records are written from the directory on your system into the specified file. This file can then be transferred to other systems via diskette, the WSN File Transfer Service, or some other supported means of distribution.

Note: The system to which you export a starter kit must be defined in the directory of the system at which the starter kit is created prior to creation.

5.4 ENTERING DIRECTORY INFORMATION THROUGH WSNEDIT

After you have defined the location of the directory, you are ready to run WSNEDIT to enter directory information. Directory information includes area and system names and IDs, as well as other parameters CNS systems require to communicate.

Note: Before you can access WSNEDIT to define directory information you must define the location of the "active" directory (that is, the location of the directory that corresponds to the location in DIRPTR.) To check the location of the directory, you can run the DIRPTR program from the Command Processor screen. DIRPTR also allows you to change the location of the directory -- to switch from one directory to another -- if more than one directory is installed on your system.

You can run WSNEDIT via the Run Program or Procedure function from the Command Processor screen, or by pressing PF2 from the CNFGAID menu. The WSNEDIT main menu is the first screen that appears when you run WSNEDIT. The WSNEDIT main menu is shown in Figure 5-9.

Note: The system for which the local-view WSNEDIT configuration is being defined is called the "target" system. The target system is the local VS that you are configuring, unless you are exporting the WSNEDIT configuration file to another VS system, hence the name target. When you first access WSNEDIT, a screen appears that enables you to specify the target system.

```
14:05:04  ** WANG Systems Networking Configuration Editor  **   06/18/88
          Copyright, Wang Laboratories, Inc. 1987
          Version 08.10.20
```

Please select a configuration function from the list below

- (2) Manage Areas - Network View
- (3) Manage Systems - Network View

- (5) Manage Transports - System View
- (6) Manage Routing - System View
- (7) Manage Services - System View

- (16) Exit

Figure 5-9. WSNEDIT Main Menu

The WSNEDIT main menu enables you to access network and system level configuration functions. Network level functions allow you to enter area and system information in the directory. System level functions allow you to define the local-view network configuration. The local-view network configuration includes transport, route, and service definitions, which are described in Chapters 6, 7, and 8.

5.4.1 Managing Areas

To manage areas in the network

1. Press PF2 from the WSNEDIT main menu. The Area List menu appears (see Figure 5-10).

14:05:45

** Display Areas in Network **
Copyright, Wang Laboratories, Inc. 1987

06/18/88

The Network is configured with 26 Areas

Please position the cursor at the appropriate tabstop
and press ENTER to manage Systems in an Area

| <u>Area</u> | <u>AID</u> | <u>Admin System</u> | <u>Primary Dist Pt</u> | <u>System Count</u> |
|-------------------|------------|---------------------|------------------------|---------------------|
| ■ 1AREATEST | 1111 | TESP2 | | 29 |
| ■ 42X114 | 4321 | | | 6 |
| ■ 8023AREA | 4444 | | | 6 |
| ■ ALFREDLAST | 9999 | | | 2 |
| ■ AREA08AUSTRALIA | 8 | SP085 | SP085 | 9 |
| ■ AREA27EUROPE | 27 | SSGVS100 | SSGVS100 | 14 |
| ■ AREA41TELENOVA | 41 | NOVA | NOVA | 12 |
| ■ AREA69EUROPE | 69 | ITRC | ITRC | 1 |
| ■ AREA70AUSTRALIA | 70 | ATSYDNEY | ATSYDNEY | 1 |
| ■ AREAFIFTEEN | 15 | | | 1 |

(3)Last (5)Next (6)Find (8)Display (11)Create (16)Exit
(9)Modify (12)Delete (32)Menu

Figure 5-10. The Area List Menu

The Area List menu displays all of the areas that have been defined in the network. It also lists the area ID (AID), the Administrative system, the Primary Distribution Point, and the number of systems (System Count) in each area. These parameters are entered when the area is defined (except for system count).

If the list of areas consists of more than one screen, use the PF keys PF2 (First), PF3 (Last), PF4 (Prev), or PF5 (Next) to scroll through the list of areas, or use PF6 (Find) to search for a specific area. All or a combination of these keys may appear at the bottom of the screen, depending on the number of screens that the list requires and the specific screen you are viewing at the time.

2. The Area List menu enables you to view, modify, delete, or define area definitions.
 - a. To view or modify an existing area definition, select the area from the Area List menu. Press PF8 to view the area definition. Press PF9 to modify the area definition.
 - b. Press PF12 to delete an existing area definition (and its parameters) from the network directory. If the area contains any systems, a message appears asking you to delete all systems from the area, first. (For instructions on how to do this, refer to Section 5.4.2.)

c. Press PF11 to define a new area in the network. The Area Definition screen appears (see Figure 5-11).

```
14:08:09          ** Create Area in Network **          06/18/88
                  Copyright, Wang Laboratories, Inc. 1987
                  Please ENTER the definition of the new Area

                  Area Name ████████████████████
                  Area ID  ████████

                  Admin System Name ██████████
                  Primary Distribution Point ██████████

                  (16)Exit                               (32)Menu
```

Figure 5-11. Area Definition Screen

The Area Definition screen allows you to specify the information required to define a new area in the network directory. Until you have defined systems in the area, you can specify information only in the following fields:

Area Name -- Type in a valid area name. The name can be from 1 to 16 alphanumeric characters long. Each area name must be unique throughout the network.

Area ID -- Type in a valid area ID. The ID can be a decimal number from 1 to 9999. Each area ID must be unique throughout the network.

You can not enter information in the remaining fields that appear on this screen until you have defined all the systems in the area (the procedure for defining systems is described in Section 5.4.2).

The following fields require system names and IDs that are entered in the directory when systems are defined:

Admin System Name -- Type in the name of the Administrative system for the area. The name can be from one to eight alphanumeric characters long. The name should correspond to the system name entered in the directory when the system was defined.

Note: The Administrative system is also called the ACC for Distributed Management Facility (DMF) functions.

Primary Distribution Point -- Enter information in this field only if you are using an application or service that uses PDS Store and Forward routing capabilities (such as, Wang OFFICE or Software Manager). Type in the name of the system that will serve as the store and forward distribution point. The name of the system should correspond to the system name that was entered in the directory when the system was defined. The name can be from one to eight alphanumeric characters.

3. After you have completed steps 2a, b, or c, press ENTER. Any changes or new definitions that you made are displayed. Press PF16 to return to the Area System List menu from which you can proceed to define systems in the area. Or, press PF32 to return to the WSNEDIT main menu.

5.4.2 Managing Systems

To manage systems in a network

1. Press PF2 from the WSNEDIT main menu (see Figure 5-9). The Area List menu appears (see Figure 5-10).
2. The Area List menu enables you to access system definition functions (that is, Create, View, or Modify modes). To access system definition functions, position the cursor next to the appropriate area and press ENTER. The Area System List menu appears (see Figure 5-12).

14:09:11

** Display Systems in Area **
Copyright, Wang Laboratories, Inc. 1987

06/18/88

Area AREANINENONCNS is configured with 9 Systems

| <u>System</u> | <u>SID</u> | <u>Type</u> | <u>Model</u> |
|---------------|------------|-------------|--------------|
| ■ EEYORE | 2 | OIS | 140 |
| ■ JMTAB | 4 | OIS | 140 |
| ■ NETMGMT | 6 | OIS | 140 |
| ■ OISNM | 1 | OIS | 140 |
| ■ OS2 | 5 | OIS | 140 |
| ■ PROBE | 100 | VS | |
| ■ SYS | 11 | OIS | 140 |
| ■ TIGGER | 7 | OIS | 140 |
| ■ TRON | 3 | OIS | 140 |

(8)Display (11)Create
(9)Modify (12)Delete

(16)Exit
(32)Menu

Figure 5-12. Area System List Menu

3. The Area System List menu enables you to create, view, or modify system definitions.
 - a. To create system definitions for a newly created area, press PF11 from the Area System List menu.
 - b. To view existing system definitions, press PF8.
 - c. To modify existing system definitions, press PF9.
 - d. To delete existing system definitions, press PF12. The system is deleted after pressing ENTER.

Note: If any services (e.g., File Transfer, Store and Forward Windows, or VSTE logon) have been defined for a system that you wish to delete from the Area System list, you must delete that system from all services before you can delete it from the Area System list. (Refer to Chapter 8 for instructions.)

4. When you have completed step 3a, b, or c, the System Definition screen appears (see Figure 5-13). The screen appears in either Display, Modify, or Create mode depending on which PF key (8, 9, or 11) that you pressed from the Area System List menu.

14:09:40

** Create System in Area **
Copyright, Wang Laboratories, Inc. 1987

06/18/88

Please ENTER the definition of the new System in Area AREANINENONCNS

```
System Name ██████████
System ID   ██████

System Type VS██████
and Model  ██████████

Has WSN with CNS been installed YES

Shall File Transfer use CNS YES
Has Store & Forward been installed NO
```

(16)Exit

(32)Menu

Figure 5-13. System Definition Screen

The System Definition screen enables you to specify the information required to define a new system in an area or modify an existing system definition. (The screen in Figure 5-13 is in Create mode.) You must define the local system as well as each remote system in the network. Specify the information in the following fields:

System Name -- Enter a valid system name. For VS systems, the name you type in this field should match the System WangNet ID that was entered in that system's system generation (that is, GENEDIT) file at the time of that system's last IPL. For a Wang PC/APC, PC 200/300 Series, LapTop Computer, IBM PC AT/XT or compatible system, or Wang Remote Office Connection (WROC), enter the system name defined when the PC was configured for network communications. For an OIS or an Alliance system, enter the name the MIS or Alliance system administrator assigned when that particular system was configured. For a 2200 system, enter the name that was assigned when the 2200 system administrator defined local system options.

The system name can contain from one to eight alphanumeric characters. The name must be unique within the network.

System ID -- Enter a valid system ID. Valid IDs must be unique and range from 1 to 9999.

System Type -- Enter the system type for the system that you are defining. Valid types are VS (for VS systems), OIS (for Office Information Systems), ALLIANCE (for Alliance systems), 2200 (for 2200 systems), PC (for Wang PC/APC, PC 200/300 Series, LapTop Computer, IBM PC AT/XT and compatible PC systems, and WROC), and IDS (for IBM or plug-compatible mainframes equipped with IDS).

System Model -- Enter the model number (or name) for the system that you are defining. For example, enter 140 for an OIS 140, 7110 for a VS 7110, or AT for an IBM PC AT.

Has WSN with CNS been installed? -- Enter YES in this field if CNS is installed on the system. Enter NO if CNS is not installed on the system. Only VS, IDS, Wang PC 200/300 Series, IBM PC AT/XT and compatible PC systems, and Wang PC/APC systems can have CNS installed.

Shall File Transfer use CNS? -- Enter YES in this field if CNS is installed on the system and you want the WSN File Transfer service to use the capabilities of CNS. Enter NO in this field if CNS is not installed on the system or the WSN File Transfer service is for non-CNS use only. Enter YES if the system is an IDS system.

Has Store and Forward been installed? -- Enter YES if Store and Forward is installed on the system. Enter NO if Store and Forward is not installed on the system.

5. After you have viewed or specified the appropriate information in the fields on the System Definition screen, press ENTER to save any changes or new definitions. The information that you entered is displayed. Press PF16 to return to the Area System List menu from which you can define more systems. After you define all of the systems for an area, you can define the Administrative system, and the Primary Distribution Point for the area. (Refer to Section 5.4.1 for instructions.)

5.4.3 DISPLAYING SYSTEMS IN THE NETWORK

To display all of the systems that are defined in the directory

1. Press PF3 from the WSNEDIT main menu. The Network Systems menu appears (see Figure 5-14).

14:10:38

** Display Systems in Network **
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06/18/88

The Network is configured with 89 Systems

| <u>AID</u> | <u>SID</u> | <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> |
|------------|------------|---------------|-------------|--------------|----------------|
| 1111 | 1112 | 1111 | VS | 7150 | 1AREATEST |
| 1111 | 1113 | 1113 | VS | 7110 | 1AREATEST |
| 4444 | 1 | 114A | PC | 280 | 8023AREA |
| 1111 | 4444 | 12200 | 2200 | | 1AREATEST |
| 1111 | 3333 | 1ALLIANC | ALLIANCE | | 1AREATEST |
| 1111 | 2221 | 1FTM | VS | 85 | 1AREATEST |
| 1111 | 8888 | 1IDS | IDS | | 1AREATEST |
| 1111 | 2223 | 1NOFTM | VS | 90 | 1AREATEST |
| 1111 | 1 | 1OIS | OIS | 140 | 1AREATEST |
| 1111 | 2222 | 1VS | VS | 6 | 1AREATEST |

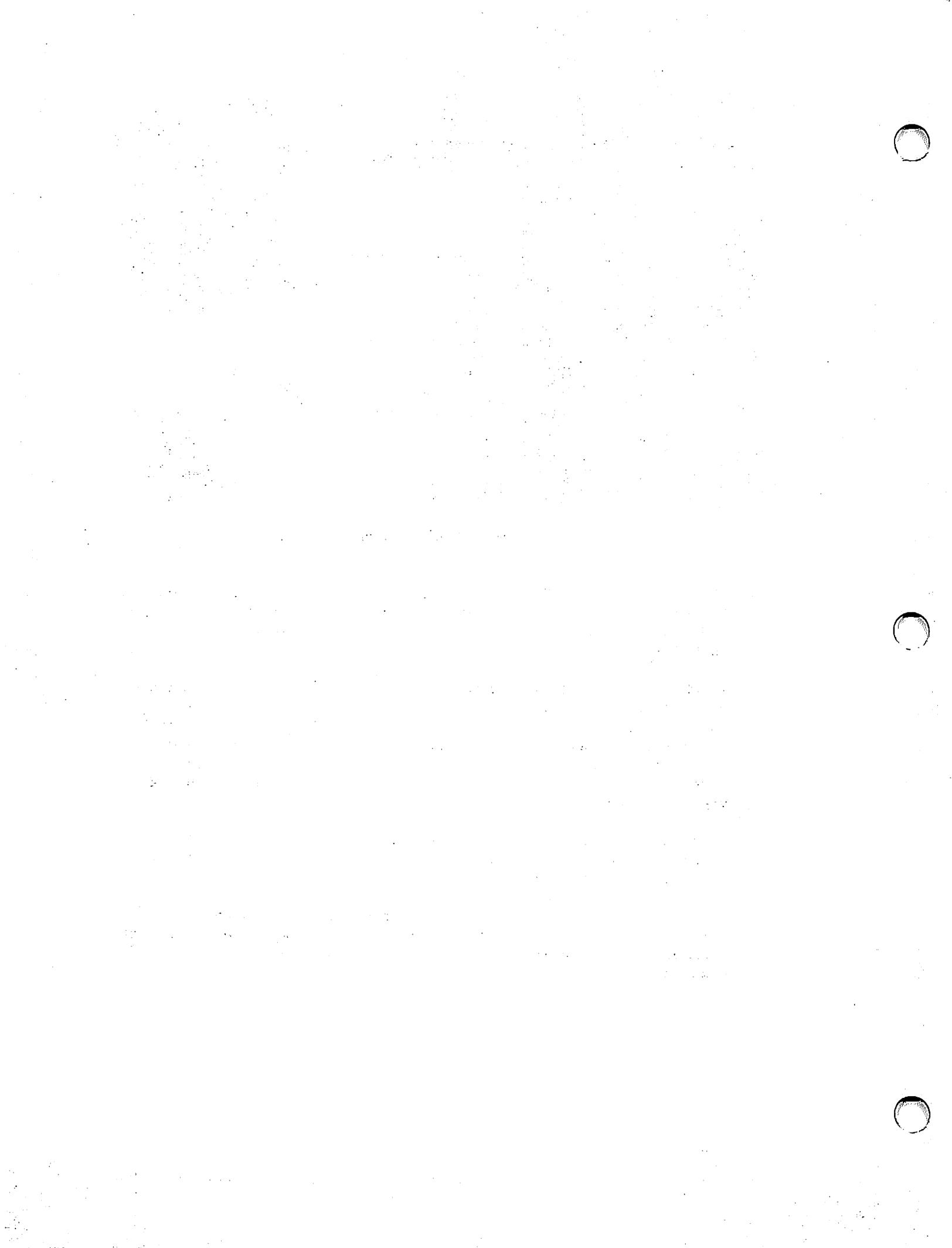
(3)Last (5)Next (6)Find (15)Report (16)Exit (32)Menu

Figure 5-14. Network Systems Menu

The Network Systems menu displays the names of all the systems in the directory. The menu also displays the system ID (SID), type, model number, area, and area ID (AID) for each system, as contained in the directory.

If the list of systems consists of more than one screen, use the PF keys PF2 (First), PF3 (Last), PF4 (Prev), or PF5 (Next) to scroll through the list of systems, or use PF6 (Find) to search for a specific system. All or a combination of these keys may appear at the bottom of the screen, depending on the number of screens that the list requires and the specific screen you are viewing at the time.

2. To print out a list of systems in the directory, press PF15 (Report). The printed report has a format that is identical to the Network systems menu.
3. After viewing or creating a report of the systems in the directory, press PF16 to return to the WSNEDIT main menu. You can then proceed to defining transports for your local-view configuration.



CHAPTER 6 MANAGING WSN TRANSPORTS

6.1 OVERVIEW

Your first step in creating the local-view configuration for a VS system is to define transports and designate systems on the transports.

When you define a transport, you enter the parameters that the transport requires to send and receive data. These parameters vary depending on the specific transport type; however, each transport requires a transport name that is unique to the local or target system and a DLP address. The DLP address specifies to the transport the network hardware it will use to send and receive data. DLPs were configured when GENEDIT was run (refer to Chapter 4).

Note: The terms "local" and "target" are used synonymously in this chapter to refer to the system for which the local-view configuration is being defined. This system can be the actual VS that you are configuring (the local VS), or another system to which the configuration file is later exported (hence the term target). Both are configured the same way. (Refer to Chapter 3 for more information.)

6.2 GENERAL TRANSPORT DEFINITION

There are several parameters (for example, transport name, transport ID, DLP address, and so forth) that are common to all transport types. You must enter these parameters before you can proceed to enter transport specific information. You enter these parameters on the General Transport Definition screen for each transport that you configure.

When multiple transports are configured between two adjacent systems for load balancing, network traffic is switched from one transport to another to balance message loading.

You should give special consideration to the parameters that are used to affect load balancing. These parameters are Base cost, Congestion Level, and Connection bias. Load balancing requires these parameters to determine the Relative cost for selecting one transport over another. (Refer to Chapter 2 for a description of load balancing and how transport selection is handled.)

To access the General Transport Definition screen

1. Press PF5 (Manage Transports) from the WSNEDIT main menu (see Figure 5-9).
2. Press ENTER if you are creating a new configuration file or PF2 to view or modify the active configuration file. To edit a configuration file that is not the active configuration file, specify that file, its library, and its volume and press ENTER. The Transport List menu appears (see Figure 6-1).

Note: If you already specified the configuration file when you accessed the Manage Services or Manage Routing functions, the Transport List menu appears after you press PF5 from the WSNEDIT main menu. This happens because the configuration file has already been specified; there is no need to specify it again.

```

14:16:15          ** Display Transports from Target System **          06/18/88
                  Copyright, Wang Laboratories, Inc. 1987

                  System NETVS is configured with 15 Transports

                  Please position the cursor at the appropriate tabstop
                  and press ENTER to manage Systems on a Transport

Transport Name    TID    Transport Type    DLP    System
Count
■ ONETVSNOTPRIMARY  3    WSN Multipoint    123A    6
■ BOKLINK           5    WSN P-P Leased    000K    2
■ DIALANOTHERTIME   6    WSN P-P Switched  000J    2
■ DIALUPOS11        7    WSN P-P Switched  000I    2
■ FAM4INTOWER4TWO   8    WSN P-P Switched  000P    1
■ FFM4IN4TOWERTWO   9    WSN P-P Leased    000L    2
■ IDS4BSC4SAMPLE    10   IDS 3271 (BSC)    3
■ IDS4SNA4SAMPLE    11   IDS 3274 (SNA)    4
■ IDS4TESTONLY      12   IDS 3271 (BSC)    2
■ LD1208            13   WSN P-P Leased    144D    2

(3)Last (5)Next (6)Find (8)Display (11)Create (16)Exit
(9)Modify (12)Delete (32)Menu

```

Figure 6-1. Transport List Menu

- a. To view or modify an existing Transport definition, select the transport from the Transport List menu.

If the list of transports consists of more than one screen, use the PF keys PF2 (First), PF3 (Last), PF4 (Prev), or PF5 (Next) to scroll through the list of transports, or use PF6 (Find) to search for a specific transport. All or a combination of these keys may appear at the bottom of the screen, depending on the number of screens that the list requires and the specific screen you are viewing at the time. (*These keys are used similarly throughout WSNEDIT.*)

After selecting an existing transport definition, you can perform any of the following operations:

Press PF8 to view the transport definition -- The General Transport Definition screen appears in display mode.

Press PF9 to modify the transport definition -- The General Transport Definition screen appears in modify mode (see Figure 6.3).

Press PF12 to delete the transport definition -- The transport definition is deleted from the local-view configuration.

Note: If X.25 transport records in the local-view configuration file need to be converted so they can be compatible with the current release of WSN VS NETCORE, PRIOR RELEASE X.25 will appear in the Transport Type field for that transport. A Wang system analyst has access to the conversion tool required to update the X.25 transport records.

- b. To create a transport definition, press PF11. The Transport Type menu appears (see Figure 6-2). Certain transports on the Transport Type menu (such as IEEE 802.3 and X.25) only appear when installed on the system.

13:08:23

**** Display Transport Types ****
Copyright, Wang Laboratories, Inc. 1987

06/02/88

Please position the cursor at the appropriate tabstop
and press ENTER to choose a Transport Type

- | | |
|--------------------|-------------------|
| ■ WSN Wangband | ■ IDS 3271 (BSC) |
| ■ WSN Multipoint | ■ IDS 3274 (SNA) |
| ■ WSN P-P Leased | ■ PC Local Option |
| ■ WSN P-P Switched | |
| ■ IEEE 802.3 | ■ X25 WANGPAC |
| ■ X25 TYMNET | |
| ■ X25 TELENET | |

(16)Exit

(32)Menu

Figure 6-2. Transport Type Menu

Select the type of transport definition that you want to create and press ENTER.

3. When you have completed steps 2a or 2b, the General Transport Definition screen appears (see Figure 6-3). The screen appears in Display, Modify, or Create mode depending on which PF key (8, 9, or 11) that you pressed from the Transport List menu.

14:24:45

** Create WSN Wangband Transport **
Copyright, Wang Laboratories, Inc. 1987

06/18/88

Please ENTER the definition of the new Transport

```
Transport Name ██████████  
Transport ID  ███0  
  
DLP address  ████ [ 3 digits (0 thru 9) plus ]  
              [ 1 letter (A thru Z) ]  
Base Cost    █2 [ 1 thru 15 ]  
  
Initial Status  ENABLED█ [ ENABLED or DISABLED ]  
Inactivity Timeout █30 [ 30 thru 9999 sec ]  
Reactivation Timer 300 [ 60 thru 600 sec ]  
  
Connection Bias █2 [ 0 thru 2 ]  
Congestion Levels █2 [ 1 thru 29 ] █4 [ 2 thru 30 ]  
                  █6 [ 3 thru 31 ] █8 [ 4 thru 32 ]
```

(16)Exit

(32)Menu

Figure 6-3. General Transport Definition Screen

The General Transport Definition screen appears whenever you define a transport, regardless of the transport type you selected from the Transport Type menu. The transport type appears at the top of the screen. In Figure 6-3, the transport type is a Wang Band transport.

This screen enables you to specify the parameters that all transport definitions require. Recommended values and ranges appear next to the fields. The values given in this example are the default values for all transports, which are automatically set when a transport is created. Although these default values can be changed to suit particular situations, in most cases, they are sufficient. A description of each modifiable field follows:

Transport Name -- Enter the name of the transport. The name can be from 1 to 16 alphanumeric characters in length.

Transport ID -- No action is necessary. WSNEDIT automatically assigns the transport ID.

DLP address -- Enter the device name (the name you assigned to the DLP during GENEDIT) of the CIU, VS-TC, or VS-TC1, etc., that serves the transport you are defining. The DLP name is a combination of the lowest or base device number of the IOP to which the DLP is connected and an uppercase letter that indicates its port assignment. For example, the device name of a VS-TC connected to port 0 of an IOP with the base device number 96 is 096A.

If you enter an address of a DLP that is not defined in the active GENEDIT file, WSNEDIT displays the message "DLP Not Defined Via GENEDIT." The same message is displayed if your VS was not IPLed after GENEDIT to define the address, or if you are creating a file for a target system that is not the local system. This is not a problem, since you can define the DLP and/or IPL the system after WSNEDIT is run.

The DLP Address field does not appear if you are defining an IDS 3271 BSC or IDS 3274 SNA transport. The DLP address is defined only when the 3271 BSC or 3274 SNA emulators are configured. Refer to the *VS 3274 SNA Administrator's Guide* and the *VS 3271 BSC Emulator User's Guide* for more information on 3274 SNA and 3271 BSC emulators.

Base Cost -- Enter the Base cost of the transport. The Base cost can be a number from 1 to 15. You can enter the default setting or another valid setting.

In a load balancing or alternate transport configuration, Base cost is used as the primary factor for influencing the selection of one transport over another (Connection bias and Congestion Levels are the remaining factors). Generally, when you are configuring two or more transports between your local system and an adjacent system, you assign Base cost values to these transports on the basis of how they can manage congestion. Typically, this relates to the line speed capability of a transport, with the general rule being, the higher the line speed, the lower the Base cost value you assign to the transport. (Refer to Chapter 2 for more information about Base cost.)

Initial Status -- Enables you to specify whether the transport is enabled or disabled at the time WSNSTART is run to bring up CNS. An enabled transport can support communications between systems. It is capable of performing the functions required to initialize itself (for example, dialing on a switched Point-to-Point transport). Enter the default setting ENABLED if you want the transport to be enabled. Type in DISABLED if you want the transport to be disabled. Disabled transports still support non-CNS traffic. The status can be changed while the network is running, through the CNS Manager (CNSMGR) program (refer to the *WSN VS Network Control and Monitoring Guide*).

Note: XIDs are not exchanged between systems on an enabled switched Point-to-Point transport when WSNSTART is run to bring up CNS. The XID exchange takes place when user data is sent for the first time. (Refer to the *WSN VS Network Control and Monitoring Guide* for information on XID exchanges.)

Generally, you enter Initial Status = DISABLED only when you are attempting to configure a transport before the transport software has been installed, or if you want to manually enable the transport through the CNSMGR. For example, if there is a dedicated Point-to-Point transport connecting the local VS and a Wang PC, you may want to set Initial Status = DISABLED. Then you could manually set Initial Status = ENABLED when you know that the Wang PC is powered on.

You may also want to enter Initial Status = DISABLED for IDS transports. The IDS transport initialization process is very complex. You may want to manually enable the IDS transport through CNSMGR so that you can observe the initialization process and be prepared to immediately detect problems if they occur.

Inactivity Timeout -- Enter a value from 30 to 9999. This is the length of time (in seconds) CNS waits before releasing a virtual circuit from a transport on which there is no CNS session. This timeout is especially useful in switched line configurations where you do not want the line connection to remain established after sessions have ceased. The default setting for this field is 30.

If the local system for which the transport is configured is an intermediate node in a multihop configuration and the transport is frequently used, you may want to use a high Inactivity timeout value. A high Inactivity timeout value gives all the transports from source system to destination system time to connect. A high Inactivity timeout value is especially useful when the transports from source to destination along the multihop configuration support low line speeds (for example, 48 Kbps), or there are several intermediate systems along the multihop path with significant system and network overhead or both. If connectivity continues to fail because of transport inactivity timeout, keep raising the Inactivity timeout value until connectivity is consistently successful.

Reactivation Timer -- Enter the amount of time (in seconds) that CNS will wait after detecting that a line for a transport is down before attempting to use that transport. The default setting for this field is 300.

Generally, the efficiency of CNS may decrease as Reactivation timer values decrease. Performance becomes less efficient because lower Reactivation timer values increase the number of attempts CNS makes to try a line when it is down. Thus, a Reactivation timer of 60 may adversely affect CNS efficiency.

However, as Reactivation timer values increase, the time it takes for CNS to determine whether or not a transport has been returned to service after a failure also increases. You should weigh these considerations when setting a Reactivation timer value.

Connection Bias -- Enter the Connection bias for the transport. Valid Connection bias values are 0, 1, and 2. Connection bias is the value added to an unconnected transport's Base cost so that a transport currently in use remains the preferred transport for as long as possible. (Refer to Chapter 2 for more information about Connection bias.)

Enter the default setting 0 if you are not setting up a load balancing configuration. Enter 0, 1, or 2 if the transport being configured will be part of a load balancing configuration. If you want the transport being configured to be the preferred transport in this configuration, enter 0 for the transport and enter 1 or 2 for the other transports in the configuration. If the transport being configured is not to be the preferred transport, enter 1 or 2. Remember that as the difference in Connection bias values between transports in a load balancing configuration increases, it is more likely the preferred transport will be chosen to handle traffic.

Congestion Levels -- Congestion levels determine the number of messages that can accumulate in the transport queue before a Congestion Level factor is added to the Base cost. (Refer to Chapter 2 for more details on Congestion Level factor.)

The Congestion Level fields enable you to associate a number of messages with each of the four Congestion Levels. For example, if you specify the default value 2 for Level 1, a Congestion Level factor of 1 is added to the transport's Base cost if two or more messages reach the queue. If you specify the default value 4 for Level 2, a Congestion Level factor of 1 is added to the transport's Base cost if four messages accumulate in the queue. The fields for Congestion Level include

Level 1 Field -- Displays a default value of 2. You may enter any value from 1 to 29, as long as the value is less than the value entered in the Level 2 field. The default value in this field is recommended for most configurations.

Level 2 Field -- Displays a default value of 4. You may enter any value from 2 to 30, as long as the value is greater than the Level 1 value and less than the value entered in the Level 3 field. The default value in this field is recommended for most configurations.

Level 3 Field -- Displays a default value of 6. You may enter any value from 3 to 31, as long as the value is greater than the Level 2 value and less than the value entered in the Level 4 field. The default value in this field is recommended for most configurations.

Level 4 Field -- Displays a default value of 8. You may enter any value from 4 to 32, as long as the value is greater than the Level 3 value. The default value in this field is recommended for most configurations.

If you want to exit the General Transport Definition screen without making or saving any entries, press one of the following keys:

PF16 -- Returns you the Transport List menu.

PF32 -- Returns you to the WSNEDIT main menu.

4. To complete your General Transport Definition, press ENTER after you have specified the appropriate information on the General Transport Definition screen. The screen that appears next, depends on the type of transport that you are configuring. Sections 6.3 through 6.11 describe the remainder of the configuration process for each of the WSN transports.

The WSN Wang Band System Designation screen lists the names of all of the systems on the WSN Wang Band transport. The screen also lists the type, model, area, and cable address for each system. If no remote systems have been designated on a transport, only the local system is displayed on the screen. (Figure 6-4 shows a transport with systems already designated.)

- To designate systems, or to review or modify designated systems on a Wang Band transport, press PF10 while viewing the Wang Band System Designation screen. The WSN Wang Band System List menu appears (see Figure 6-5).

14:27:03 ** Review Systems on WSN Wangband Transport ** 06/18/88
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Please Review the Cable Address
 of each System sharing Transport LOCAL5CABLE

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Cable Address</u> |
|---------------|-------------|--------------|-----------------|----------------------|
| ATLAS | VS | 65 | AREASEVEN | 0A21 |
| ATSYDNEY | VS | | AREA70AUSTRALIA | #### |
| B52 | VS | 85 | AREAOSI | #### |
| COBBER | VS | 65 | AREATEN | 0A18 |
| COMET | VS | | AREA41TELENOVA | #### |
| DEMV01 | VS | | AREA27EUROPE | #### |
| DEMV02 | VS | | AREA27EUROPE | #### |
| DIGGER | VS | 45 | AREATEN | 0A17 |
| DMFCNTRL | VS | 100 | AREAFIVE | 0056 |
| DUNE | VS | 100 | AREAONE | 005F |

(2)First (4)Prev (6)Find (16)Exit
 (3>Last (5)Next (9)Modify (32)Menu

Figure 6-5. WSN Wang Band System List Menu

- The WSN Wang Band System List menu lists all the systems in the directory. Press PF9 to designate systems, modify existing information, or to delete designated systems. Enter a unique cable address value for each system that you want to designate on the Wang Band transport. Systems that have been designated on the transport have a cable address in the Cable Address field.

Note: Every system on the Wang Band transport must have a unique cable address. Cable addresses must be established prior to running WSNEDIT for all systems on the Wang Band transport. Enter cable addresses in hexadecimal. The lowest number that you can use as a valid cable address is the default address (0001); the highest valid cable address is 3FFF. Enter the correct cable address that you and other administrators have agreed on for each system you define on the Wang Band transport, including the local system.

To delete designated systems on the Wang Band transport, position the cursor in the Cable Address field for the system definition you wish to delete and use the space bar or the DELETE key to delete the hexadecimal address from the Cable Address field.

4. Press ENTER once you have completed designating, modifying and/or deleting systems. Press PF16 to display the systems that have been designated on the transport.

6.4 DEFINING A WSN MULTIPOINT TRANSPORT

To define a Multipoint transport, you first specify the appropriate information on the General Transport Definition screen (see Figure 6-3) after selecting WSN Multipoint from the Transport Type menu (see Figure 6-2). To complete the transport definition

1. Press ENTER after you have specified the appropriate information on the General Transport Definition screen to access the *Second* Multipoint Transport Definition screen (see Figure 6-6).

14:39:03

** Create WSN Multipoint Transport **
Copyright, Wang Laboratories, Inc. 1987

06/18/88

Please ENTER the definition of Transport WSNMULTIPOINT

Electrical Interface RS232 [RS232 or RS449]

Line Speed 9600

(16)Exit

(32)Menu

Figure 6-6. Second Multipoint Transport Definition Screen

2. The Second Multipoint Transport Definition screen enables you to specify the Multipoint specific parameters required to define a Multipoint transport. Each field on the screen has a default setting. Press ENTER if you wish to use all the default settings. To change the default settings enter the appropriate information in the following fields:

Electrical Interface -- Enter the type of modem connector for the Multipoint transport. The type can be either RS232 (the default setting) or RS449. Press ENTER to display the next field.

Line Speed -- Enter the modem speed for the Multipoint transport you are defining. All modems on the same transport must use the same speed. Therefore, the number you enter in this field must be the same as the modem rates defined in the configuration files of all other systems on the transport. Valid line speeds (in bits per second (bps)) are 1200, 2400, 4800, 9600 (the default setting), 19200, 56000, and 64000.

3. Press ENTER after you have specified the appropriate information in the fields on the Multipoint Transport Definition screen. The Transport List menu appears, allowing you to designate systems on the Multipoint transport.

6.4.1 Designating Systems on a Multipoint Transport

To designate systems, or to review or modify designated systems on a Multipoint transport

1. Position the cursor under the selection block next to the name of the Multipoint transport on the Transport List menu and press ENTER. The Multipoint System Designation screen appears (see Figure 6-7).

```
13:10:40      ** Display Systems on Multipoint Transport **      06/02/88
                Copyright, Wang Laboratories, Inc. 1987
```

Transport WSNMULTIPOINT is configured with 1 System

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Poll Address</u> | <u>Poll Weight</u> | <u>Class</u> |
|---------------|-------------|--------------|----------------|---------------------|--------------------|--------------|
| NETVS | VS | 100 | AREATWO | 01 | | PRI |

(10)Review

(16)Exit
(32)Menu

Figure 6-7. Multipoint System Designation Screen

The Multipoint System Designation screen lists the names of all the systems on the Multipoint transport. The screen also lists the type, model, area, polling address, polling weight, and class (primary or secondary) for each system. If no remote systems have been designated on the transport, only the local system is displayed on the screen. (Figure 6-7 shows a screen with the primary system already designated on the transport.)

2. To designate systems, or to review or modify designated systems on a Multipoint transport, press PF10 while viewing the Multipoint System Designation screen. The WSN Multipoint System List menu appears (see Figure 6-8).

13:11:40

** Review Systems on Multipoint Transport **
Copyright, Wang Laboratories, Inc. 1987

06/02/88

Please Review the Poll Address and Poll Weight
of each System sharing Transport WSNMULTIPOINT

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Poll Address</u> | <u>Poll Weight</u> | <u>Class</u> |
|---------------|-------------|--------------|----------------|---------------------|--------------------|--------------|
| NETVS | VS | 100 | AREATWO | 01 | ■ | PRI |
| NOVA | VS | | AREA41TELENOVA | 02 | 1 | SEC |
| OA32SYS | VS | | AREAFORTY | 03 | 1 | SEC |
| OISNM | OIS | 140 | AREANINENONCNS | 04 | 1 | SEC |
| OS11 | VS | 100 | AREATWO | 05 | 1 | SEC |
| OS2 | OIS | 140 | AREANINENONCNS | 06 | 1 | SEC |
| OSI1 | VS | 85 | AREAOSI | 07 | 1 | SEC |
| OSI2 | VS | 85 | AREAOSI | 08 | 1 | SEC |
| PROBE | VS | | AREANINENONCNS | 09 | 1 | SEC |
| RASCAL | VS | | AREATWELVE | 10 | 1 | SEC |

(2)First (4)Prev (6)Find

(3)Last (5)Next

(9)Modify

(16)Exit

(32)Menu

Figure 6-8. Multipoint System List Menu

- The Multipoint System List menu lists all the systems in the directory. Press PF9 to designate systems, modify existing information, or to delete designated systems. Enter the appropriate information in the following fields:

Note: You must define one primary system on the Multipoint transport. The primary system must be a VS system. You may define no more than 16 secondary systems on the Multipoint transport. The number of secondary systems defined depends on the usage demands of the network and the maximum number of tasks the primary VS supports.

If the local system is a secondary, you need only define the local system plus the primary on the transport. You are permitted to define other secondary systems if you want.

Poll Address -- Enter a unique poll address value for each system that you want to designate on a Multipoint transport. Systems that have been designated on the transport have a poll address in the Poll Address field.

For a Multipoint transport, you must enter a 2-digit hexadecimal address for each system on the transport. This address must be 01 if the system is the primary. Entering 01 as a poll address designates the system as the primary system. Only a VS computer can be a valid primary system.

For secondary systems, the address can be any valid 2-digit hexadecimal address between 02 and FE. Valid secondary systems include the VS computer, the Office Information System (OIS), the 2200 system (2200), the ALLIANCE (Alliance), and the Wang PC/APC.

Poll Weight -- Enter the polling weight for each system you are defining on the transport, including the local system. The polling weight is the number of times a primary system polls a secondary system in a single polling cycle. Valid polling weights are 1, 2, and 3. If you enter 01 in the Poll Address field for a primary system, leave the associated Poll Weight field blank. Enter 1, 2, or 3 if you have used any valid hexadecimal value other than 01 in the Poll Address field.

When deciding on a polling weight, consider the number of systems in the Multipoint configuration, and the amount of network activity individual systems will generate. You may wish to assign the maximum polling weight to systems that transmit a large number of messages. Keep in mind that the time required to complete a polling cycle increases as the number of systems in the Multipoint configuration increase and as the sum of the polling weights of all the systems in the Multipoint configuration increases.

Class -- This field cannot be modified. PRI appears in this field if you designated the system as the primary by entering 01 in the Poll Address field. SEC appears in this field if you designated the system as the secondary by entering any valid hexadecimal address other than 01 in the Poll Address field. If you wish to change the Class field for a system, you must modify the Poll Address field by entering the appropriate Poll Addresses for primary and secondary systems.

To delete designated systems on the Multipoint transport, position the cursor in the Poll Address field for the system definition you wish to delete and use the space bar or the DELETE key to delete the hexadecimal address from the Poll Address field.

4. Press ENTER once you have finished designating and/or deleting systems. Press PF16 to display the systems that have been designated on the transport.

6.5 DEFINING A WSN DEDICATED POINT-TO-POINT TRANSPORT

To define a WSN Dedicated (leased) Point-to-Point transport, you first specify the appropriate information on the General Transport Definition screen (see Figure 6-3) after selecting WSN P-P leased from the Transport Type menu (see Figure 6-2). To complete the transport definition

1. Press ENTER after you have specified the appropriate information on the General Transport Definition screen to access the Second Dedicated Point-to-Point Transport Definition screen (see Figure 6-9).

```
14:40:19          ** Create WSN P-P Leased Transport **          06/18/88
                  Copyright, Wang Laboratories, Inc. 1987

Please ENTER the definition of Transport WSNPTPTLEASED

                Line Mode: FULL          [ FULL or HALF Duplex      ]
                Line Operation:  SYNC      [ SYNChronous or ASYNChronous ]
                Multiline TC IOC: NO       [ YES or NO                ]

(16)Exit                                               (32)Menu
```

Figure 6-9. Second Dedicated Point-to-Point Transport Definition Screen

2. The Second Dedicated Point-to-Point Transport Definition screen enables you to specify the specific parameters required to define a dedicated Point-to-Point transport. The screen first appears with certain defaults shown. Press ENTER if you wish to use all of the default settings shown. To change the default settings enter the appropriate information in the fields shown. The information you enter determines what fields will appear next on the screen.

The fields that appear on the Second Dedicated Point-to-Point Transport Definition screen include

Line Mode -- Enter the mode for the line that serves the transport. The line mode can be full-duplex or half-duplex. A full-duplex line permits simultaneous, two-way communication. A half-duplex line permits alternate two-way communication.

Line Operation -- Enter either SYNChronous or ASYNChronous to select the line operation you require.

Multiline TC IOC -- Enter YES or NO depending on whether you are configuring this transport on a MLTC or some other type of communications controller.

Electrical Interface -- Enter the type of modem connector for the Point-to-Point transport. The type can be either RS232 (the default setting) or RS449. *This field appears only if you selected synchronous line operation.*

Number of Stop Bits -- Enter a value of 1, 1.5, or 2 for the number of stop bits used for asynchronous communications. The default value of 1 is sufficient under most conditions. However, depending on the type and condition of the communications line that connects the local and destination systems, you may want to increase the number of stop bits to 1.5 or 2, which will compensate for loss attributed to line noise. Be sure that this value matches the one for the system to which you will be sending or receiving data. *This field appears only if you selected asynchronous line operation.*

Line Speed -- Enter the modem speed for the dedicated Point-to-Point transport you are defining. The default setting is 9600 bps. Remember that all modems that use the same transport must send and receive data at the same speed. Therefore, the number you enter in this field must be the same as the modem rates defined in the configuration files of all other systems that use the transport. Valid line speeds (in bps) are 1200, 2400, 4800, 9600, and 19200 for asynchronous communications, and 1200, 2400, 4800, 9600, 19200, 56000, and 64000 for synchronous communications. *This field appears only if you selected either synchronous line operation or asynchronous (half-duplex) line operation.*

Note: Line mode, line operation, electrical interface, and line speed must match the modem specifications and capabilities.

3. Press ENTER after you have specified the appropriate information in the fields on the Dedicated Point-to-Point Transport Definition screen.

- If you selected NO for Multiline TC IOC, the Transport List menu appears, enabling you to designate systems on the dedicated Point-to-Point transport (refer to Section 6.5.1).
- If you entered YES for Multiline TC IOC, the MLTC Line Group Definition screen appears (see Figure 6-10). Continue the configuration as follows:

```

13:12:58                ** Define Line Group **                06/02/88

Please ENTER the definition of lines in Transport WSNPTPTLEASED

Please ENTER a non-blank character to indicate
the location of each line used by this transport

Unit A 0 ■      1 ■      2 ■      3 ■
Unit B 0 ■      1 ■      2 ■      3 ■
Unit C 0 ■      1 ■      2 ■      3 ■
Unit D 0 ■      1 ■      2 ■      3 ■

(16)Exit                (32)Menu

```

Figure 6-10. MLTC Line Group Definition Screen

Note: Support for MLTC line groups is provided with MLTC transport, Release 3.00.00 and later. Prior releases of the MLTC transport require each line to be defined as a separate transport and thus as individual DLPs.

The MLTC Line Group Definition screen enables you to configure a group of leased lines that share a single transport. The screen contains 16 fields divided into four sections labelled Unit A, Unit B, Unit C, and Unit D. Units A, B, C, and D represent the four MLTC subpanels that when installed, are located on the back panel of your VS or cable concentrator (your actual system's configuration can range from two to four MLTC subpanels). Refer to your Dedicated Point-to-Point Transport Record in Appendix B for information on how many MLTC subpanels your system has, and what their Unit designations (A, B, C, or D) are.

Each Unit on the MLTC Line Group Definition screen has four fields labelled 0, 1, 2, and 3. These fields correspond to the location of the four serial ports on each of the four MLTC subpanels.

4. To assign lines to the Point-to-Point transport, enter an X (or any nonblank character) in the appropriate field that represents the line's actual physical location on the MLTC subpanel. Repeat this for each line you wish to define. Depending on how many lines are available, you can define up to 16 locations (configuring 16 lines) for the transport. (Refer to the "Special Considerations" section that follows for additional information.)
5. Press ENTER after you have specified the location of each line you wish to assign to the dedicated Point-to-Point transport. The Transport List menu appears, enabling you to designate systems on the transport.

Special Considerations

Special considerations for assigning (MLTC) lines to a Point-to-Point transport are as follows:

- Keep in mind that the grouping of lines into one transport means those lines will have like parameters; they will all have the same CNS parameters such as Base cost and Congestion Levels, and the same line parameters such as speed, full/half duplex, and synchronous or asynchronous operation. It also means that for outbound calls, only one line in a group will be connected to a given remote system at any time, since the MLTC selects the actual line to use once the transport is selected. Inbound calls on multiple lines within a group are also supported. This situation could arise when a remote system has two transports configured to lines in one group on a system, and calls are made on both in the support of load balancing.
- By configuring more lines on a transport, you minimize the number of transports you need to configure to reach remote systems. You also increase the efficiency and performance of CNS routing by maximizing the use of table space for transports and routing records, and decreasing the number of times CNS may try a transport and find a line failure. CNS uses a transport that is configured on an MLTC as any other transport that may have multiple destinations. It picks the transport as usual on the basis of Base cost and Congestion Levels for the next hop system, choosing between transports that reach the desired system and have available device numbers.
- The same advantages hold for the implementation of non-CNS routing to adjacent systems. If a set of lines reaches the adjacent system, it does not matter which one is chosen.

- In both CNS and non-CNS cases, if the lines need selection on a per line basis, they need to be configured on separate transports. For example, if one line is used for the preferred transport, and another is to be used only for backup, they would be configured as two transports with different Base costs.

6.5.1 Designating Systems on a Dedicated Point-to-Point Transport

To designate systems, or to review or modify designated systems on a dedicated Point-to-Point transport

1. Position the cursor under the selection block next to the name of the dedicated Point-to-Point transport on the Transport List menu and press ENTER. The Dedicated Point-to-Point System Designation screen appears (see Figure 6-11).

```

13:14:41      ** Display Systems on WSN P-P Leased Transport **      06/02/88
              Copyright, Wang Laboratories, Inc. 1987

              Transport WSNPTPTLEASED is configured with 1 System

              System      Type      Model      in Area      Key
              -----      -
              NETVS      VS      100      AREATWO      X

              (10)Review      (16)Exit
              (32)Menu
  
```

Figure 6-11. Dedicated Point-to-Point System Designation Screen

The Dedicated Point-to-Point System Designation screen lists the names of all the systems on the dedicated Point-to-Point transport. The screen also lists the type, model, area and key for each system (the key field indicates only that a particular system has been defined on the dedicated Point-to-Point transport). If no systems have been defined for the transport, only the local system is displayed on the screen. (Figure 6-11 shows a screen with a system already designated on the transport.)

- To designate systems, or to review or modify designated systems on a dedicated Point-to-Point transport, press PF10 while viewing the Dedicated Point-to-Point System Designation screen. The WSN Dedicated Point-to-Point System List menu appears (see Figure 6-12).

13:15:02 ** Review Systems on WSN P-P Leased Transport ** 06/02/88
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Please Review the Systems sharing Transport WSNPTPLEASED

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Key</u> |
|---------------|-------------|--------------|----------------|------------|
| NETVS | VS | 100 | AREATWO | X |
| NOVA | VS | | AREA41TELENOVA | ■ |
| OA32SYS | VS | | AREAFORTY | ■ |
| OISNM | OIS | 140 | AREANINENONCNS | ■ |
| OS11 | VS | 100 | AREATWO | ■ |
| OS2 | OIS | 140 | AREANINENONCNS | ■ |
| OS11 | VS | 85 | AREAOSI | ■ |
| OS12 | VS | 85 | AREAOSI | ■ |
| PROBE | VS | | AREANINENONCNS | ■ |
| RASCAL | VS | | AREATWELVE | ■ |

(2)First (4)Prev (6)Find (16)Exit
 (3)Last (5)Next (9)Modify (32)Menu

Figure 6-12. Dedicated Point-to-Point System List Menu

The Dedicated Point-to-Point System List menu lists all the systems in the directory. If the transport is configured on a single-line DLP, only two systems can be designated: the local VS and the system on the other end. If the transport is configured on a MLTC, the number of systems that you can configure includes the local system and a remote system for each line in the line group.

- Press PF9 to designate systems, modify existing information, or to delete designated systems. Enter an X in the Key field for each system that you want to designate on the Dedicated Point-to-Point transport. If a system is not on the dedicated Point-to-Point transport, or you wish to delete it from the transport, leave the Key field blank for that system.
- Press ENTER once you have completed designating, modifying and/or deleting systems. Press PF16 to display the systems that are designated on the transport.

6.6 DEFINING A WSN SWITCHED POINT-TO-POINT TRANSPORT

To define a WSN switched (dial-up) Point-to-Point transport, you first specify the appropriate information on the General Transport Definition screen (see Figure 6-3) after selecting WSN P-P Switched from the Transport Type menu (see Figure 6-2). To complete the transport definition

1. Press ENTER after you have specified the appropriate information on the General Transport Definition screen to access the *Second Switched Point-to-Point Transport Definition* screen (see Figure 6-13).

```
14:41:24          ** Create WSN P-P Switched Transport **          06/18/88
                  Copyright, Wang Laboratories, Inc. 1987

Please ENTER the definition of Transport WSNPTPTSWITCHED

                Line Mode  HALF          [ FULL or HALF Duplex      ]
                Line Operation ■SYNC      [ SYNChronous or ASYNChronous ]
                Multiline TC IOC NO■      [ YES or NO                ]
                Call Direction BOTH       [ IN, OUT, or BOTH         ]
                Disconnect Timeout ■60    [ 1 through 255 seconds    ]

(16)Exit                                               (32)Menu
```

Figure 6-13. *Second Switched Point-to-Point Transport Definition Screen*

2. The *Second Switched Point-to-Point Transport Definition* screen enables you to specify the specific parameters required to define a switched Point-to-Point transport. The screen first appears with certain defaults shown. More defaults appear upon pressing ENTER. Press ENTER if you wish to use all the default settings. To change the default settings, enter the appropriate information in the fields shown. The information that you enter determines what fields will appear next on the screen.

The fields that appear on the Second Switched Point-to-Point Transport Definition screen include

Line Mode -- Enter the mode for the line that serves the transport. The line mode can be full-duplex or half-duplex. A full-duplex line permits simultaneous, two-way communication. A half-duplex line permits alternate two-way communication.

Note: Most dial-up modems support half-duplex communications. Check your line and the manufacturer's instructions for your modem to determine whether the modem and line support half- or full-duplex communications.

Line Operation -- Enter either SYNChronous or ASYNChronous to select the line operation you require.

Multiline TC IOC -- Enter YES or NO depending on whether you are configuring this transport on a MLTC or some other type of communications controller.

Call Direction -- Specify whether or not the transport will accept incoming calls, calls going out, or both. Type IN if you want the transport to accept incoming calls. Type OUT if you want the transport to accept calls going out. Use the default setting BOTH if you want the transport to handle incoming calls and outgoing calls.

Disconnect Timeout -- Enter the number of seconds after the end of all sessions on the line before the line connection is terminated. The number can be from 1 through 255. Enter the default setting 60 or another valid value.

Electrical Interface -- Enter the type of modem connector for the switched Point-to-Point transport. The type can be either RS232 (the default setting) or RS449. *This field appears only if you selected synchronous line operation.*

Number of Stop Bits -- Enter a value of 1, 1.5, or 2 for the number of stop bits used for asynchronous communications. The default value of 1 is sufficient under most conditions. However, depending on the type and condition of the communications line that connects the local and destination systems, you may want to increase the number of stop bits to 1.5 or 2, which will compensate for loss attributed to line noise. Be sure that this value matches the value for the system to which you will be sending or receiving data. *This field appears only if you selected asynchronous line operation.*

Line Speed -- Enter the modem speed for the switched Point-to-Point transport that you are defining. The default setting is 9600 bps. Remember that all modems that use the same transport must send and receive data at the same speed. Therefore, the number you enter in this field must be the same as the modem rates defined in the configuration files of all other systems that use the transport. Valid line speeds (in bps) are 1200, 2400, 4800, 9600, and 19200 for asynchronous communications, and 1200, 2400, 4800, 9600, 19200, 56000, and 64000 for synchronous communications. *This field appears only if you selected either synchronous line operation or asynchronous (half-duplex) line operation.*

Note: *Line mode, line operation, electrical interface, and line speed must match the modem specifications and capabilities.*

3. Press ENTER after you have specified the appropriate information in the fields on the Switched Point-to-Point Transport Definition screen.
 - If you specified YES for Multiline TC IOC, proceed to step 6.
 - If you specified NO for Multiline TC IOC and call direction is IN, the transport List menu appears allowing you to designate systems on the switched Point-to-Point transport (refer to Section 6.6.1).
 - If you selected NO for Multiline TC IOC and call direction is OUT or BOTH, the Dialing Parameters Definition screen appears (see Figure 6-14). Continue the configuration.

14:41:53

**** Define Dialing Parameters ****
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06/18/88

Please ENTER the definition of the Dialing Parameters
of Transport WSNPTPTSWITCHED

Autocall Unit Type NONE [801A, 801C, V25, VADIC, NONE]

(16)Exit

(32)Menu

Figure 6-14. Dialing Parameters Definition Screen

4. The Dialing Parameters Definition screen enables you to define the dialing parameters systems require to communicate over switched lines. The screen first appears with certain defaults shown. More defaults appear upon pressing ENTER. Press ENTER if you wish to use all of the default settings. To change the default settings, enter the appropriate information in the fields shown. The information you enter determines what fields will appear next on your screen. These fields include

Autocall Unit Type -- Enter the model type of your autodial device. Valid types are Bell 801A, Bell 801C, V25, and VADIC. The default setting for this field is NONE. If the line that serves the transport does not use an autodial device, enter the default setting NONE.

Dialer Address -- If you enter VADIC in the Autocall Unit Type field, you must enter the dialer address for your Vadic unit. The address can be from 0 to 7. (Refer to the manufacturer's instructions for more information.)

Modem Address -- If you enter VADIC in the Autocall Unit Type field, you must enter the modem address for your Vadic unit. The address (in hexadecimal) can be from 0 to E. (Refer to the manufacturer's instructions for more information.)

Dial Retry Count -- Enter the number of attempts the autodial device will make to establish a connection with a remote system. Recommended values are from 1 to 3. These values ensure that transport level dial retry timeouts will always function properly. *The Dial Retry Count and Dial Delay Time fields only appear if you selected an autocal unit type.*

Dial Delay Time -- Enter the number of seconds between successive attempts to establish a connection with a remote system. Recommended values are from 1 to 10. These values ensure that transport level dial delay timeouts will always function properly.

Manual Dial Timeout -- Enter information in this field when you are not using an autocal unit. Valid values are 1 through 255. If you entered NONE in the Autocal Unit Type field, specify the number of minutes the transport allows for a dial connection to be established after a service request has been issued. *This field only appears if you selected NONE in the Autocal Unit Type field.*

5. Press ENTER after you have specified the appropriate information in the fields on the Dialing Parameters Definition screen. The Transport List menu appears, enabling you to designate systems on the switched Point-to-Point transport (refer to Section 6.6.1).
6. If you specified YES for Multiline TC IOC, proceed as follows:
 - If call direction is IN, the screen that appears is identical to the MLTC Line Group Definition screen that is used for a dedicated Point-to-Point transport (see Figure 6-10). To complete your switched Point-to-Point transport definition, use the same procedure that is described in Section 6.5 for defining a dedicated Point-to-Point transport line group.
 - If call direction is OUT or BOTH, the MLTC Line Group Modem Definition screen appears (see Figure 6-15). Continue the configuration.

Please ENTER the definition of lines in Transport WSNPTPTSWITCHED

```

MODEM [ Modem using an 801A/C, V25, or no ACU      ]
801A [ 801A, 801C, or V25 autocal unit. The ACU   ]
801C [ must be in the location following the      ]
V25  [ associated MODEM.                          ]
HAYES [ Location of a HAYES combined modem/ACU.   ]

```

```

Unit A 0 MODEM 1 801A 2 MODEM 3 801A
Unit B 0 MODEM 1 V25 2 MODEM 3 V25
Unit C 0 1 2 3
Unit D 0 1 2 3

```

(16)Exit

(32)Menu

Figure 6-15. MLTC Line Group Modem Definition Screen

The MLTC Line Group Modem Definition screen enables you to configure a group of switched lines that share a single transport. The screen contains 16 fields divided into four sections labelled Unit A, Unit B, Unit C, and Unit D. Units A, B, C, and D represent the four MLTC subpanels that when installed, are located on the back panel of your VS or cable concentrator (your actual system's configuration can range from two to four MLTC subpanels). Refer to your Switched Point-to-Point Transport Record in Appendix B for information on how many MLTC subpanels your system has, and what their Unit designations (A, B, C, or D) are.

Each Unit on the MLTC Line Group Definition screen has four fields labelled 0, 1, 2, and 3. These fields correspond to the location of the four serial ports on each of the four MLTC subpanels.

- To assign lines to the switched Point-to-Point transport, enter MODEM in the appropriate field for each line you wish to configure (up to a maximum of eight with autocal units, or 16 Hayes modems with built-in autocal capability). Next, enter the type of autocal unit (801A, 801C, or V25) in the field adjacent to the modem it serves.

Notes: Hayes modem/autodialers are currently not supported for the MLTC. Support will be provided in a future release of the WSN VS MLTC Point-to-Point transport.

You can specify a modem for receiving manually-dialed calls by entering modem once for the entire line group and leaving all other fields blank. Because this feature has limited usefulness, it is only recommended in special cases, such as when performing some preliminary tests on the line or communications hardware.

A typical configuration is shown in Figure 6-15. The fields for Unit A and Unit B show the proper configuration for four lines using modems with separate autocall units. (For additional information on assigning (MLTC) lines to Point-to-Point transports, refer to the "Special Considerations" section in Section 6.5.)

8. When you have completed the fields for defining the line group press ENTER. The following additional fields appear at the bottom of the MLTC Line Group Modem Definition screen for MODEM/autocall unit configurations:

Dial Retry Count -- Enter the number of attempts the autodial device will make to establish a connection with a remote system. Recommended values range from 1 to 3. These values ensure that transport level Dial Delay timeouts will always function properly.

Dial Delay Time -- Enter the number of seconds between successive attempts to establish a connection with a remote system. Recommended values range from 1 to 10. These values ensure that transport level Dial Delay timeouts will always function properly.

Note: If you specified a manual receive configuration, the Manual Dial Timeout field appears in place of those above. No entry is necessary since this parameter pertains to manual dial, which is not supported on the VS through an MLTC. Only manual receive, which does not use this parameter, is supported.

9. Press ENTER after you have specified the appropriate information on the MLTC Line Group Modem Definition screen. The Transport List menu appears, allowing you to designate systems on the switched Point-to-Point transport.

6.6.1 Designating Systems On a Switched Point-to-Point Transport

To designate systems, or to review or modify designated systems on a switched Point-to-Point transport

1. Position the cursor under the selection block next to the name of the switched Point-to-Point transport on the Transport List menu and press ENTER. The Switched Point-to-Point System Designation screen appears (see Figure 6-16).

```
13:21:27      ** Display Systems on Point-Point Transport **      06/02/88
              Copyright, Wang Laboratories, Inc. 1987
```

```
Transport WSNPTPTSWITCHED is configured with 3 Systems
```

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Phone Number</u> |
|---------------|-------------|--------------|----------------|---------------------|
| NETVS | VS | 100 | AREATWO | 8750987 |
| NOVA | VS | | AREA41TELENOVA | 8978765 |
| OISNM | OIS | 140 | AREANINENONCNS | 5352332 |

```
(10)Review
```

```
(16)Exit  
(32)Menu
```

Figure 6-16. Switched Point-to-Point System Designation Screen

The Switched Point-to-Point System Designation screen lists the names of all the systems on the switched Point-to-Point transport. The screen also lists the type, model, area, and phone number for each system. If no systems have been defined for the transport, only the local system is displayed on the screen. (Figure 6-16 shows a screen with systems already designated on the transport.)

- To designate systems, or to review or modify designated systems on a switched Point-to-Point transport, press PF10 while viewing the Switched Point-to-Point System Designation screen. The Switched Point-to-Point System List menu appears (see Figure 6-17).

13:21:45 ** Review Systems on Point-Point Transport ** 06/02/88
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Please Review the Phone Number
 of each System sharing Transport WSNPTPTSWITCHED

| System | Type | Model | in Area | Phone Number |
|---------|------|-------|----------------|--------------|
| NETVS | VS | 100 | AREATWO | 8750987 |
| NOVA | VS | | AREA41TELENOVA | 8978765 |
| OA32SYS | VS | | AREAFORTY | |
| OISNM | OIS | 140 | AREANINENONCNS | 5352332 |
| OS11 | VS | 100 | AREATWO | |
| OS2 | OIS | 140 | AREANINENONCNS | |
| OSI1 | VS | 85 | AREAOSI | |
| OSI2 | VS | 85 | AREAOSI | |
| PROBE | VS | | AREANINENONCNS | |
| RASCAL | VS | | AREATWELVE | |

(2)First (4)Prev (6)Find (16)Exit
 (3)Last (5)Next (9)Modify (32)Menu

Figure 6-17. Switched Point-to-Point System List Menu

- The Switched Point-to-Point System List menu lists all the systems in the directory. Press PF9 to designate systems, modify existing information, or to delete designated systems. Enter a unique telephone number in the Phone Number field for each system, including the local system, that you want to designate on the switched Point-to-Point transport. If a system is not on the switched Point-to-Point transport, or you wish to delete it from the transport, leave the Phone Number field blank for that system.

Note: Every system on the switched Point-to-Point transport must have a unique phone number. You and the other administrators must establish phone numbers for all systems on the switched Point-to-Point transport. The number may consist of numeric characters and the following special characters: #, *, and :. Include a colon (:) in the number if you want to wait for a dial tone before attempting to establish a connection with a remote system. Hayes or Hayes-compatible modems support additional special characters that may also be used in the phone number string. (Refer to your modem's user manual for a list and description of these characters.)

4. Press ENTER once you have completed designating, modifying and/or deleting systems. Press PF16 to display the systems that have been designated on the transport.

6.7 DEFINING AN IDS 3271 BSC TRANSPORT

To define an IDS 3271 BSC transport, you first specify the appropriate information on the General Transport Definition screen (see Figure 6-3) after selecting IDS 3271 (BSC) from the Transport Type menu (see Figure 6-2). To complete the transport definition

1. Press ENTER after you have specified the appropriate information on the General Transport Definition screen to access the *Second* IDS 3271 (BSC) Transport Definition screen (see Figure 6-18).

```
14:50:57          ** Create IDS 3271 (BSC) Transport **          06/18/88
                  Copyright, Wang Laboratories, Inc. 1987

Please ENTER the definition of Transport WSNIDSBSC

      Controller address 00

          Attach Timeout 60 [ 0 thru 99 sec ]
          Attach Retry   2 [ 0 thru 5   ]

      Host Response Timeout ■90 [ 60 thru 180 sec ]
      CICS Logon Timeout   20 [ 10 thru 45 sec ]
      IDS Signon/Signoff Timeout 20 [ 0 thru 45 sec ]
      IDS Signon/Signoff Retry 3 [ 0 thru 5   ]

      MCP Procedure File RUNMCP■■
      in Library         WXEPROG■
      on Volume          ROY■■■

(16)Exit                                     (32)Menu
```

Figure 6-18. Second IDS 3271 Transport Definition Screen

The Second IDS 3271 Transport Definition screen displays the first screen of fields in which you must enter the specific parameters to define an IDS 3271 BSC transport. You can accept the default values given or enter new values for some or all of these fields. However, in both cases, you must supply the Controller address.

2. Enter the parameters that you require in the following fields:

Controller address -- Enter the Control Unit Address (Cluster Controller Address) the host uses for polling and selection. The value entered here must be in hexadecimal. It must also match the Control Unit Address specified in the Wang VS 3271 Emulator Master Control Program (MCP). The host generation parameters determine the Control Unit Address.

Attach Timeout -- Enter the number of seconds the IDS Transport waits after failing to attach to the Master Control Program (MCP) before it tries again if the Attach Retry Count permits. Values may range from 00 to 99. The default is 60.

Attach Retry -- Enter the number of times the IDS Transport attempts to attach to MCP after failing to do so once. Values may range from 0 to 5. The default is 2.

Host Response Timeout -- Enter the Host Response Timeout limit in seconds. The value can be from 60 to 180. The default is 90. Host Response Timeout defines how long the VS system waits for a response from the IDS application on the host. If the VS system has not received a response when the timer expires, the VS system deactivates the transport and the session, and the File Transfer Manager, via CNS, sends you the link-terminated message Net Send Return Code 5.

CICS Logon Timeout -- Enter the CICS Logon Timeout limit in seconds. CICS Logon Timeout defines how long the VS system waits for a response after sending a sign-on to CICS. The value can be from 10 to 45. The default is 20. A low value (10 to 15) does not realistically allow time for logon to be accomplished and is generally not recommended.

IDS Signon/Signoff Timeout -- Enter the number of seconds the local VS system waits for link sign-on or sign-off events to occur. The timer begins when the local VS issues a sign-on or sign-off request to the host. If the requested sign-on or sign-off has not been received from the host when the timer expires, the failure is logged and the IDS Transport tries again to fulfill the request if the IDS Signon/Signoff Retry Count permits. Values may range from 00 to 45 seconds. The default is 20. Values between 10 and 45 give the best results.

IDS Signon/Signoff Retry -- Enter the number of times the VS attempts to fulfill sign-on or sign-off events after failing to do so once. Values may range from 0 to 5. The default is 3.

MCP Procedure File -- Enter the file containing the procedure that runs MCP. It is recommended that you write a procedure that supplies input required by program MCP and enter the procedure's file name, library, and volume on this menu. Doing this enables CNS to activate MCP automatically when CNS attempts to enable the IDS link. MCP may be running when CNS attempts to activate it through such a procedure.

in Library -- Enter the library containing the procedure that runs MCP.

on Volume -- Enter the volume containing the procedure that runs MCP.

- Press ENTER when you have specified the appropriate information in the fields on the Second IDS 3271 BSC Transport Definition screen. The IDS 3271 BSC Transport Send/Receive Parameters screen appears (see Figure 6-19).

```

14:51:14                ** Create IDS 3271 (BSC) Transport **          06/18/88
                        Copyright, Wang Laboratories, Inc. 1987

                        Please ENTER the definition of Transport WSNIDSBSC

                                VS Transmit Parameters
Dev address 00 [ 40, 4A-50, 5A-5F, C1-C9, D1-D9 ]          Password ████████
1st Sign On ████████████████████████████████████████████████████████████
2nd Sign On ████████████████████████████████████████████████████████████
Sign Off   ████████████████████████████████████████████████████████████

                                VS Receive Parameters
Dev address 00 [ 40, 4A-50, 5A-5F, C1-C9, D1-D9 ]          Password ████████
1st Sign On ████████████████████████████████████████████████████████████
2nd Sign On ████████████████████████████████████████████████████████████
Sign Off   ████████████████████████████████████████████████████████████

(16)Exit                                     (32)Menu
  
```

Figure 6-19. IDS 3271 BSC Transport Send/Receive Parameters Screen

4. The fields on the IDS 3271 BSC Transport Send/Receive Parameters screen identify the Emulator resources used to send and receive IDS messages, and the sign-on security parameters IDS needs to access the Emulator and the host. The screen is divided into two sections, one for transmit parameter fields and one for receive parameter fields. Enter the appropriate information for each of the fields shown.

The transmit parameter fields are

Dev Address -- Enter the Send Device Unit Address (SDUA) on the 3271 BSC Emulator that IDS uses to send data to the host. This value must be entered in hexadecimal. It is recommended that you allocate to IDS the two highest SDUAs configured on the Emulator. Valid device addresses are 40, C1 through C9, D1 through D9, 4A through 50, and 5A through 5F. The SDUA matches

- A DUA configured on the VS 3271 BSC Emulator through program MCP.
- The NCP host generation parameters (already required for Emulator capability).
- The entry in the CICS Terminal Control Table that defines the IDS transmit terminal to the host.

Password -- Enter the send password of up to eight alphanumeric characters that IDS passes to the Emulator. The BSC 3271 Emulator enables you to define a device password as part of the configuration defined by program MCP. If no send password is defined for the device unit allocated for IDS transmission, you can leave this field blank. However, if this device unit is password-protected in MCP, you must enter the required password in this field. Otherwise, IDS cannot use the Emulator device unit allocated to it.

1st Sign On -- Enter the host-defined sign-on to CICS. This value can be up to 64 alphanumeric characters.

2nd Sign On -- Enter the host-defined sign-on to ACF2 or other security system. This value can be up to 64 alphanumeric characters. You can enter a multiple-field sign-on by separating the fields with a slash (e.g., "CSSN LOGON/NAME/PASSWORD"). The slash field separator causes CNS to search for the next modifiable field, even if the next modifiable field is on a new screen. Every modifiable field must be accounted for. To skip a field, enter a space as the field value.

Sign Off -- (Send Sign-off) Enter the host-defined sign-off from both ACF/VTAM and CICS. This value can be up to 64 alphanumeric characters.

The receive parameter fields are

Dev Address -- Enter the Receive Device Unit Address (RDUA) parameter similar to the SDUA previously described. This value must be entered in hexadecimal. Valid addresses for the receive parameter are the same as valid send address values. However, the receive device unit address cannot be the same as the send unit device address.

Password -- Enter the receive parameter similar to the Send Password previously described.

1st Sign On -- Enter the receive parameter similar to the CICS Send Sign On previously described.

2nd Sign On -- Enter the receive parameter similar to the ACF2 Sign On previously described.

Sign Off -- Enter the receive parameter similar to the Send Sign Off previously described.

5. Press ENTER when you have specified the appropriate information in the fields on the IDS 3271 BSC Transport Send/Receive Parameters screen. The Transport List menu appears, allowing you to designate systems on the IDS 3271 BSC transport.

6.7.1 Designating Systems on an IDS 3271 BSC Transport

Once the IDS 3271 BSC transport has been defined, you can designate the systems on that transport. Thus, you must designate the IBM or plug-compatible (such as, Amdahl) mainframe and another VS as the systems on the IDS 3271 BSC transport. To do this, perform the following steps:

1. Position the cursor under the selection block next to the name of the IDS 3271 BSC transport on the Transport List menu and press ENTER. A screen identical to the Dedicated Point-to-Point System Definition screen appears (see Figure 6-11). This screen lists the names of all the systems on the transport. The screen also lists the type, model, area and key for each system (the key field indicates only that a particular system has been defined on the IDS 3271 BSC transport).

The procedure for designating a system on an IDS 3271 BSC transport is the same as the procedure for designating a system on a dedicated Point-to-Point transport. If no systems have been designated on the transport, only the local VS is displayed on the screen.

2. Press PF10 to access the menu that enables you to designate a system, or to review or modify designated systems on an IDS 3271 BSC transport. The menu that appears is similar to the Dedicated Point-to-Point System List menu (refer to Figure 6-12). This menu lists all the systems in the network. It also lists the type, model, area and key for each system.

Note: If a system has been designated on the IDS 3271 BSC transport, a nonblank character appears in the Key field for that system. If a system has not been defined for the IDS 3271 BSC transport, the Key field is blank for that system.

3. Press PF9 to designate systems on the IDS 3271 BSC transport. The key fields for all the systems on the menu appear in modify (highlighted) mode. Then position the cursor in the key field for the mainframe or the VS system you wish to designate, including the local system. Type a nonblank character in the key field.

Note: Pressing PF9 also allows you to delete designated systems on the IDS 3271 BSC transport. The Key fields for all the systems on the list appear in modify mode. Position the cursor in the Key field for the system definition you wish to delete. Then use the space bar or the DELETE key to delete the nonblank character from the key field.

4. Press ENTER once you have finished designating and/or deleting systems. Press PF16 to display the systems that have been designated on the transport.

6.8 DEFINING AN IDS 3274 SNA TRANSPORT

To define an IDS 3274 SNA transport, first specify the appropriate information on the General Transport Definition screen (see Figure 6-3) after selecting IDS 3274 (SNA) on the Transport Type menu (see Figure 6-2). To complete the transport definition

1. Press ENTER after you have specified the appropriate information on the General Transport Definition screen to access the Second screen for defining a 3274 SNA transport (see Figure 6-20).

14:52:39

** Create IDS 3274 (SNA) Transport **
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06/18/88

Please ENTER the definition of Transport WSNIDSSNA

PU Name PU01

| | | |
|----------------------------|----|---------------------|
| Attach Timeout | 60 | [0 thru 99 sec] |
| Attach Retry | 2 | [0 thru 5] |
| Host Response Timeout | 90 | [60 thru 180 sec] |
| CICS Logon Timeout | 20 | [10 thru 45 sec] |
| IDS Signon/Signoff Timeout | 20 | [0 thru 45 sec] |
| IDS Signon/Signoff Retry | 3 | [0 thru 5] |

MCP Procedure File RUNMCP
in Library WXEPROG
on Volume ROY

(16)Exit

(32)Menu

Figure 6-20. Second IDS 3274 SNA Transport Definition Screen

The Second IDS 3274 SNA Transport Definition screen displays the first screen of fields in which you must enter the specific parameters to define an IDS 3274 SNA transport. You can accept the default values given, or enter new values for some or all of these fields. However, in both cases, you must supply the Controller address.

2. Enter the parameters that you require in the following fields:

PU Name -- Enter the name of the Physical Unit (which implies a unique SDLC address) the host uses for polling and selection. The value you enter here must match the PUNAME specified in the Wang VS 3274 Emulator configuration program (SNAEDIT). The host generation parameters determine the PUNAME. The PUNAME also matches the specifications in the CICS Terminal Control Table defined on the host.

Attach Timeout -- Enter the number of seconds the IDS Transport waits after failing to attach to the Master Control Program (MCP) before it tries again if the Attach Retry Count permits. Values may range from 0 to 99. The default is 60.

Attach Retry -- Enter the number of times the IDS Transport attempts to attach to MCP after failing to do so once. Values may range from 0 to 5. The default is 2.

Host Response Timeout -- Enter the Host Response Timeout limit in seconds. The value can be from 60 to 180. The default is 90. Host Response Timeout defines how long the VS system waits for a response from the IDS application on the host. If the VS system has not received a response when the timer expires, the VS system deactivates the transport and the session, and the File Transfer Manager, via CNS, sends you the link-terminated message Net Send Return Code 5.

CICS Logon Timeout -- Enter the CICS Logon Timeout limit in seconds. CICS Logon Timeout defines how long the VS system waits for a response after sending a sign-on to CICS. The value can be from 10 to 45. The default is 20. A low value (10 to 15) does not realistically allow time for logon to be accomplished and is generally not recommended.

IDS Signon/Signoff Timeout -- Enter the number of seconds the local VS system waits for link sign-on or sign-off events to occur. The timer begins when the local VS issues a sign-on or sign-off request to the host. If the requested sign-on or sign-off has not been received from the host when the timer expires, the failure is logged and the IDS Transport tries again to fulfill the request if the IDS Signon/Signoff Retry Count permits. Values may range from 0 to 45 seconds. The default is 20. Values between 10 and 45 give the best results.

IDS Signon/Signoff Retry -- Enter the number of times the VS attempts to fulfill sign-on or sign-off events after failing to do so once. Values may range from 0 to 5. The field defaults to 3.

MCP Procedure File -- Enter the file containing the procedure that runs MCP. It is recommended that you write a procedure that supplies input required by program MCP and enter the procedure's file name, library, and volume on this menu. Doing this enables CNS to activate MCP automatically when CNS attempts to enable the IDS link. MCP may be running when CNS attempts to activate it through such a procedure.

in Library -- Enter the library containing the procedure that runs MCP.

on Volume -- Enter the volume containing the procedure that runs MCP.

3. Press ENTER after you have specified the appropriate information in the fields on the Second IDS 3274 SNA Transport Definition screen. The IDS 3274 SNA Transport Send/Receive Parameters screen appears (see Figure 6-21).

14:52:58

** Create IDS 3274 (SNA) Transport **
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06/18/88

Please ENTER the definition of Transport WSNIDSSNA

```

                                VS Transmit Parameters
LU number 02 [ 02 thru 33 ]
1st Sign On /rty
2nd Sign On
Sign Off
```

```

                                VS Receive Parameters
LU number 03 [ 02 thru 33 ]
1st Sign On /67
2nd Sign On
Sign Off
```

(16)Exit

(32)Menu

Figure 6-21. IDS 3274 SNA Transport Send/Receive Parameters Screen

- The fields on the IDS 3274 SNA Transport Send/Receive Parameters screen identify the Emulator resources used to send and receive IDS messages, and the sign-on and security parameters IDS needs to access the Emulator and the host. The screen is divided into two sections, one for transmit parameter fields and one for receive parameter fields. Enter the appropriate information for each of the fields shown.

The transmit parameter fields are

LU Number -- Enter the number of the Logical Unit (LU) on the 3274 SNA Emulator that IDS uses to send data to the host. Enter this value only as a decimal number. It is recommended that you allocate to IDS the two highest LUs configured on the Emulator. Valid LU numbers are 02 through 33. No duplicates are allowed. The LU NUMBER matches the following:

- An LU configured on the VS 3274 SNA Emulator through program SNAEDIT.
- The NCP host generation parameters (already required for Emulator capability).
- The entry in the CICS Terminal Control Table that defines the IDS transmit terminal to the host.

1st Sign On -- Enter the host-defined sign-on to CICS. This value can be up to 64 alphanumeric characters.

2nd Sign On -- Enter the host-defined sign-on to ACF2 or other security system. This value can be up to 64 alphanumeric characters. You can enter a multiple-field sign-on by separating the fields with a slash (e.g., "CSSN LOGON/NAME/PASSWORD"). The slash field separator causes CNS to search for the next modifiable field, even if the next modifiable field is on a new screen. Every modifiable field must be accounted for. To skip a field, enter a space as the field value.

Sign Off -- Enter the host-defined sign-off from both ACF/VTAM and CICS. This value can be up to 64 alphanumeric characters.

The receive parameter fields are

LU Number -- Enter the receive parameter similar to the send LU NUMBER previously described. Valid receive LU numbers are the same as valid send LU numbers. However, the receive LU number must not equal the send LU number.

1st Sign On -- Enter the receive parameter similar to the CICS SIGN ON previously described.

2nd Sign On -- Enter the receive parameter similar to the ACF2 SIGN ON previously described.

Sign Off -- Enter the receive parameter similar to the send SIGN OFF previously described.

5. Press ENTER after you have specified the appropriate information in the fields on the IDS 3274 SNA Transport Send/Receive Parameters screen. The Transport List menu appears, allowing you to define systems on the IDS 3274 SNA transport.

6.8.1 Designating Systems on an IDS 3274 SNA Transport

Once the IDS 3274 SNA transport has been defined, you can designate the systems on that transport. Thus, you must designate the IBM or plug-compatible (such as, Amdahl) mainframe and another VS system on the IDS 3274 SNA transport.

To designate systems or to review designated systems on an IDS 3274 SNA transport, position the cursor under the selection block next to the name of the IDS 3274 SNA transport on the Transport List menu and press ENTER. After this point, the procedure for designating systems and deleting designated systems is the same as the one used for designating systems and deleting designated systems on an IDS 3271 BSC transport. The screens and fields involved are identical. (Refer to Section 6.7.1 for more information.)

6.9 DEFINING A WANG PC LOCAL COMMUNICATIONS TRANSPORT

To define a WSN Wang PC Local Communications transport, you need only specify the appropriate information on the General Transport Definition screen (see Figure 6-3) after selecting PC Local Option from the Transport Type menu (see Figure 6-2). Press ENTER after you have specified the appropriate information on the General Transport Definition screen. You can then define systems on the transport.

When you return to the Transport List menu (see Figure 6-1), the screen will display the information for the WSN Wang PC Local Communications transport you just defined.

6.9.1 Designating Systems on a Wang PC Local Communications Transport

When you designate systems on a Wang PC Local Communications transport, you designate the Wang PC system and the VS to which it is connected. To designate a system or to review a designated system on a Wang PC Local Communications transport, position the cursor under the selection block next to the name of the Wang PC Local Communications transport on the Transport List menu and press ENTER.

From this point on, the procedure for designating systems and deleting designated systems is the same as the procedure used for designating systems and deleting designated systems on a WSN Dedicated Point-to-Point transport. You simply designate the local VS and the PC that is connected to it. The screens and fields involved are identical. (Refer to Section 6.5.1 for more information.)

6.10 DEFINING AN IEEE 802.3 TRANSPORT

WSNEDIT allows you to configure an IEEE 802.3 transport that is installed on your system.

To define an IEEE 802.3 transport, you need only specify the appropriate information on the General Transport Definition screen (see Figure 6-3) after selecting IEEE 802.3 from the Transport Type menu (see Figure 6-2). Press ENTER after you have specified the appropriate information on the General Transport Definition screen. The Transport List menu appears.

When you return to the Transport List menu, it displays the IEEE 802.3 transport you just defined. You can then proceed to designate systems on the IEEE 802.3 transport.

6.10.1 Designating Systems on an IEEE 802.3 Transport

To designate systems, or to review or modify designated systems on an IEEE 802.3 transport

1. Position the cursor under the selection block next to the name of the IEEE 802.3 transport on the Transport List menu and press ENTER. The IEEE 802.3 System Designation screen appears (see Figure 6-22).

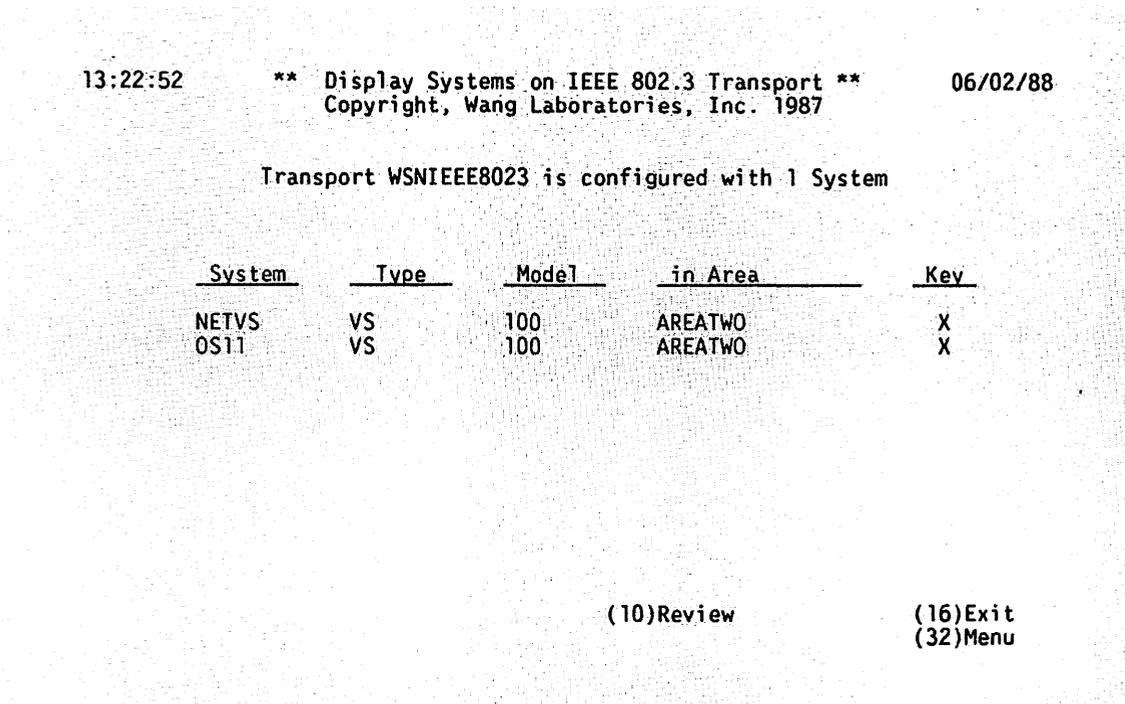


Figure 6-22. IEEE 802.3 System Designation Screen

The IEEE 802.3 System Designation screen lists the names of all the systems on the IEEE 802.3 transport. The screen also lists the type, model, area and key for each system. (The key field indicates only that a particular system has been defined on the IEEE 802.3 transport.) If no systems have been defined for the transport, only the local system is displayed on the screen. (Figure 6-22 shows a screen with a system already designated on the transport.)

- To designate systems, or to review or modify designated systems on an IEEE 802.3 transport, press PF10 while viewing the IEEE 802.3 System Designation screen. The IEEE 802.3 System List menu appears (Figure 6-23).

13:24:20

** Review Systems on IEEE 802.3 Transport **
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06/02/88

Please Review the Systems sharing Transport WSNIEE8023

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Key</u> |
|---------------|-------------|--------------|----------------|------------|
| NETVS | VS | 100 | AREATWO | X |
| NOVA | VS | | AREA41TELENOVA | ■ |
| OA32SYS | VS | | AREAFORTY | ■ |
| OS11 | VS | 100 | AREATWO | X |
| OSI1 | VS | 85 | AREAOSI | ■ |
| OSI2 | VS | 85 | AREAOSI | ■ |
| PROBE | VS | | AREANINENONCNS | ■ |
| RASCAL | VS | | AREATWELVE | ■ |
| SNA15 | VS | 15 | AREAFOUR | ■ |
| SNA90 | VS | 100 | AREAFOUR | ■ |

(2)First (4)Prev (6)Find
(3)Last (5)Next

(9)Modify

(16)Exit
(32)Menu

Figure 6-23. IEEE 802.3 System List Menu

- The IEEE 802.3 System List menu lists all of the systems in the directory. Press PF9 to designate systems, modify existing information, or to delete designated systems. Enter an X in the Key field for each system that you want to designate on the IEEE 802.3 transport. If a system is not on the IEEE 802.3 transport, or you wish to delete it from the transport, leave the Key field blank for that system.
- Press ENTER when you finish designating, modifying and/or deleting systems. Press PF16 to display the systems that have been designated on the transport.

6.11 DEFINING AN X.25 TRANSPORT

WSNEDIT allows you to define X.25 transports that are installed on your system. It supports several kinds of X.25 transports for connections to different public data switched networks (PSDNs) such as, International, Telenet, Tymnet, and SangPac. The procedure for defining an X.25 transport and systems on the transport is the same for each PSDN.

To define an X.25 transport, press ENTER after selecting the desired X.25 transport from the Transport Type menu (see Figure 6-2). Then specify the appropriate information on the General Transport Definition screen (see Figure 6-3). To complete the transport definition

1. Press ENTER after you have specified the appropriate information on the General Transport Definition screen to access the *Second X.25 Transport Definition* screen (see Figure 6-24).

```
14:59:16          ** Modify X25 TELENET Transport **          06/18/88
                  Copyright, Wang Laboratories, Inc. 1987

                  Please Modify the definition of Transport X25TELENET

                  Electrical Interface RS232 [ RS232 or RS449 ]
                  Line Speed 9600 [ 1200, 2400, 4800, 9600, ]
                               [ 19200, 56000, or 64000 ]

                  Maximum Virtual Circuits 24 [ 1 thru 24 ]
                  Modify Network Defaults NO [ YES or NO ]

(16)Exit          (32)Menu
```

Figure 6-24. Second X.25 Transport Definition Screen

2. The Second X.25 Transport Definition screen allows you to specify the X.25 specific parameters that are required to define an X.25 transport. Each field on the screen has a default setting. Press ENTER if you wish to use all of the default settings. To change the default settings, enter the appropriate information.

The fields that appear on the X.25 Transport Definition screen are

Electrical Interface -- Enter the type of modem connector for the link. The modem connector acts as the interface between Data Terminal Equipment (such as, VS-6550) and Data Communication Equipment (modem). Valid types are RS232 (default) and RS449.

Line Speed -- Enter the modem speed for the transport. (The network generally supplies the modem.) The speed is agreed to with the network per the customer contract. Valid line speeds (in bps) are 1200, 2400, 4800, 9600 (the default setting), 19200, 56000, and 64000.

Maximum Virtual Circuits -- Enter the default setting, 24, or a value less than that at this time, based on your overall system configuration. Higher values are reserved at this time. (Call requests are sent on the highest numbered virtual circuit so this number needs to match the customer contract.)

Modify Network Defaults -- Enter YES or NO to specify whether or not the screen that enables you to enter X.25 subscription parameters is displayed. Enter YES in this field only if you are using a customized X.25 service with nonstandard defaults. Enter NO (the default response) if your VS is using standard X.25 parameters. (If you are unsure whether or not you need to change your default parameters, refer to your X.25 service contract or consult your X.25 subscription service representative.)

3. Press ENTER when you have finished specifying information on the X.25 Transport Definition screen.
 - If you entered NO in the Modify Network Defaults field, the Transport List menu appears, enabling you to define systems on the X.25 transport (refer to Section 6.11.1).
 - If you entered YES in this field, the X.25 Subscription Parameters screen appears (see Figure 6-25).

14:59:39

** Modify X25 TELENET Transport **
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06/18/88

Please Modify the definition of Transport X25TELENET

| <u>Parameter</u> | <u>Negotiable</u> | <u>Calling DTE</u> | <u>Called DTE</u> | <u>Range</u> |
|------------------|-------------------|--------------------|-------------------|---|
| Frame Window | | 7 | 7 | [2 thru 7] |
| Packet Window | NO■ | 2 | 2 | [2 thru 7] |
| Packet Size | NO■ | 128 | 128 | [128, 256, or 512] |
| Throughput class | NO■ | ■9600 | ■9600 | [75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200 or 48000] |

Features supported:

| | | |
|--------------------|-----|---------------|
| Fast select | NO■ | [YES or NO] |
| D bit modification | NO■ | [YES or NO] |
| Call statistics | NO■ | [YES or NO] |
| Sub addressing | NO■ | [YES or NO] |
| Diagnostic bytes | NO■ | [YES or NO] |

(16)Exit

(32)Menu

Figure 6-25. X.25 Subscription Parameters Screen

The X.25 Subscription Parameters screen enables you to specify nonstandard parameters. The screen is divided into two parts. The top part of the screen enables you to enter frame window, packet window size, packet size, and throughput class parameters. The bottom part of the screen enables you to specify whether or not certain features are supported. The fields in the top part of the screen are arranged in matrix form. The columns of the matrix include the specific parameter, whether or not the parameter is negotiable, the parameter assigned to the calling (that is, local) data terminal equipment (DTE), the parameter assigned to the called DTE, and the range of negotiation.

Note: Your X.25 packet-switched data network (PSDN) representative should supply information for the following fields. The majority of these networks support frame window defaults of 7, packet window defaults of 2, and packet size defaults of 128. You should not alter any of the parameters on the Subscription Parameter screen without first checking your X.25 subscription service contract.

4. Enter the appropriate information in the fields on the X.25 Subscription Parameters screen.

The fields on the top part of the X.25 Subscription Parameters screen are

Frame Window -- Enter the following information:

- The number of frames that the local system's DTE can send before receiving an acknowledgment of their arrival when the local system is the calling DTE. The number can be from 1 to 7 (7 is the default setting). Enter this parameter in the Calling DTE column.
- The number of frames that the local system's DTE can receive from the called DTE before sending an acknowledgment. The number can be from 1 to 7 (7 is the default setting). Use the value agreed upon with the network. Enter this parameter in the Called DTE column.

Packet Window -- Enter the following information:

- Whether or not the packet window is negotiable. The Negotiable column enables you to specify whether or not the VS can acquire a packet window size from the network other than the default specified in the Calling and Called DTE columns. The range of negotiation can be from 2 to 7 (Modulo 8 flow control support). For example, if some packets are outstanding, a packet window size other than the default may be required. Enter YES in the Negotiable column if negotiation is permitted; enter NO if the default specified in the Calling and Called DTE fields is always to be used.
- The number of packets that the local system's DTE should send before receiving an acknowledgment of their arrival when the local DTE is the calling DTE. The number can be from 2 (the default setting) to 7. Enter this parameter in the Calling DTE column.
- The number of packets that the local system should receive from the called DTE before sending an acknowledgment of their arrival. The number can be from 2 (the default setting) to 7. Enter this parameter in the Called DTE column.

Packet Size -- Enter the following information:

- Whether or not the network enables the VS to send packets with sizes that differ from the size specified in the Calling and Called DTE columns. For example, if the packet size is normally 128 bytes and circumstances suddenly require that the size be increased to 256 bytes, the VS would be permitted to transmit 256-byte packets. The range of negotiation is 128 to 512. Enter YES if negotiation is permitted; enter NO if the default specified in the Calling and Called DTE columns is always to be used.
- The size (in bytes) of the outbound packets when the local DTE is the calling DTE. The size can be 128 (the default setting), 256, or 512 bytes. Enter this parameter in the Calling DTE column.
- The size (in bytes) of the inbound packets from a called DTE. The size can be 128 (the default setting), 256, or 512 bytes. Enter this value in the Called DTE column.

Throughput Class Fields -- Enter the following information:

- Whether or not the service contract permits throughput class negotiation. For each user class of service the network provides, a DTE-to-DTE throughput class is associated with it. The throughput class negotiation facility is a user facility agreed to for a period of time that a DTE can use for virtual calls. If subscribed to, this facility permits negotiation of throughput classes on a per call basis. The throughput classes are considered independently for each direction of data transmission. Enter YES if throughput class negotiation is permitted; enter NO if it is not permitted.
- The throughput class for transmission from the calling (i.e., local) DTE. Enter this value (in bps) in the Calling DTE column.
- The throughput class for transmission from the called DTE. Enter this value (in bps) in the Called DTE column.

The fields on the bottom part of the X.25 Subscription Parameters screen are

Fast select -- Specify whether or not the service contract permits fast select support. Fast select is an optional user facility that DTEs can request on a per call basis by means of an appropriate facility request in a call request packet.

If requested in the call request packet and if the packet indicates no restriction on response, the following items are authorized:

- The call request packet may contain a user field of up to 128 octets.
- During the DTE waiting state, the data communication equipment (DCE) may transmit a call connected or clear indication packet with a called or clear user data field respectively of up to 128 octets.
- After the call is connected, the DTE and DCE may transmit a clear request or a clear indication packet respectively with a clear user data field of up to 128 octets.

Enter YES if this facility is permitted in the contract; enter NO if it is not permitted.

D bit modification -- Specify whether or not the service contract provides for Delivery Confirmation (D) Bit Modification support. The D bit is Bit 7 of the General Format Identifier (GFI). Every packet starts with a GFI, which identifies the general type of packet group (e.g., call accept). The setting of the D bit is used to indicate whether or not the DTE is to receive an end-to-end acknowledgement of delivery for data it is transmitting by means of the packet receive sequence number. Without D Bit Modification support, the bit is set to 0, signifying that the local DTE does not request acknowledgement from the remote DTE. With D Bit Modification support, the local DTE sets the D bit to 1 to request acknowledgement from the remote DTE. Enter YES if the service contract provides for D bit modification support; enter NO if it is not provided.

Call statistics -- Specify whether or not the service contract provides for call statistics or charging information support. If this facility is provided, the network supplies charging information and other statistical records for calls. Enter YES if the service contract provides for this support; enter NO if this support is not provided.

Sub addressing -- Specify whether or not the service contract provides for subaddressing support. A subaddress is a 2-digit address that is attached to the DTE address. The subaddress identifies a particular end user. Enter YES if subaddressing support is provided; enter NO if it is not provided.

Diagnostic bytes -- Specify whether or not the service contract provides for Diagnostic-bytes support. A diagnostic byte is found in clear, reset, and restart packets to explain reasons for events involving those packets. Enter YES if Diagnostic-bytes support is provided; enter NO if it is not provided.

5. Press ENTER after you have entered the appropriate parameters. The Transport List menu appears, displaying the X.25 transport you just created. You may then proceed to define systems on the X.25 transport.

6.11.1 Designating Systems on an X.25 Transport

To designate systems, or to review or modify designated systems on an X.25 transport

1. Position the cursor under the selection block next to the name of the appropriate X.25 transport on the Transport List menu and press ENTER to access the X.25 System Designation screen (see Figure 6-26).

```

13:29:13      ** Display Systems on X25 TELENET Transport **      06/02/88
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                Transport X25TELENET is configured with 5 Systems

                System      Type      Model      in Area      DTE Address
                NETVS      VS          100          AREATWO        454544
                NOVA       VS          100          AREA41TELENOVA 675543
                OA32SYS     VS          100          AREAFORTY      554355
                OISNM      OIS        140          AREANINENONCNS 235232
                OS11       VS          100          AREATWO        243444

                                (10)Review      (16)Exit
                                (32)Menu
  
```

Figure 6-26. X.25 System Designation Screen

The X.25 System Designation screen lists the names of all the systems on the X.25 transport. The screen also lists the type, model, area, and data terminal equipment (DTE) address for each system. If no remote systems have been designated on the transport, only the local VS is displayed on the screen. (Figure 6-26 shows a screen with systems already designated on the transport.)

- To designate systems, or to review or modify designated systems on an X.25 transport, press PF10 while viewing the X.25 transport System Designation screen. The WSN X.25 System List menu appears (see Figure 6-27).

13:28:48 ** Review Systems on X25 TELENET Transport ** 06/02/88
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Please Review the DTE Address
 of each System sharing Transport X25TELENET

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>DTE Address</u> |
|---------------|-------------|--------------|----------------|--------------------|
| NETVS | VS | 100 | AREATWO | 454544■■■■■■■■ |
| NOVA | VS | | AREA41TELENOVA | 675543■■■■■■■■ |
| OA32SYS | VS | | AREAFORTY | 554355■■■■■■■■ |
| OISNM | OIS | 140 | AREANINENONCNS | 235232■■■■■■■■ |
| OS11 | VS | 100 | AREATWO | 243444■■■■■■■■ |
| OS2 | OIS | 140 | AREANINENONCNS | ■■■■■■■■■■■■■■ |
| OSI1 | VS | 85 | AREAOSI | ■■■■■■■■■■■■■■ |
| OSI2 | VS | 85 | AREAOSI | ■■■■■■■■■■■■■■ |
| PROBE | VS | | AREANINENONCNS | ■■■■■■■■■■■■■■ |
| RASCAL | VS | | AREATWELVE | ■■■■■■■■■■■■■■ |

(2)First (4)Prev (6)Find (16)Exit
 (3)Last (5)Next (9)Modify (32)Menu

Figure 6-27. X.25 System List Menu

- The X.25 System List menu lists all of the systems in the directory. Press PF9 to designate systems, modify existing information, or to delete designated systems. Enter the DTE address for each system that can be reached via the X.25 transport, including the local system. The network assigns the address for each system (in the same way that the telephone company assigns a phone number). Systems that have been designated on the transport have a DTE address in the DTE Address field.

To delete designated systems on a X.25 transport, position the cursor in the DTE Address field for the system definition you want to delete and use the space bar or the DELETE key to delete the DTE address from the DTE Address field.

- Press ENTER once you have finished designating and/or deleting systems. Press PF16 to display the systems that have been defined on the transport.

CHAPTER 7 MANAGING WSN ROUTING

7.1 INTRODUCTION

You are ready to define paths to destinations after you define all the transport configurations for the local (target) VS. (Refer to the note in Chapter 6, which explains the use of the terms "local" and "target.") A path is the course over which a message travels between the originating system and destination. The destination can be another system or an area designation.

The WSNEDIT Manage Routing function enables you to define paths for two separate routing purposes:

CNS routing -- Defines the paths that CNS uses to route data between systems.

Store and Forward routing -- Defines the paths that Store and Forward uses to route packages through the network.

Note: Do not confuse CNS path and Store and Forward path definition. Store and Forward routes rely on standard CNS path definitions, since Store and Forward uses CNS. The Store and Forward routing configuration only specifies the intermediate points at which information gets stored and then forwarded along the path. These systems must have sufficient on-line storage to accept an entire "package" before forwarding to the next system. (Refer to Chapter 2 for more information about CNS and Store and Forward routing concepts.)

To access the WSNEDIT Manage Routing function, press PF6 (Manage Routing) from the WSNEDIT main menu (see Figure 5-9). The Destination Systems and Areas menu appears if you specified the configuration file when you accessed the Manage Transports or Manage Services function.

If you have not previously specified the configuration file, a screen appears that asks you to specify the file and the target system for which it is intended. The Destination Systems and Areas menu appears after you specify the file and press ENTER (see Figure 7-1).

16:25:27

** Display WSN Routing **
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06/18/88

Please position the cursor at the appropriate tabstop and press ENTER to manage WSN routing from NYVS2 to the given destination

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Paths Defined</u> | <u>Least Cost Path</u> |
|---------------|-------------|--------------|------------------|----------------------|------------------------|
| ■ (all) | systems | without | an explicit path | 1 | NYVS1■■■■ |
| ■ (all) | systems | within | AREA2 | 1 | CHIVS2■■■ |
| ■ (all) | systems | within | AREA3 | 1 | CHIVS2■■■ |
| ■ (all) | systems | within | AREA27EUROPE | 0 | ATLAS■■■■ |
| ■ (all) | systems | within | AREA41TELENOVA | 0 | NOVA■■■■■ |
| ■ (all) | systems | within | AREA70AUSTRALIA | 1 | ATLAS■■■■ |
| ■ STVS1 | VS | 7150 | AREA1 | 2 | BOSVS1■■■ |
| ■ DTVS4 | VS | 85 | AREA1 | 1 | DTVS4■■■■ |
| ■ BOSVS1 | VS | 7110 | AREA1 | 1 | BOSVS1■■■ |
| ■ DALPC6 | PC | 280 | AREA1 | 0 | ■■■■■■■ |
| ■ DENPC | PC | IBM | AREA1 | 0 | ■■■■■■■ |

(3)Last (5)Next (6)Find (9)Modify (14) S&F Hops (16)Exit (32)Menu

Figure 7-1. Destination Systems and Areas Menu

The Destination Systems and Areas menu lists all the destination systems and areas in the network. It also lists certain parameters that are associated with each of the systems. From this menu you can define WSN (CNS) paths, or you can press PF14 to define Store and Forward next hops. When defining Store and Forward next hops, PF14 will return you to WSN path definition. The menu automatically defaults to WSN path definition when you first access it.

7.2 DEFINING CNS ROUTING

When you run WSNEDIT to define paths, you specify the destinations to which messages are routed by way of an adjacent or next-hop system that is running CNS. You may define no more than three paths from the local system to a particular destination; that is, you may not define paths from the local system to the destination by way of more than three next-hop (adjacent) systems.

Note: Refer to the CNS routing overview in Chapter 2 before you run WSNEDIT to configure routes. If you are configuring a new system, the information required to define the specific paths for your local system should be recorded on the appropriate Network Planning Configuration Checklist in Appendix B.

Cautions: CNS does not support more than three communications paths between a source and a destination.

Do not configure paths that have more than five intermediate systems (hops) between a source and destination. Performance will not be acceptable if messages have to pass through more than five systems between source and destination. This limitation should be reflected in your network topology.

Do not create your routing configuration so that a system in one area must route messages to a destination in that area through a system in another area. For example, System A and System B are in the same area. The routing configuration should not be created so that the only way for System A to route messages to System B is through a system in another area.

The transport configuration determines which systems are adjacent and which systems are nonadjacent. The routing configuration cannot be created until adjacent systems have been designated on the appropriate transports.

CNS-routed messages either originate from the local VS or are passing through the local VS on their way to a destination. Thus, messages that originate from one system are affected by the routing configuration on all the systems along the path.

To define CNS paths

1. Press PF6 (Manage Routing) from the WSNEDIT main menu to access the Destination Systems and Areas menu (see Figure 7-1).

The Destination Systems and Areas menu lists all the destination systems and areas in the network. Messages that originate from or pass through the local VS are sent to these destinations. Destinations are listed as either individual systems in the same area as the local VS, as all the systems within another area, or as all systems reached by means of a default path.

The Destination Systems and Areas menu displays the following information for each destination:

Type -- For individual systems in the same area as the local VS, the system type is listed if it was entered in the directory for that system. If the destination is all the systems in another area or all the systems to which a path has not been defined (for default path routing), "systems" appears in this field to indicate all systems.

Model -- For individual systems in the same area as the local VS, the system model is listed if it was entered in the directory for that system. If the destination is all the systems in an area, "within" appears to indicate all the systems in an area. If the destination is all the systems to which paths have not been defined (for default path routing), "without" appears in this field.

in Area -- The area in which the destination system or systems reside. "An explicit path" appears in this field to indicate that all destinations in the network that are not associated with specific and general routing records can be reached by way of a default path.

Paths Defined -- The number of paths defined from the local VS to the destination. The number of paths defined is equal to the number of specified adjacent systems by way of which the local VS can route messages. If no paths have been defined to a destination, 0 appears in this field.

Least Cost Path -- If two paths are defined to the destination, this field indicates the path assigned the lower Path cost. If only one path is defined, the field indicates the single path. The field displays the name of the adjacent system associated with the lower Path cost. Remember that each path is associated with an adjacent system, and each adjacent system, in turn, is associated with a Path cost. If no paths have been defined for the destination, the Least Cost Path field is blank.

Press PF2 (First), PF3 (Last), PF4 (Prev), or PF5 (Next) to scroll through the list of destinations when the list consists of more than one screen. Or use PF6 (Find) to search for a specific destination. Some or all of these keys appear at the bottom of the screen, depending on the number of screens that the list requires and the specific screen you are viewing at the time (*These keys have the same function on all screens in which they appear.*)

2. To specify a least cost path for a destination, press PF9 and enter the name of the adjacent system associated with the path. Press ENTER. This action automatically defines the least cost path and assigns it a Path cost of two.

You may use this field to create a path when none previously exists. This field does not enable you to change a least cost path. To change a least cost path, you must access the Path Definition menu as described in step 3.

3. Position the cursor next to the destination that you want to define, modify or delete a path for and press ENTER. The Path Definition menu appears (see Figure 7-2).

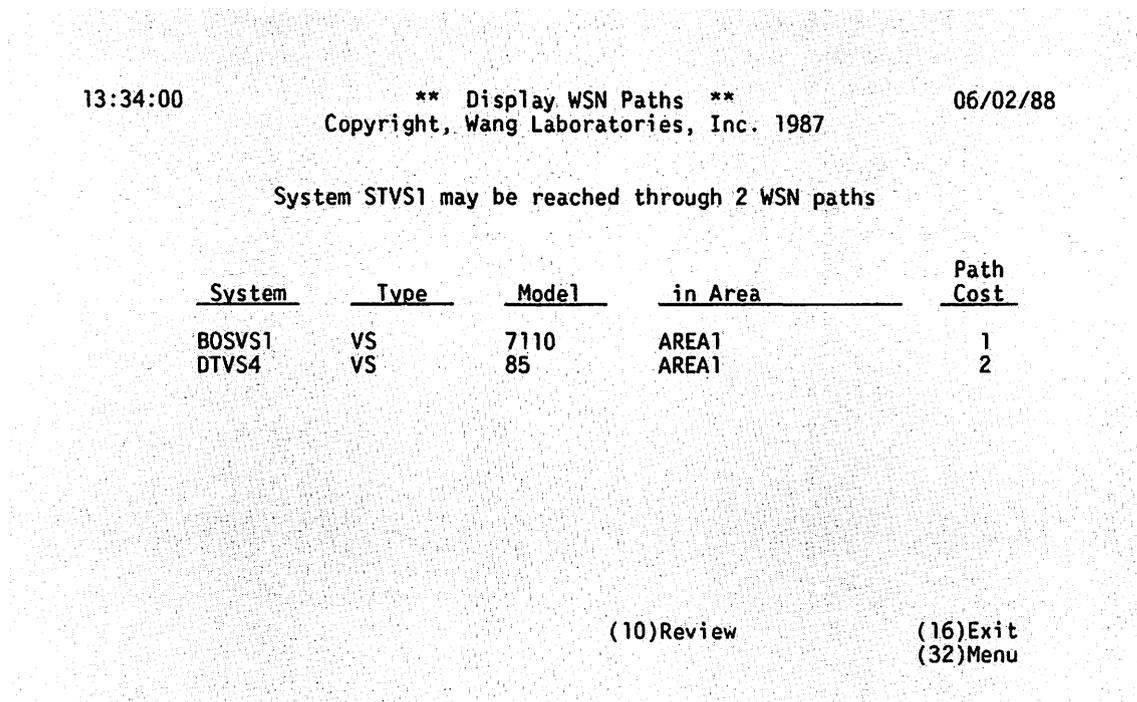


Figure 7-2. Path Definition Menu

The Path Definition menu lists the defined paths to the destination selected from the previous screen. The path is identified on the screen by the adjacent system with which it is associated. If no paths have been defined yet, none appear on the screen.

The Path Definition menu displays the following information about each path:

System -- The name of the adjacent system associated with the path.

Type -- The type of system if a system type was entered for the system in the directory.

Model -- The model number of the system if a model number was entered for the system in the directory.

in Area -- The area in which the adjacent system resides.

Path Cost -- A Path cost is assigned to an adjacent system if it has been used to define a path to a destination. When a path is defined, a Path cost is associated with an adjacent system by way of which messages are routed from the local system to a specific destination.

4. Press PF10 to access the Adjacent Systems menu, from which you can define new paths, modify existing paths, or delete paths. The Adjacent Systems menu appears (see Figure 7-3).

13:35:20

** Display WSN Paths **
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06/02/88

Please Review the Path Costs for each system through which
WSN can route information from NYVS2 to STVS1

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Path Cost</u> |
|---------------|-------------|--------------|----------------|------------------|
| STVS1 | VS | 7150 | AREA1 | ■2 |
| BOSVS1 | VS | 7110 | AREA1 | ■1 |
| DTVS4 | VS | 85 | AREA1 | ■ |
| DALPC6 | PC | 280 | AREA1 | ■2 |
| DENPC | PC | IBM | AREA1 | ■ |
| OSVS3 | VS | 100 | AREA3 | ■ |

(9)Modify

(16)Exit
(32)Menu

Figure 7-3. Adjacent Systems Menu

The Adjacent Systems menu lists all the possible adjacent systems where the local system can route information to the destination named at the top of the screen. The Adjacent Systems menu displays the name, type, model, area, and Path cost for each adjacent system.

5. Press PF9 to define, modify, or delete a path listed on the Adjacent Systems menu. To define, modify, or delete a path, you enter or change the value in the Path cost field. Enter a Path cost in the Path cost field to define each path to a destination or use the space bar to delete a Path cost for a previously defined path. If you delete the Path cost for a path and do not specify a new Path cost, the local VS can no longer route messages to that destination by way of the adjacent system on the Adjacent Systems menu.

You are not required to define each possible path. Enter the Path cost in the Path Cost field for each path you want to define. If you are defining only one path, enter any valid Path cost for that destination. If you are defining two or three paths, enter the lowest Path cost for the primary or least cost path (that is, the primary next hop). Valid values range from 1 to 99. (Refer to Chapter 2 for additional information.)

Use the TAB key or the cursor keys to move the cursor from field to field. Press ENTER when you have finished creating, modifying, or deleting Path costs. The Adjacent Systems menu appears in Display mode.

6. When you have defined the routing configuration for the local VS, press PF16 to return to the Path Definition menu (see Figure 7-3). From the Path Definition menu, press PF16 again to return to the Destination Systems and Areas menu (see Figure 7-1) to define the Store and Forward routing configuration.

7.3 Defining Store and Forward Routing

After you have defined your CNS paths, you can define the Store and Forward paths the local system uses when sending packages to destinations.

Note: Make sure that CNS paths are appropriately configured when you configure Store and Forward paths. Remember that Store and Forward uses CNS, and CNS must have knowledge of network topology. Regular CNS paths must be configured to define adjacent systems where messages are routed to destinations.

Store and Forward routing is based on the concept of Store and Forward next hops. A Store and Forward next hop is a Store and Forward system that you designate to store packages originating from your system before they are forwarded to a destination. The destination can be a system in the same area, another area, or another Store and Forward next hop.

Note: Do not confuse Store and Forward next hop and CNS next hop. CNS next hops are adjacent systems. A Store and Forward next hop may or may not be an adjacent system. Refer to the Store and Forward Routing overview in Chapter 2 before you run WSNEDIT to configure Store and Forward routes.

To define or modify Store and Forward paths

1. Press PF14 from the Destination Systems and Areas menu, the Store and Forward Routing menu appears (see Figure 7-4).

16:39:21 ** Display Store and Forward Routing ** 06/18/88
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Please position the cursor at the appropriate tabstop and press ENTER to manage S & F routing from NYVS2 to the given destination

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Default Next Hop</u> | <u>Override</u> |
|---------------|-------------|--------------|------------------|-------------------------|-----------------|
| ■ (all) | systems | without | an explicit path | CHIVS1 | ■■■■■■■ |
| ■ (all) | systems | within | AREA2 | CHIVS2 | ■■■■■■■ |
| ■ (all) | systems | within | AREA3 | CHIVS2 | UPTOWN■ |
| ■ (all) | systems | within | AREA27EUROPE | PARVS3 | ■■■■■■■ |
| ■ (all) | systems | within | AREATELENOVA | FEDVS6 | NOVA■■■ |
| ■ (all) | systems | within | AREAAUSTRALIA | DSSVS9 | ATLAS■■■ |
| ■ STVS1 | VS | 7150 | AREA1 | STVS1 | ■■■■■■■ |
| ■ DTVS4 | VS | 85 | AREA1 | DTVS1 | ■■■■■■■ |
| ■ BOSVS1 | VS | 7110 | AREA1 | BOSVS1 | ■■■■■■■ |
| ■ DALPC6 | PC | 280 | AREA1 | DALPC6 | ■■■■■■■ |
| ■ DENPC | PC | IBM | AREA1 | DENPC | ■■■■■■■ |

(2)First (4)Prev (6)Find (16)Exit
 (3)Last (5)Next (9)Modify (14)WSN Paths (32)Menu

Figure 7-4. Store and Forward Routing Menu

The Store and Forward Routing menu displays all the Store and Forward destinations in the network. The destinations are listed in the system column. "All" in the system column refers to all the Store and Forward systems in an area or, in the case of the default path, all the Store and Forward destinations that are not associated with specific and general CNS routing records. The following information is displayed for each destination:

Type -- For individual systems in the same area as the local VS, the system type is listed if it was entered in the directory for that system. If the destination is all the systems in another area or all the systems without an explicit path (for default path routing), "Systems" appears to indicate all systems.

Model -- For individual systems in the same area as the local VS, the system model is listed if it was entered in the directory for that system. If the destination is all the systems in an area, "within" appears to indicate all the systems in an area. If the destination is all the systems without an explicit path (for default path routing), "without" appears.

in Area -- The area in which the destination system or systems reside. "An explicit path" appears to indicate that all systems in the network to which specific paths have not been defined can be reached by way of a default path.

Default Next Hop -- The default Store and Forward next hop system that is assigned by WSNEDIT.

Override Next Hop -- The override next hop. The override next hop is the Store and Forward next hop you may assign (in place of the default next hop) for routing Store and Forward packages to a specific destination. (Refer to Chapter 2 for recommendations on defining override next hops.)

2. Press PF9 to define, change, or delete an override next hop. The fields in the Override Next Hop column become highlighted, enabling you to perform one or more of the following actions:

Define an Override Next Hop -- Enter the system name of the override next hop as it appears in the directory in the field associated with the appropriate destination. Enter each override next hop that you want to define.

Note: To review a list of possible overrides for a particular destination before you define or modify an override, go to step 4 after pressing ENTER.

Change an Existing Override Next Hop -- Enter over the old entry with the new override next hop. Repeat this procedure for each override next hop you want to change.

Delete an Override Next Hop -- Use the space bar to delete the appropriate entry or entries in the Override Next Hop column.

3. Press ENTER when you have finished defining, changing, and/or deleting override next hops. The screen displays the override next hops you entered.

Note: PF14 (WSN Paths) is helpful when you are defining Store and Forward routes to destinations. Remember that Store and Forward uses CNS, and CNS paths must be defined to Store and Forward destinations. PF14 allows you to determine whether or not CNS paths have been defined to Store and Forward destinations.

4. To display a list of all Store and Forward systems from which you can define an override for a particular destination, position the cursor next to the destination that you want to define and press ENTER. The Store and Forward Next Hop menu appears (see Figure 7-5).

13:36:59 ** Display Store and Forward Next Hop Systems ** 06/02/88
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Please position the cursor at the appropriate tabstop and press ENTER to define S & F next hop to AREA3

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> |
|---------------|-------------|--------------|-----------------|
| ■ ATLAS | VS | 65 | AREASEVEN |
| ■ ATSYDNEY | VS | 7150 | AREA70AUSTRALIA |
| ■ COBBER | VS | 65 | AREATEN |
| ■ COMET | VS | 100 | AREA41TELENOVA |
| ■ DEMV01 | VS | 300 | AREA27EUROPE |
| ■ DEMV02 | VS | 65 | AREA27EUROPE |
| ■ DIGGER | VS | 85 | AREATEN |
| ■ DMFCNTRL | VS | 7110 | AREAFIVE |
| ■ DUNE | VS | 100 | AREAONE |
| ■ EBC01 | VS | 15 | AREA27EUROPE |

(2)First (4)Prev (6)Find
 (3)Last (5)Next

(16)Exit
 (32)Menu

Figure 7-5. Store and Forward Next Hop Menu

5. The Store and Forward Next Hop menu displays all the Store and Forward systems in the network. Use the cursor to select a destination with which you want to associate an override next hop. Press ENTER. The Store and Forward Routing menu appears, displaying the override next hop for the destination that you specified.

CHAPTER 8 MANAGING WSN SERVICES

8.1 INTRODUCTION

You are ready to create the service configuration for the local (target) VS after you have defined transports and routes. (Refer to the note in Chapter 6 that explains the use of the terms "local" and "target.") You create the service definition using the WSNEDIT Manage Services function. This function enables you to

- Define Store and Forward Service Windows
- Define the File Transfer Service that the local system shares with both adjacent and nonadjacent systems
- Define the nonadjacent systems to which the VS Terminal Emulation (VSTE) service can perform multihop logons

WSNEDIT automatically creates VSTE service definitions for the local VS and adjacent systems. The Manage Services function also allows you to review and modify Store and Forward Service Windows, File Transfer, and remote Logon Service definitions.

To access the WSNEDIT Manage Services function, press PF7 (Manage Services) from the WSNEDIT main menu (see Figure 5-9). The Edit Service Definition menu appears if you specified the configuration file when you accessed the Manage Transports or Manage Routing function.

If you have not previously specified the configuration file, a screen appears that asks you to specify the file and the target system for which it is intended. The Edit Service Definition menu appears after you specify the file and press ENTER (see Figure 8-1).

13:37:34

** Display Service Types **
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06/02/88

Please position the cursor at the appropriate tabstop
and press ENTER to choose a Service Type

Service Type

- SERVICE WINDOWS
- FILE-TRANSFER
- LOGON

(16)Exit

(32)Menu

Figure 8-1. Edit Service Definition Menu

The Edit Service Definition menu displays the choices for defining Store and Forward Service Windows, File Transfer service, and VSTE Logon service.

8.2 MANAGING SERVICE WINDOWS

This section explains how to manage Store and Forward Service Windows. A service window is a time interval when Store and Forward can establish a session with a peer application on a remote VS. (Refer to Chapter 2 for Store and Forward Service Window design and planning considerations.)

You manage Store and Forward Service Windows using the Service Windows function. The service windows function enables you to

- Create, view, or modify the parameters associated with a particular service window.

- Create, view, or modify the service window times (15-minute intervals) for each day of the week. You can select the days of the week when a window is open and the priority (Low, Medium, High, and Immediate) of each window. Wang OFFICE or Software Manager users assign priority to packages which are sent when a window with a corresponding priority opens.
- Assign the destination systems to windows.
- Review the destination systems that can be assigned to windows.

To access the Service Windows function

1. Position the cursor under the acceptance block for SERVICE WINDOWS on the Edit Services Definitions menu and press ENTER. The Service Window List menu appears (see Figure 8-2).

```

16:39:57                ** Manage WSN Service Windows **                06/18/88
                        Copyright, Wang Laboratories, Inc. 1987

                        System NETVS is configured with 3 Windows

                        Please position the cursor at the appropriate tabstop
                        and press ENTER to manage the Destination(s) for a Window

                        Window Name      System
                        Window Name      Count

                        ■ (Default Window)
                        ■ WESTCOAST        2
                        ■ EASTCOAST        2

                        (8)Display (11)Create      (16)Exit
                        (9)Modify  (12)Delete     (32)Menu
  
```

Figure 8-2. Service Window List Menu

The Service Window List menu lists the names of windows, including the default window, that have been defined. If you or any other WSNEDIT user have not defined any windows, only the default window is displayed. The default window applies to all systems on the network that have not been assigned to an explicitly defined service window. The screen also displays the name of the local system (for example, NETVS).

- a. To view, modify, or delete an existing service window definition (for example, WESTCOAST), select the window from the Service Window List menu.

If the list of service windows consists of more than one screen, use the PF keys PF2 (First), PF3 (Last), PF4 (Prev), or PF5 (Next) to scroll through the list of windows, or use PF6 (Find) to search for a specific window. All or a combination of these keys may appear at the bottom of the screen, depending on the number of screens that the list requires and the specific screen you are viewing at the time.

Press PF8 to view the parameters associated with the window.
Press PF9 to modify the parameters.

Press PF12 to delete an existing Window and the parameters associated with it. When you press PF12, a message appears prompting you to press ENTER to confirm your selection. When you press ENTER, the window is deleted and the Service Window List menu reappears.

Note: You must first delete all destinations assigned to a service window before you can delete that window. (Refer to Section 8.2.1 for details.)

You cannot delete the default service window because it is used for all destinations that have not been assigned a window. Therefore PF12 is not enabled when the default service window is the only entry on the Service Window List menu.

- b. To create a service window and define the parameters associated with it, press PF11 from the Service Window List menu.
2. When you have performed step 1a or 1b, the Service Windows Parameters screen appears (see Figure 8-3). The screen appears in Display, Modify, or Create mode depending on which PF key (8, 9, or 11) that you pressed from the Service Window List menu.

16:41:08

** Create Service Window Parameters **
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06/18/88

Please ENTER the following Service Window Parameters

Window Name: ■■■■■■■■■■■■

Maximum Number of Retries: ■3 (0 - 99)
Time Between Retries: 00 : 15 (hh : mm)
Time Between Sessions
within an Open Window: 00 : 15 (hh : mm)
Immediate Priority
postponement time: 00 : 15 (hh : mm)

(16)Exit

(32)Menu

Figure 8-3. Service Window Parameters Screen

The fields on the Service Window Parameters screen are the same regardless of whether the screen is in Display, Modify, or Create mode. The PF keys are the same except when the screen is in Display mode. When the screen is in Display mode, PF9 appears and enables you to enter Modify mode.

This screen enables you to specify the parameters that apply to all window priorities for each day of the week. The window name field is modifiable only when you are creating a new window. After you define a new window, you cannot modify its name. Recommended parameters and parameter ranges appear next to the fields for the window defined. Use the following fields to define or modify these parameters:

Maximum Number of Retries -- Enter the number of times an attempt should be made to establish a session if the first attempt is not successful. This value can range between 0 and 99. The default value is 3.

Time Between Retries -- Enter the length of time between retries. The default value is 15 minutes.

Time Between Sessions within an Open Window -- Enter the minimum length of time that must pass since the last successful session before another session can be established. The default value is 15 minutes.

Immediate Priority postponement time -- Enter the length of time that an Immediate-priority session can be postponed before the next scheduled service window opens. (Chapter 2 gives more details about this parameter.)

This parameter enables you to balance the number of sessions established against the priority levels of those sessions. For example, if an Immediate-priority session request is sent to Destination A at 8 a.m. and a window is scheduled to open at 8:15 a.m. with that same destination, the Immediate-priority session is postponed until 8:15 a.m. if the postponement time is 15 minutes or more.

It is recommended that the value of this parameter not exceed 15 minutes, but the value that you enter depends on how you configure each service window for each day of the week. If you set this value to 0, Immediate-priority mail that is sent to destinations through the window will never be postponed.

The following PF key selections appear at the bottom of the screen:

PF9 (Modify) -- Appears on the Service Window parameters screen only when it is in Display mode. This key enables you to display the screen in Modify mode and change the values of service window parameters as described above.

PF16 (Exit) -- Returns you to the Service Window List menu (see Figure 8-2) without saving any new definitions or changes to the Service Window Parameters screen.

After you enter values for each parameter, press ENTER to save those changes. The Select Day screen appears so that you can review or modify the service window for each day of the week (see Figure 8-4).

17:00:39

** Select Day of the Week **
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06/18/88

To modify Service Window EASTCOAST
Please ENTER a non-blank character at the desired day(s) of the week

Summary: Each hour marked with an 'X' has a window open
during that hour for at least one priority

| | AM | | | | | | | | | | | PM | | | | | | | | | | | | |
|-------|----|---|---|---|---|---|---|---|---|---|----|----|----|---|---|---|---|---|---|---|---|---|----|----|
| | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| ■ Sun | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| X Mon | | | | | | | | | | | | | | | | | | | | | | | | |
| ■ Tue | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| X Wed | X | X | X | X | | | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X |
| ■ Thu | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| X Fri | | | | | | | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X |
| ■ Sat | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

(16)Exit

(32)Menu

Figure 8-4. Select Day Screen

The Select Day screen enables you to review the days of the week when a window is open. The name of the window to which the screen applies appears at the top of the screen. Only those hours marked with an X have open windows. The Select Day screen appears in Display, Modify, or Create mode depending on which mode you were in when you accessed the screen.

- To create or modify the window for any day of the week, enter an X next to one or more days and press ENTER. The Display Service Windows Times screen appears (see Figure 8-5). The screen appears in Display, Modify, or Create mode depending on which mode you were in when you accessed the screen.

If you select more than one day and the service windows for those days are not identical, the screen displays the following message:

The selected days do not have matching windows
Which day should be used as the base? __

Type in the first three letters of the day that you want to use as the pattern for the other days and press ENTER. The Display Service Window Times screen appears in Modify mode.

17:01:04

**** Create Service Window ****
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06/18/88

for Monday

Each 15 minute interval marked with an 'X'
is included in the open Service Window TEST2

| Priority | Time: AM | | | | | | | | | | | |
|----------|----------|------|------|------|------|------|------|----|-----|-----|-----|-----|
| | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| High: | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ | X X | X X | X X | X X |
| Med: | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ |
| Low: | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ██ | ██ | ██ | ██ | ██ |

| Priority | Time: PM | | | | | | | | | | | |
|----------|----------|-----|-----|-----|-----|------|------|------|------|------|------|------|
| | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| High: | XXXX | X X | X X | X X | X X | ██ | ██ | ██ | ██ | ██ | ██ | ██ |
| Med: | ██ | ██ | ██ | ██ | ██ | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ██ |
| Low: | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ | ██ | XXXX |

(16)Exit

(32)Menu

Figure 8-5. Display Service Window Times Screen

The Display Service Window Times screen displays the exact times during a day when intervals in the service window for a destination are open. The days of week to which the window applies appear in the screen title. The name of the window also appears at the top of the screen.

Each service window is divided into three priority levels: High, Medium, and Low. Each priority level divides the day into 24-hour intervals, which, in turn, are divided into 15-minute intervals.

In Create or Modify mode, the Display Service Window Times screen enables you to designate the time intervals when a window is open by assigning a priority level to each 15-minute interval for every hour of the day.

- To designate the time intervals for a service window, enter a nonblank character in the appropriate fields on the Display Service Window Times screen for each 15-minute interval. Use the following information to designate the service window time intervals to your best advantage.

When a marked 15-minute interval is reached, Store and Forward will establish sessions to the associated destinations and send mail of the specified priority and any higher priority. It will also poll those systems designated for polling.

In addition, the service window facility enables you to

Define multiple windows -- A priority can have a range of 15-minute intervals during which time mail can be sent. For example, High priority can be defined as 8 a.m. to 9 a.m. and 3 p.m. to 4 p.m. for one or more days of the week. You can define up to 48 intervals for each priority level. (Enter an X for every other interval and leave the other intervals blank.)

Define overlapping windows so that two priorities share a range of time -- For example, for a period of one or more days, High priority can be defined as 3 p.m. to 5 p.m., and Medium priority could be defined as 4 p.m. to 6 p.m. When windows overlap, packages that a user has designated as higher priority are moved to the top of the queue and enter the network first. In this case, High-priority packages are sent before Medium-priority packages between 3 p.m. and 6 p.m. since High priority is defined for 3 p.m. to 5 p.m. and can be sent from 5 p.m. to 6 p.m. during the last hour of the Medium-priority timeframe. Medium-priority items are sent between 4 p.m. and 6 p.m. only.

A service window is closed for High-, Medium-, and Low-priority items during each 15-minute interval of the day that is left blank. Only Immediate-priority items may be sent through the window at these times. To close a window, leave any 15-minute interval during the day blank.

For example, if you specify that High-priority items are to be sent at 8:15 and 8:45 a.m., Store and Forward attempts to establish Immediate-priority sessions at 8:00 a.m. and 8:30 a.m. if there are items to send. Between 12 midnight and 8 a.m. service windows are closed.

You may want values that you enter for priority levels to reflect local area telephone rates or when traffic over the network is reduced. For example, you might send all High-priority items during the business day (weekdays, 9 a.m. to 5 p.m.) when telephone rates are highest. Packages designated as Medium priority could be sent during off-hours when telephone rates are lower. Low-priority items could be distributed over the weekend.

Note: A window closes at the defined time, even when items with that priority remain to be transmitted. An item being transmitted will complete after the "close" time, but items left on the queue will wait for the next window.

The following PF key selection appears at the bottom of the screen:

PF9 Modify -- Appears only when the screen is in Display mode. You may press this key to modify the fields on the screen.

PF16 (Exit) -- Returns you to the Select Day screen (see Figure 8-4) so that you can select another day. If you are in Modify mode, the screen returns to Display mode without saving any changes that you made to the window.

PF32 (Menu) -- Returns you to the WSNEDIT main menu.

8.2.1 Assigning and Reviewing Service Window Destinations

When you create new windows, you must assign destinations to those windows. More than one destination can share the same window but a destination may be assigned to a single window only. To assign destinations to a window or to review destinations already assigned

1. Position the cursor at the tab stop next to the window on the Service Window List menu and press ENTER. The Manage Service Window Destination screen appears (see Figure 8-6).

Note: You cannot display the destination systems associated with the default window by pressing ENTER since the default window is used for all systems that have not been assigned to an explicitly defined service window.

16:40:14

** Manage Service Window Destinations **
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06/18/88

Service Window WESTCOAST is configured with 2 Destinations

List Mode: S&F Only

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Key</u> | <u>Poll</u> | <u>Turn Around</u> |
|---------------|-------------|--------------|----------------|------------|-------------|--------------------|
| DUNE | VS | 100 | AREAONE | X | NO | YES |
| IDSR20T | IDS | IBM | AREATHREE | X | NO | YES |

(10)Review

(16)Exit
(32)Menu

Figure 8-6. Manage Service Window Destinations Screen

The Manage Service Window Destinations screen lists the names of all the destination systems that are assigned to the window. The screen also lists the type, model, area, key, poll indication, and turn around response.

When the Manage Service Window Destinations screen first appears for a given window, it displays no Store and Forward destinations since none have been assigned yet. Figure 8-6 shows a screen with destinations already assigned.

The fields on the Manage Service Window Destinations screen that you can review are as follows:

System -- Name of the destination system assigned to the service window named at the top of screen.

Type -- Type of system (for example, VS, PC) for which windows have been defined.

Model -- The system model (for example, VS65, VS100) for which service windows have been defined.

in Area -- The area in which the system is located.

Key -- An X indicates that the destination system has been assigned to the selected service window.

Poll -- Indicates whether the local system polls the remote system that is associated with a service window. You define a different set of windows for each system or for subsets of systems on the network. Those windows regulate whether the local system can query the remote systems to send packages. If configured, the local system polls whenever a window opens for a remote destination regardless of the priority.

Turn Around -- Indicates whether the local system enables the remote system to turn a session around to send packages after the local system establishes a session with a remote system for polling or sending packages. When the session is established, the local system tells the remote system that the turn around option is YES and dictates the priority level of the window. When the local system is finished sending packages, the session is turned around and the remote system can send items. The remote system's window configuration is overridden and the remote system sends items according to the priority level dictated to it by the local system. For example, if Medium priority was dictated, the remote system could send Medium-, High-, and Immediate-priority items.

Note: *Poll* and *Turn Around* features are described more fully in Section 2.8.

2. To designate destination systems, or to review or modify designated systems for the window, press PF10 while viewing the Manage Services Destination screen. The Service Window Destination List menu appears (see Figure 8-7).

16:40:41

** Review Service Window Destinations **
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06/18/88

Please review the systems that may be destinations
 for Service Window WESTCOAST

List Mode: S&F Only

| System | Type | Model | in Area | Key | Poll | Turn Around |
|----------|------|-------|----------------|-----|------|----------------|
| DUNE | VS | 100 | AREAONE | X | NO | YES |
| EBC01 | VS | | AREA27EUROPE | ■ | NO | YES |
| IDSR20G1 | IDS | | AREATEN | ■ | NO | YES |
| IDSR20T | IDS | IBM | AREATHREE | X | NO | YES |
| IDSR21F1 | IDS | | AREATEN | ■ | NO | YES |
| IIRC | VS | | AREA69EUROPE | ■ | NO | YES |
| LOCALNET | VS | 100 | AREAONE | ■ | NO | YES |
| MASTER | VS | | LNOTEST | ■ | NO | YES |
| MATILDA | VS | 85 | AREATEN | ■ | NO | YES |
| NOVA | VS | | AREA41TELENOVA | ■ | NO | YES |

(2)First (4)Prev (6)Find (16)Exit
 (3)Last (5)Next (9)Modify (32)Menu

Figure 8-7. Service Window Destination List Menu

3. The Service Window Destination List menu lists all destinations that meet *one or more* of the following criteria:
- Assigned to the service window named at the top of the screen (denoted by an X in the Key field).
 - Assigned to no other service window. (This group of destinations has not been assigned to any other service window by a user and the systems are Store and Forward systems, and, therefore, can be assigned to this window.)
 - Assigned as Store and Forward systems. (The screen displays List Mode (Store and Forward Only) at the top. Store and Forward Only means that the destinations are Store and Forward destinations that have been assigned already or Store and Forward destinations that may be assigned.)

Note: When a destination is assigned to another window, the Service Window Destination List menu does not list that destination. If you want to assign a destination to another window, you must first remove that destination from its assigned window before you can assign it to another window.

Press PF9 to designate systems, modify existing information, or to delete designated systems. The menu changes to Select mode and highlights the Key, Poll, and Turn Around fields, enabling you to enter or modify the parameters for these fields.

Enter an X in the key field for each system that you want to designate for the service window. If a system is not designated for the service window, or you wish to delete it from the window, leave the Key field blank for that system.

To change the Poll or Turn Around options for a previously assigned destination, change the entries in the Poll and Turn Around fields for the selected destination.

The rules for entering the Poll or Turn Around options are

| Poll | Turn Around | Result |
|------|-------------|--|
| YES | YES | Local system establishes an outbound session to poll other destinations. When the line is turned around, the local system will receive the packages according to the priority set by the local system. |
| NO | YES | Local system does not poll. It opens an outbound session only when there is a package to send to a remote system. After line turn around, the local system will receive packages according to the priority set by the local system |
| NO | NO | Local system does not poll. It opens a session only when there is a package to send to a remote system. After line turn around, the local system will receive packages according to the priority set by the remote system. |

Note: Another option is to configure no service windows on the local system. The local system does not open any service windows to poll or to send packages with High-, Medium-, or Low-priority to remote systems. It can only send Immediate-priority packages to remote systems. (Refer to Chapter 2, Section 2.8, for details.)

4. Press ENTER to save the changes. The menu reverts to Review mode displaying the changes you made. Press PF16 to return to the Manage Service Window Destinations screen or PF32 to return to the WSNEDIT main menu.

8.3 MANAGING FILE TRANSFER SERVICE

This section explains how to manage the File Transfer Service the local system shares with both adjacent and nonadjacent systems. To do this you use the File Transfer Service function. The File Transfer Service function enables you to

- Review systems that share the File Transfer Service with the local system.
- Create or modify the File Transfer Service definition for systems that share the service.
- Define file types (VS, OIS, WP, or Spool) for systems that share the File Transfer Service.

The File Transfer Service is automatically defined for the local VS: you do not need to designate the local system for the File Transfer Service.

To access the File Transfer Service function

1. Position the cursor under the acceptance block for FILE-TRANSFER on the Edit Service Definitions menu (see Figure 8-1) and press ENTER. The File Transfer Service System Designation screen appears (see Figure 8-8).

29 Systems share File Transfer Service with System NETVS

| <u>System</u> | <u>Type</u> | <u>in Area</u> | <u>Key</u> | <u>Password</u> | <u>Transfer Group</u> |
|---------------|-------------|----------------|------------|-----------------|-----------------------|
| 1IDS | IDS | 1AREATEST | X | TEST | |
| ATLAS | VS | AREASEVEN | X | | DEFAULTXFGROUP |
| BOK | PC | AREAFIFTEEN | X | | |
| BOK2 | PC | AREATWO | X | | |
| COBBER | VS | AREATEN | X | | |
| DIGGER | VS | AREATEN | X | | |
| DMFCNTRL | VS | AREAFIVE | X | | |
| DUNE | VS | AREAONE | X | | |
| EEYORE | OIS | AREANINENONCNS | X | PASSWORD | |
| IDSR20G1 | IDS | AREATEN | X | | |

(3)Last (5)Next (6)Find (10)Review (16)Exit
(14)File Types (32)Menu

Figure 8-8. File Transfer Service System Designation Screen

The File Transfer Service System Designation screen displays the name, and type for each system that is defined for File Transfer service, and the area in which each system resides. Systems that are defined for the File Transfer service are assigned the following parameters:

- A key value of X. An X identifies a system as sharing File Transfer Service with the local system.
- A password that the local VS expects to receive from a remote system when the VS File Transfer Manager establishes a session with the file transfer software on that system. The password is optional.
- A transfer group the local VS uses as a default to control the disposition of files and documents received from the remote system. The transfer group is optional for remote systems and required for the local VS.

If the list of systems consists of more than one screen, use the PF keys PF2 (First), PF3 (Last), PF4 (Prev), or PF5 (Next) to scroll through the list of systems, or use PF6 (Find) to search for a specific system. All or a combination of these keys may appear at the bottom of the screen, depending on the number of screens that the list requires and the specific screen you are viewing at the time. *These keys function similarly for all screens in which they appear.*

- To designate systems, or to review or modify designated systems for File Transfer Service, press PF10 while viewing the File Transfer Service System Designation screen. The File Transfer Service System List menu appears (see Figure 8-9).

13:39:02 ** Review Systems with File Transfer Service ** 06/02/88
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Please review the Systems sharing File Transfer Service with System NETVS

| <u>System</u> | <u>Type</u> | <u>in Area</u> | <u>Key</u> | <u>Password</u> | <u>Transfer Group</u> |
|---------------|-------------|----------------|------------|-----------------|-----------------------|
| NETVS | VS | AREATWO | X | ■■■■■■■ | DEFAULTXFGROUP■■ |
| NOVA | VS | AREA41TELENOVA | X | ■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OA32SYS | VS | AREAFORTY | X | ■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OISNM | OIS | AREANINENONCNS | X | ■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OS11 | VS | AREATWO | X | ■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OSI1 | VS | AREAOSI | ■ | ■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OSI2 | VS | AREAOSI | ■ | ■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| RASCAL | VS | AREATWELVE | ■ | ■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| SNA15 | VS | AREAFOUR | ■ | ■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| SNA90 | VS | AREAFOUR | ■ | ■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |

(2)First (4)Prev (6)Find (9)Modify (14)File Types (16)Exit
 (3)Last (5)Next (32)Menu

Figure 8-9. File Transfer Service System List Menu

The File Transfer Service System List Menu lists all the systems in the network. An X appears in the Key field for each newly configured system that has been identified as sharing File Transfer Service with the local VS. Passwords and transfer groups are optional and may not appear for all systems. The local VS appears highlighted. Either a user-defined transfer group or the default transfer group, DEFAULTXFGROUP, should appear in the Transfer Group field.

- Press PF9 to designate systems, modify existing information, or to delete designated systems. The Select Systems With File Transfer Service screen appears (see Figure 8-10).

13:39:28

** Select Systems with File Transfer Service **
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06/02/88

Please ENTER a non-blank character in the Key column
to indicate each System sharing File Transfer Service with System NETVS

Optionally, specify the Password and inbound default Transfer Group
to be employed in File Transfer operations with each correspondent

| System | Type | in Area | Key | Password | Transfer Group |
|---------|------|----------------|-----|----------|--------------------|
| NETVS | VS | AREATWO | X | ■■■■■■■■ | DEFAULTXFGROUP■■ |
| NOVA | VS | AREA41TELENOVA | X | ■■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OA32SYS | VS | AREAFORTY | X | ■■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OISNM | OIS | AREANINENONCNS | X | ■■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OS11 | VS | AREATWO | X | ■■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OSI1 | VS | AREAOSI | ■ | ■■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| OSI2 | VS | AREAOSI | ■ | ■■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| RASCAL | VS | AREATWELVE | ■ | ■■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| SNA15 | VS | AREAFOUR | ■ | ■■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |
| SNA90 | VS | AREAFOUR | ■ | ■■■■■■■■ | ■■■■■■■■■■■■■■■■■■ |

(14)File Types (16)Exit (32)Menu

Figure 8-10. Select Systems With File Transfer Service Screen

The Select Systems With File Transfer Service screen allows you to define the File Transfer Service for a system or modify an existing definition. Enter the appropriate information in the fields as follows:

Key -- Type X in this field to define the File Transfer Service for a remote system. This action identifies that system as sharing the File Transfer Service with the local VS. If a system is not designated for File Transfer Service, or you wish to delete it from the window, leave the key field blank for that system. The key field cannot be modified for the local VS.

Transfer Group (Optional) -- Enter the name of the transfer group for a system. A default transfer group (DEFAULTXFGROUP) appears for the local (highlighted) system. The default group can be used or you can enter a new one. The local VS uses this transfer group as a default to control the disposition of files and documents sent from the remote system, unless you allow user-override when you create the transfer group. If you do not enter a transfer group for a remote system, the transfer group entered for the local VS is used to control the disposition of items sent from that system. Before you can use a transfer group (including the default) it must first be created. (Chapter 9 describes how to create transfer groups.)

Password (Optional) -- If your system is to exchange passwords with remote systems to establish File Transfer sessions, enter the password that your system expects to receive from the remote system in this field. The send password that you enter must match the receive password that the remote systems expect from your VS (as entered in their configuration files).

4. Press ENTER once you have defined, modified, and/or deleted File Transfer Service definitions. The Service Definition screen appears, displaying the information you entered.

8.3.1 Defining File Types

Press PF14 (File Types) from any screen on which this key is displayed after you have entered key value, transfer group, and password parameters for each system with which the local VS shares the File Transfer Service. File type fields replace the Transfer column on the screen from which you pressed PF14.

Press PF14 if you wish to display the Transfer column again. Press PF9 to specify the types of files the local system can send to a remote system. The file type columns appear in modify mode; however, the columns for the local system are not modifiable. Default values are set to support system specific file types. The modifiable columns are listed as follows:

VS -- Type an X in this field for each system to which the local VS can send VS files.

OIS -- Type X in this field for each system to which the local VS can send OIS and VS Alliance formatted files.

WP -- Type X in this field for each system to which the local VS can send WP documents.

Spool -- Type X in this field for each system to which the local VS can send VS print files.

Press ENTER after you have specified the appropriate file type information. The file type columns then appear in display mode. You can then return to the Edit Service Definitions menu to define the VS Terminal Emulation Service.

8.4 MANAGING VS TERMINAL EMULATION SERVICE

This section explains how to manage the VS Terminal Emulation (VSTE) Service that enables your VS to share Logon Service with other systems in the network. To do this you use the Logon Service function. The Logon Service function enables you to

- Review systems in the network that share Logon Service with the local system.
- Create or modify the Logon Service definition for remote systems in the network.

WSNEDIT defines the VS Terminal Emulation Service for adjacent systems when you create that system's definition. The actual operation that VSTE performs is known as a remote logon.

To access the Logon Service function

1. Position the cursor under the acceptance block for LOGON on the Edit Services Definitions menu (see Figure 8-1) and press ENTER. The Logon Service System Designation screen appears (see Figure 8-11).

13:40:28

** Display Systems with Logon Service **
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06/02/88

5 Systems share Logon Service with System NETVS

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Key</u> |
|---------------|-------------|--------------|----------------|------------|
| NETVS | VS | 100 | AREATWO | X |
| NOVA | VS | | AREA41TELENOVA | X |
| OA32SYS | VS | | AREAFORTY | X |
| PCSNM | PC | 280 | AREANINENONCNS | X |
| OS11 | VS | 100 | AREATWO | X |

(10)Review

(16)Exit
(32)Menu

Figure 8-11. Logon Service System Designation Screen

The Logon Service System Designation screen lists the names of all the systems that share Logon Service with the local system. The screen also lists the type, model, area, and key for each system (the key field indicates only that a particular system has been designated for logon service). If no systems have been designated for Logon Service, none will appear on the screen.

- To designate systems, or to review or modify designated systems that share Logon Service with the local VS, press PF10 while viewing the Logon Service System Designation screen. The Logon Service System List menu appears (see Figure 8-12).

Caution: Do not define any IDS host systems for the Logon Service. IDS host systems cannot use the Logon Service to access a VS. If the Logon Service is defined for an IDS host, the SNA or BSC MCP program on the local VS will not be able to use the VS-TC hardware.

13:40:53

** Review Systems with Logon Service **
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06/02/88

Please review the Systems sharing Logon Service with System NETVS

| <u>System</u> | <u>Type</u> | <u>Model</u> | <u>in Area</u> | <u>Key</u> |
|---------------|-------------|--------------|----------------|------------|
| NETVS | VS | 100 | AREATWO | X |
| NOVA | VS | | AREA41TELENOVA | X |
| OA32SYS | VS | | AREAFORTY | X |
| PCSNM | PC | 280 | AREANINENONCNS | X |
| OS11 | VS | 100 | AREATWO | X |
| OS11 | VS | 85 | AREAOSI | ■ |
| OS12 | VS | 85 | AREAOSI | ■ |
| RASCAL | VS | | AREATWELVE | ■ |
| SNA15 | VS | 15 | AREAFOUR | ■ |
| SNA90 | VS | 100 | AREAFOUR | ■ |

(2)First (4)Prev (6)Find
(3)Last (5)Next

(9)Modify

(16)Exit
(32)Menu

Figure 8-12. Logon Service System List Menu

The Logon Service System List menu lists every system in the directory that is equipped with CNS, and those systems that are adjacent. Notice that the Key field for every adjacent system contains an X. This is because all adjacent systems automatically support remote logon from the local system. (This does not prevent you from removing an adjacent system from Logon Service by deleting the X in the Key field.)

3. Press PF9 to designate systems, modify existing information, or delete designated systems. Enter an X in the Key field for each system that you want to designate for logon service. If a system is not designated for logon service, or you wish to delete it from the transport, leave the Key field blank for that system.

Note: To display nonadjacent systems that may logon to your system, exit from WSNEDIT and press PF8 (Manage COMMUNICATIONS) from the VS Command Processor screen. Press PF4 (Communications LINKS). The Display Communications Links screen appears. Nonadjacent systems that may logon to the local system are listed under the name [nonadjacent] in the link field.

4. Press ENTER once you have completed designating, modifying, and/or deleting systems. The Key field appears in display mode for each remote system.

8.5 SPECIFYING THE OUTPUT FILE

Before you exit from WSNEDIT, you must specify the output file in order to save transport, routing, and service information. To specify the output file, press PF16 from the WSNEDIT main menu. The Output File Definition screen appears (see Figure 8-13).

```
13:41:17                ** Define Output File **                06/02/88
                        Copyright, Wang Laboratories, Inc. 1987

Please ENTER the definition of the Output Configuration File
File ■■■■■■■■ in Library @SYSTEM@ on Volume SYSTEM

(1)Edit new file                (16)Exit
                                (32)Menu
```

Figure 8-13. Output File Screen

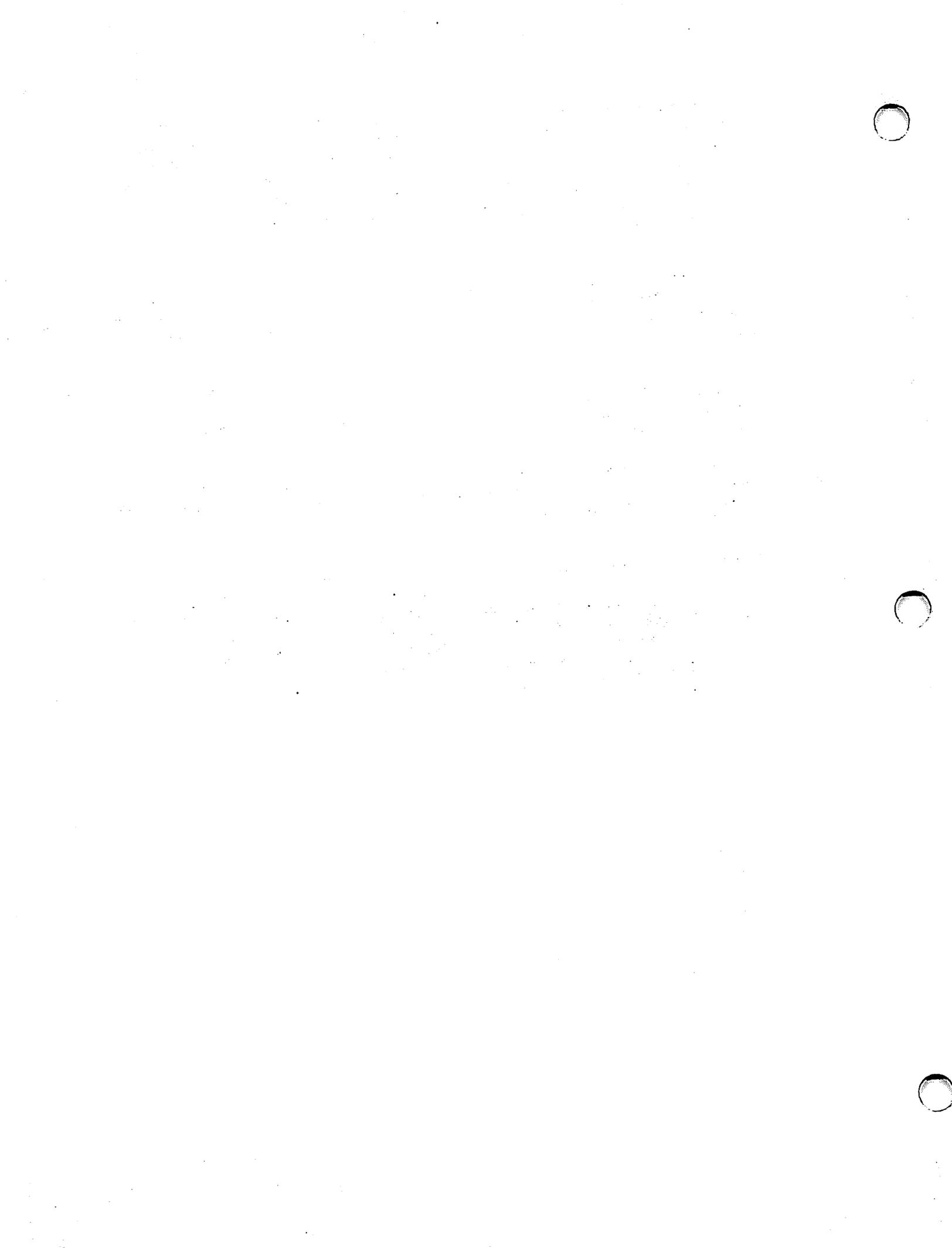
The Output File Definition screen allows you to specify the file in which the transport, service, and routing information you entered is stored. To define the output file, type in the name of the file in the FILE field. The LIBRARY and VOLUME names default to the system library and volume. You can use these default names or type in new ones. Press ENTER when you have finished specifying the output file. Then exit from WSNEDIT.

Note: If the output file already exists, you will be prompted to press PF3 to replace the existing file. When you do this, you replace the existing file with the new file containing any changes that you made.

The file that you specify on the Output File screen is the file name you enter when the local VS is IPLed. This file becomes the active communications configuration file for the local VS.

If you do not wish to save the configuration information you previously entered, you can press PF16 to exit from WSNEDIT. You can press PF32 to return to the WSNEDIT main menu.

Note: Before new definitions and changes to the WSNEDIT configuration file can take effect, you must IPL the local system and specify the file that you created as the active configuration file (the COMMMFILE file). If your network is running when you make modifications, you will also need to use WSNSTOP and WSNSTART procedures to halt and restart the network. These procedures are described in the WSN VS Network Control and Monitoring Guide.



CHAPTER 9 ESTABLISHING LOGON AND FILE PROTECTION

9.1 INTRODUCTION

Remote users cannot log on to your VS, nor can they retrieve files or documents from your VS, until you assign User IDs and file access rights. Use the VS SECURITY utility to assign User IDs to both local and remote users. This utility also provides file access rights for remote systems configured for network communications with your VS. (Refer to Section 9.3 for information on assigning intersystem security access rights.)

Section 9.2 explains how to use the TRANSFER utility to define transfer groups for files and documents received by your VS.

9.2 DEFINING VS FILE TRANSFER GROUPS

Transfer groups enable your VS to control the naming, placement, and protection for received files and documents (refer to Chapter 3).

The VS Transfer Manager assigns every received file and document to the group named when the request was made, to a remote system group (if one exists), or to your system's default transfer group. A transfer group is an assigned name that defines the volume where a system places files that it is receiving. You can assign a remote system group name to a remote system when you alter the File Transfer Service definition for that system in WSNEDIT. If no user-defined group or remote system group accompanies a transfer request, the default transfer group that you named when you defined the File Transfer Service for the local VS takes over.

To manage VS transfer groups, you need to run the TRANSFER utility. General instructions on how to manage VS transfer groups are provided in the *Network User Guide for VS Systems*. These instructions are summarized below to create a default transfer group for your VS (the local system).

1. To access the TRANSFER utility, run the program TRANSFER. Press PF5 (Auxiliary functions) and then press PF2 (Maintain Transfer Groups). The TRANSFER utility then displays a list of the names of existing transfer groups, and enables you to modify or delete an existing transfer group, or create a new transfer group.
 - a. To modify the defaults for a particular group, move the cursor to the group's name and press ENTER. Press PF3 to delete a group, PF2 to continue to the next screen of names, or PF1 to return to the previous screen.
 - b. Press PF4 (Add) to access the screen that allows you to create a default transfer group for your VS (the local system). The Transfer Group Definition screen appears (see Figure 9-1).

*** MESSAGE XU00 BY DSTRIB

INFORMATION REQUIRED BY DISTRIB SERVICES
TO DEFINE DEFAULTS

The following default information is associated with transfer
group name = ██████████ :

| | | | |
|--|---|------------------------------------|--|
| These describe where received files will be placed | File prefix in library on volume WP document library | = █ = ██████ = ██████ = █ | User override = YES User override = YES User override = YES User override = YES |
| | OIS FILE = ██████████ | | User override = NO |
| | in format Volume:Library.File prefix | | |
| These describe how received files are protected | File class Retention period Owner of Record | = █ = 000 days = JOP | A-Z, @, #, \$ or blank |

Press ENTER to record the information or
PF1 to return to the previous screen.

Figure 9-1. Transfer Group Definition Screen

2. To modify or create a transfer group, enter the appropriate information in the following fields:

group name -- Define all groups named in WSNEDIT. These are groups that can be used by default. Enter the name of the transfer group that you entered when you created the File Transfer Service definition for your VS (refer to Chapter 8). If you are creating a transfer group definition for a user-defined group or remote system group, enter the name of that group in the Group Name field.

File prefix -- Enter the 4-character prefix that the transfer group is to assign as a filename to received files for which a file name was not specified. The remaining characters are automatically assigned a unique-sequence number when the transfer takes place.

in library -- Enter the name of the library that is to store all files (but not documents) received under the control of the transfer group you are defining.

on volume -- Enter the name of the volume that is to store all files (but not documents) received under the control of the transfer group you are defining.

WP document library -- Enter the letter of the WP library that is to store all WP documents received under the control of the transfer group that you are defining. The Transfer Manager uses the next document feature of word processing. For example, if you specify Library B as the receiving library, a document received under the control of the transfer group is assigned the next available document ID from Library B.

User override -- For each of the document/file placement options on the screen, you can indicate whether remote or local users can select alternative placement at the time of a transfer request. For example, if you allow user override of the WP document library associated with your system's default transfer group, a remote user making a Send Document request to your system can send a document to a library on your system other than the one that you defined. Keep the default setting (YES) if you want to allow user override of any of the placement options that you defined. Otherwise, enter NO.

OIS FILE -- This defines placement of received OIS formatted files. The format for OIS files consists of a volume name followed by a colon, a library name followed by a period, and a 4-character file prefix. If your VS is to receive OIS formatted files, enter the default volume, library, and file prefix that is to be used to store those files. The volume name must be a valid volume on your VS. A sample format for storing such files might be entered as FROMOIS:LIBOIS.OIS in the OIS File field.

Note: It is in your best interest as a system administrator to keep tight control over the definition and use of transfer groups. In this way, you can keep track of where your system stores received documents and files.

File class -- When you define a transfer group, you assign a file class to files or documents received under the control of that transfer group. Received files always get their file class from a transfer group. The file classes are represented by the letters A through Z, the symbols #, @, and \$, or blank. (See Table 9-1 for a brief explanation of these classes.)

Table 9-1. VS File Class Protection Symbols

| Symbol | Meaning |
|--------|---|
| # | Private file. Only the owner of the file (the owner of record) or a System Security Administrator can access files of this class. |
| @ | Execute-only file. Only the owner or System Security Administrator can read and modify files of this class. Any system user, however, can execute program or procedure files of this class. |
| \$ | Read-only file. Only the owner or system security administrator can modify files of this class, but any user can read them. |
| Blank | Unprotected file. Any user can access files in this class. |
| A - Z | Protected file. Only users assigned that class (for example, A) by the VS SECURITY utility can access that file. |

Retention period -- This field indicates how many days the file is to be protected by the receiving VS before it can be modified or deleted.

Owner of Record -- You must specify the User ID to be assigned as the owner of the file when it is received. The Owner of Record field defaults to the ID under which you are running SECURITY.

3. After you enter the appropriate information for the transfer group that you are defining, press ENTER. After you press ENTER, the newly created transfer group is listed by name on the Transfer Group Selection screen.

Be sure to create a definition for every transfer group you named in the File Transfer Service definition of WSNEDIT. In addition, be sure to create a definition for every other transfer group that users may specify when making a send or retrieve request for documents and files that are to be stored on your system.

9.3 VS LOGON AND FILE ACCESS PRIVILEGES

To use the SECURITY utility to provide access rights to remote users and systems, you should be familiar with the utility or have a copy of the *VS System Administrator's Reference*. This guide presents an example of security arrangements for multidepartmental use of the VS.

9.3.1 Security Associated With VS Logon

Remote interactive users have access rights to files according to their logon IDs, as do local interactive users.

To assign access rights to a remote user

1. Display the Command Processor screen and press PF1 (Run Program or Procedure). Enter the program name SECURITY and press ENTER (or follow your specific local procedures).
2. Press PF2 (Add a New User to the System) and enter the appropriate privileges (including Modifiable Data Area Size if different from the default GENEDIT provides) for the remote user's ID and password. After you assign logon IDs to remote users of your system, you are ready to assign intersystem file access rights.

9.3.2 Security Associated With File Transfer

The VS SECURITY utility enables a security administrator to govern which VS files a remote system can read, scratch, or replace while in the process of executing a document or file transfer retrieval request made by a user on the remote system. An indication of the local system's file access privileges accompanies each file transfer (and request for file transfer).

When you use WSNEDIT to add a system definition, it has no file access privileges even though the File Transfer Service is allowed in the service definition portion of WSNEDIT. Thus, you must run SECURITY to allow each remote system to retrieve files from your VS. *Before running SECURITY, however, you should IPL your system using the new WSNEDIT file.*

Note: Failure to grant Security Administrator rights to the TRANSFER program results in the failure of send transfer requests. Failure to grant Security Administrator rights to the FTGMGMT program prohibits non-Security Administrators from modifying and adding access privileges. To assign Security Administrator rights to these two programs, run the program SECURITY. Enter the name of the program, library, and volume in the fields in option nine (9) in the first screen. Press PF9. In the next screen that appears, enter the letter Y in the 1-byte field for the Security Administrator.

To add access rights for a new remote system

1. Run SECURITY. Move the cursor to the modifiable field that specifies remote systems:

(12) REVIEW (Optional MODIFY or DELETE) Inter-system Access Privileges Starting with SYSTEM _____
(If Blank, First System is Assumed).

2. Enter the name of the new system and press PF12. The Inter-System Security screen appears (see Figure 9-2).

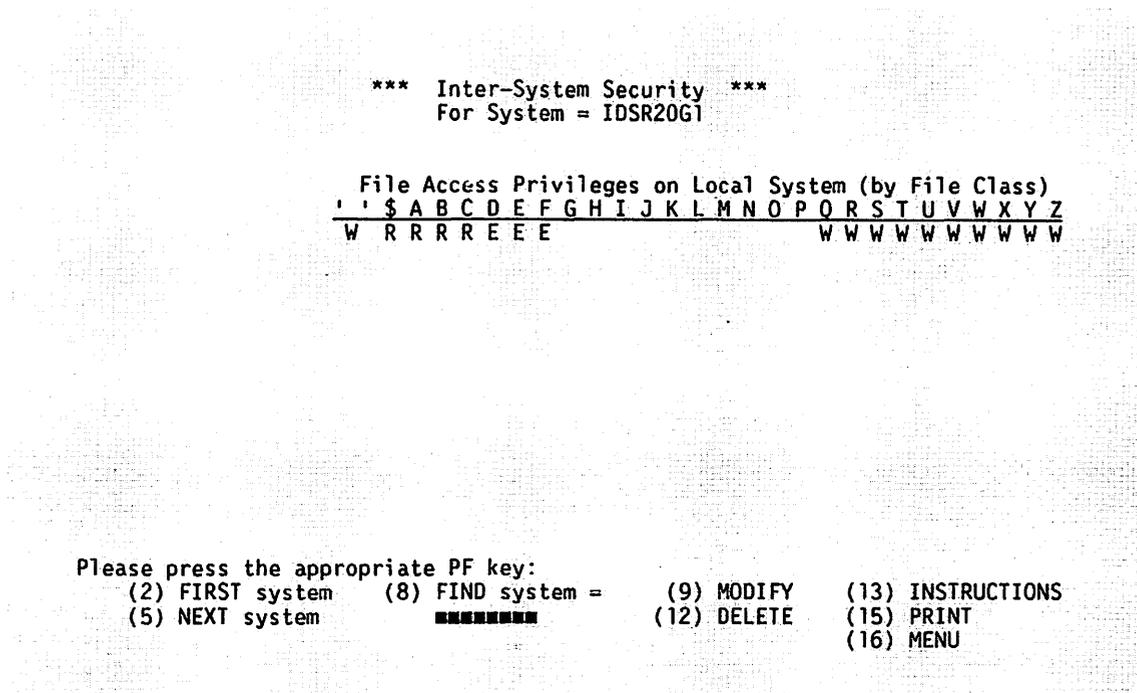


Figure 9-2. Inter-System Security Screen

The top of the Inter-System Security screen displays the name of the remote system that you entered in the previous screen.

If the remote system you entered has not been defined in the WSNEDIT file specified at IPL, the following message appears

This system is now undefined

Typically, this message appears when a previously-defined system has been deleted from the network but a record of it remains in the intersystem security file. In this case, you should delete the record. A system that is not defined in the WSNEDIT file or that the SECURITY utility did not previously accept does not appear.

The Inter-System Security screen lists each of the file classes on your VS: unprotected (' '), read-only (\$), and classes A through Z. Under a particular file class, you can enter W, R, E, or a blank to indicate which privileges the remote system is to have to the files of that class. The named system cannot retrieve private (@) or (#) files. The purpose of each entry is as follows:

W -- The named system can read and write (scratch) all files in a particular class.

R -- The named system can read (retrieve) but not write (scratch) to files of a particular class.

E -- Users of the named system can run program or procedure files of the class being specified, but can neither read nor write to those files.

Blank -- The named system has no access to the designated file class. The default is blank.

For example, in Figure 9-2 the remote system, SYSNAME, has access rights to the following file classes:

Unprotected files ('') -- W indicates that SYSNAME has access rights to all unprotected files.

\$ through C -- R indicates that SYSNAME has read-only access to read-only files (\$) and to files in classes A through C.

D through F -- E indicates that SYSNAME can execute files in classes D through F.

G through P -- A blank under each of these file classes indicates that SYSNAME has no access rights to files in those classes.

Q through Z -- W indicates that SYSNAME has write privileges to all files in classes Q through Z. This means that SYSNAME can retrieve these files, and then scratch the file afterwards or send a file and replace the existing one.

3. Define the file access privileges for all remote systems that share the File Transfer Service with your VS.

CHAPTER 10 MANAGING WSN NETWORK APPLICATIONS

10.1 OVERVIEW

This chapter explains how to use the WSN Application (WSNAPPS) utility to manage certain customer-written network applications for inclusion in the WSN directory. Applications that are added to the directory can be automatically started on the local VS by remote users or applications that have access to the WSN network.

For example, using WSNAPPS, you can add your own distributed application that was written using the WSN Network Application Interface (NAI) service, to the directory. Once this is performed, the application that is running on a remote system can request that the network software automatically start the application on the local VS and exchange data.

Currently, the WSNAPPS utility is only recommended for managing customer-written, NAI-based applications. Other WSN network applications that feature an automatic start capability such as DIRSYNC, are automatically added to the directory upon installation. In addition, the WSNAPPS utility includes functions that are reserved for Wang analyst use only.

***Note:** For consistency with internal applications that are also catalogued in the directory, WSNAPPS supports selection of certain reserved internal interfaces other than NAI. These other internal interfaces are reserved for future use.*

Once an NAI-based application is created and installed on the local VS, you can use the WSNAPPS utility to

- Add the application to the directory.
- Review or modify the VS task parameters that are used to locate and run the application.

- Delete the application from the directory. After this is done, the application can still be run by starting it manually. (For details, refer to the *Wang Systems Networking VS Network Application Interface Programmer's Guide*.)

To access the WSNAPPS utility, press PF9 from the CNFGAID menu. The WSN Application menu appears (see Figure 10-1).

WSN Applications 01.00.00 (c) Wang Labs. 1987 Friday 06/17/88 09:54

```

      ■ Add New Application
      - Edit by Application Name
      - Edit by Application Id
      - Exit
  
```

```

(1) Add                      (9) Edit by Name      (13) Instructions
(2) Edit by Id
                                (16) Exit
  
```

Figure 10-1. WSN Application Menu

10.2 DEFINING NETWORK APPLICATIONS

To add applications to the WSN directory, or to review or modify designated applications

1. Position the cursor next to the selected function on the WSN Application menu. (Alternatively, you can select the function by pressing the appropriate PF key that is listed at the bottom of the screen.)
 - a. To add a new application to the directory, select Add New Application and press RETURN. The WSN Application Designation screen appears (see Figure 10-2).
 - b. To review or modify an existing application, you can either select Edit by Application Name or Edit by Application Id.

- 1) If you select Edit by Application Name, press RETURN and enter the name of the application in the field provided.
- 2) If you select Edit by Application Id, press RETURN and enter the number that was assigned to the application when it was installed on your VS.

The application Id consists of three parts. The first two parts are the area and system Id (network address). Since you can only edit local applications, the values that appear in these fields are defaults and can not be modified. Only the third part of the Id field is modifiable. Enter a value for this part, which identifies the application that you want to review or modify.

Note: If you enter an incorrect or unknown application name or ID, the utility chooses the next alphabetically listed application (by name) or, in the second case, the next closest ID according to how the applications are listed in the directory. If the name field is left blank when selecting Edit by Application Name, the first application in the directory is displayed.

c. To exit from the WSNAPPS utility, select Exit and press RETURN.

WSN Applications 01.00.00 (c) Wang Labs. 1987 Friday 06/17/88 09:59

Application Description: -----
 Application Name: -----

File: ----- Library: ----- Volume -----

Class: - (A - Z) Status: X Run - Hold - Invoke

Procedure/Task Id: -----

Maximum Concurrent Copies: 001 (001 - 255)

Message Interface: NAI _____

(RETURN) Add (13) Instructions
 (10) Change Msg Interface
 (16) Exit

Figure 10-2. WSN Application Designation Screen

Figure 10-2 shows the WSN Application Designation screen as it appears when adding a new application.

If you are reviewing or modifying a network application, a similar screen appears with the information for that application displayed. From this screen you can review or modify other applications that are listed in the directory by pressing PF2 (first) or PF5 (Next) to scroll through the list of available applications. To delete an application from the directory, press PF8 (Delete).

2. Enter the appropriate information in the fields on the WSN Application Designation screen for the network application that you are adding or modifying.

The fields that appear on the WSN Application Designation screen include

Application Network Id -- No entry is allowed. This field gives the number that was assigned to the application when it was added to the directory

Application Description -- Enter a brief description of the application or any comment you wish to make concerning the application. This field cannot be left blank.

Application Name -- Enter the unique name of the application that identifies it on your VS. It is this application name that is specified in the NAI Open Request from the remote system. The application name can be up to 16 characters long and can include any combination of (uppercase) letters, special characters, and numbers.

File: -- Enter the file name of the procedure that will be used to run the application when the application receives data to be processed.

Library: -- Enter the name of the library where the procedure resides.

Volume: -- Enter the name of the volume where the procedure resides.

Class: -- Enter the procedure's class (A - Z). The class determines the procedure's priority and scheduling in the procedure queue and requires that a suitable (matching) background initiator be created by the system operator. This field enables you to place limitations on the number of network applications that can be run. (Refer to the *VS System Operator's Guide* for details.)

Status: -- Specify the run status for the application when it is submitted to the procedure queue by placing an X next to the status indicated. The following options are available:

Run -- Enables the procedure to be run as soon as a background initiator is available.

Hold -- Inhibits the procedure from running until it is released by the system operator or from the Command Processor.

Invoke -- Enables a procedure to be invoked by the Connection Manager. This selection supports certain VS-based applications for PC system access. It requires that the user ID and password be registered with Connection Manager. (Presently, this selection is for Wang analyst use only.)

Procedure/Task Id -- Enter the 8-character name that identifies the application in the procedure queue.

Maximum Concurrent Copies -- Enter a value from 1 to 255 to indicate the maximum number of copies of your application that can be run at the same time. Recommendations for determining this value are

- Use the default value of 1 if your application is not designed for multiple concurrent copies; for example, an application that requires exclusive access to files or other resources.
- Enter a value greater than 1 if your application is designed to support multiple concurrent copies in operation. Note that applications can also accept multiple concurrent sessions that are specified in the NETATTACH NAI call. These facilities should be used together to support the estimated network usage of the application. Keep in mind that as you increase the number of maximum concurrent copies, you increase the total consumption of VS resources.

Message Interface -- Presently requires NAI to be entered, which is the default value. This field indicates the protocol for task-to-task communications.

Note: Pressing PF10 changes the message interface by scrolling through other types of interfaces that are listed. This function is for Wang analyst use only.

3. After completing the fields on the screen, press RETURN to update the application record in the directory. The following message appears:

Application modified

At this point you can review or modify other applications or press PF16 to exit.

APPENDIX A CONFIGURATION ERROR MESSAGES

A.1 OVERVIEW

This appendix lists and describes the WSNEDIT and WSNDIRM error messages.

A.2 WSNEDIT ERROR MESSAGES

This section lists and describes error messages you may see while running WSNEDIT. Each message is followed by a description explaining the condition that accounts for its appearance and the action needed to resolve the condition. For some messages, more than one condition and action are provided.

Enter 'VS', 'OIS', 'PC', 'ALLIANCE', '2200', 'WOA', or 'IDS'

Meaning

You entered an invalid system type in the System Type field of the System Definition screen.

Action

Enter a valid system type as listed in the message.

If WSN with CNS is not installed, please answer NO

Meaning

You entered YES in the Shall File Transfer use CNS, or Has Store and Forward been Installed fields of the System Definition screen, and the system you are defining does not have CNS installed.

Action

Enter NO in these fields if the system does not have CNS installed.

WSN with CNS is not supported for the given system type

Meaning

You entered YES in the Has WSN with CNS been installed field of the System Definition screen, and the system type you entered in the System Type field is not a CNS-supported system.

Action

Enter one of the following types of systems: VS, IDS, or PC; or, change the response to NO in the Has WSN with CNS been installed field if you are defining a non-CNS system.

Name already exists

Meaning

You entered an area name in the Area Name field of the Area Definition screen or a system name in the System Name field of the System Definition screen, and the area or system name has already been defined in the directory.

Action

Enter a different area or system name. No two area names within a network and no two system names within an area can be the same. This message also appears when you attempt to assign the same name to two transports and the same name to two service windows.

Area ID already exists

Meaning

You entered an area ID in the Area ID field of the Area Definition screen, and the area ID has already been defined in the directory.

Action

Enter a different area ID. No two areas in the network can have the same area ID.

System ID already exists

Meaning

You entered a system ID in the System ID field of the System Definition screen, and the system ID has already been defined in the directory.

Action

Enter a different system ID. No two systems in the same area can have the same system ID.

System not found

Meaning

You attempted to enter a system name in the Admin System Name or Primary Distribution Point field of the Area Definition screen and the system name has not yet been defined.

Action

You must define the system name in the directory before you can enter the name in these fields. The message also appears when you specify a system that is not defined in the directory as the override Store and Forward next hop.

Please delete all systems from the area, first

Meaning

You attempted to delete an area from the Area List menu and you have not deleted all the systems in the area first.

Action

You must use PF12 to delete all system records from the Area System List menu for that area before you can delete the area record.

The Distribution Point must have WSN with CNS installed

Meaning

You entered a system name in the Primary Distribution Point field of the Area Definition screen and the system has not been defined as having CNS installed in the directory.

Action

Enter the name of a system that has CNS installed as the distribution point.

The Distribution Point must have Store & Forward installed

Meaning

You entered a system name in the Primary Distribution Point field of the Area Definition screen and the system has not been defined as having Store and Forward installed in the directory.

Action

Enter the name of a system that has both CNS and Store and Forward installed as the distribution point must be entered that has both CNS and Store and Forward installed.

File Transfer use CNS is not supported for the given system type

Meaning

You entered YES in the Shall File Transfer use CNS field of the System Definition screen and you defined the system as an OIS, Alliance, 2200, or IDS.

Action

File Transfer can use CNS only on VS and PC systems.

The Admin System must be a VS or PC

Meaning

You entered the name of a system that is not defined in the directory as being a VS or PC in the Admin System field of the Area Definition screen.

Action

Only a system defined as being a VS or PC in the directory can be the Administrative system for the area. The Administrative system acts as an Area Control Center to synchronize directory records in the area.

This system is the network center. It must be a VS

Meaning

You entered a system type other than VS in the System Type field of the System Definition screen, and the system was defined as the Network Center when WSNDIRM was run.

Action

Enter a VS system as the Network Center.

This system is the network center. It must have WSN with CNS installed

Meaning

You entered NO in the Has WSN with CNS been installed field of the System Definition screen, and the system you are defining was defined as the Network Center when WSNDIRM was run.

Action

You must enter YES in the Has WSN with CNS been installed field if the system you are defining is the Network Center.

Please delete systems from transport, services and/or windows, first

Meaning

You attempted to delete a system record from the directory and the system was still defined in the local-view configuration file as residing on a transport or as having a WSN service installed (e.g., file transfer).

Action

Before you can delete the system record from the directory, you must access Manage Transports or Manage Services and delete the system definition from the appropriate transport or service.

Please delete all systems from the transport, first

Meaning

You pressed PF12 and ENTER to delete a transport from the Transport List menu and you did not delete the systems defined as sharing the transport.

Action

You must access the system definitions for the transport by selecting the transport from the Transport List menu and pressing ENTER. Then you must delete the system definitions.

Target system must be a VS

Meaning

You attempted to enter a target system that was not a VS when you began to create or edit a configuration file.

Action

The target system for which you create or edit a configuration file must be a VS system.

Target system must have WSN with CNS installed to manage routing

Meaning

You attempted to access the Manage Routing function from the WSNEDIT main menu and the target system that you specified was not defined as having CNS installed in the directory.

Action

You must access the System Definition screen for that system and enter YES in the Has WSN with CNS been installed field. Only systems with CNS installed can manage routing.

The value for each congestion level must be greater than the previous level

Meaning

You entered a value in one of the congestion level fields on the General Transport Definition screen and the value was equal to or less than the value assigned to the previous level.

Action

Enter an appropriate value as described in Chapter 6.

Warning - DLP not yet defined via GENEDIT

Meaning

You entered a DLP in the DLP Address field of the General Transport Definition screen that has not been defined in the active system configuration file through GENEDIT.

Action

You can continue the transport definition and define the DLP afterwards.

The maximum cable address allowed is 3FFF

Meaning

You entered a cable address for a system on a Wang Band transport that was greater than 3FFF (hexadecimal).

Action

Enter a valid cable address in the range of 01 to 3FFF (hexadecimal).

Primary is not valid for the given system type

Meaning

You entered 01 as the Poll Address for a system that was not a VS when configuring a Multipoint transport. Entering 01 as the Poll Address for a system defines it as the Primary on a Multipoint transport.

Action

Designate an appropriate VS system as the primary.

Duplicate addresses are not allowed

Meaning

You assigned the same Poll Address to two or more systems in a Multipoint configuration.

Also appears if you attempted to enter duplicate Wang Band and duplicate X.25 cable addresses. Only unique values are permitted in the cable address field.

Action

Assign a unique hexadecimal address, ranging from 01 (for the Primary only) to FE, to each system in the Multipoint configuration.

The maximum poll address allowed is FE

Meaning

You attempted to assign a Poll Address greater than FE to a system on a Multipoint transport.

Action

Assign a unique hexadecimal address, ranging from 01 (for the Primary only) to FE, to each system in the Multipoint configuration.

Least cost path is not an adjacent system

Meaning

You specified a nonadjacent system as the least cost path on the Destination Systems and Areas menu. Only an adjacent system can be the least cost path.

Action

Check your transport configuration to determine which systems are adjacent and nonadjacent, and enter the name of an adjacent system. (Refer to Chapter 2 for a description of adjacent and nonadjacent systems.)

Override system is not in the target system area

Meaning

You specified an override system that is not in the target system's area as the Store and Forward Next Hop to Store and Forward systems in the target system's area.

Action

Only a Store and Forward system in the target system's area can be specified as the Store and Forward Next Hop to systems in the area. Access Manage Areas and check the directory for a list of systems in the target system's area and specify an appropriate system.

Override system is not a store and forward system

Meaning

You specified a system that is not defined as having Store and Forward installed as an override next hop on the Store and Forward Routing menu.

Action

Specify an override system that is defined as having Store and Forward installed, in the directory.

Target system cannot be an override system

Meaning

You specified the target system as an override next hop. The target system can never be an override.

Action

Specify another system that is appropriate.

The maximum number of Adjacent Systems is 512 (128 for OS prior to 6.40)

Meaning

The total number of adjacent systems (i.e., all adjacent systems on all transports) exceeds 512. VS operating systems prior to Release 6.40 only supported 128 adjacent systems.

Action

Delete some systems from the System List menu (refer to Chapter 5).

The maximum number of Transports is 50

Meaning

You attempted to define more than 50 transports.

Action

You cannot define more than 50 transports on the local system.

The maximum number of systems in an Area is 300

Meaning

You attempted to define more than 300 systems in one area.

Action

You can reconfigure some of the existing areas and redistribute the systems or create another area to include these systems.

The maximum number of Areas in the network is 150

Meaning

You attempted to define more than 150 areas in the network.

Action

You can reconfigure some of the existing areas to reduce the number of areas or define another network to include these areas.

The maximum number of systems in the network is 6500

Meaning

You attempted to define more than 6500 systems in the network.

Action

You can reduce the number of systems by either deleting noncritical systems from the network or creating another network to include the additional systems.

The maximum number of paths to a destination is 3

Meaning

You attempted to define more than 3 paths (i.e., next hops) to a destination.

Action

You cannot exceed this limit. If necessary, redesign your network so that three paths are the maximum.

Default service window may not be deleted

Meaning

You attempted to delete the default window from the Service Window screen.

Action

The default window cannot be deleted.

Please delete destination from window, first

Meaning

You attempted to delete a window from the Service Window screen, and you did not delete the destinations assigned to the window first.

Action

You must delete the destinations assigned to the window before you can delete the window.

The maximum number of service windows is 50

Meaning

You attempted to define more than 50 service windows.

Action

Do not exceed this maximum.

hh (hours): values must be 0 thru 23; mm (minutes): values must be 0 thru 59

Meaning

You attempted to enter a value greater than 23 hours or 59 minutes on the Service Window Parameters screen.

Action

Do not exceed these maximums.

If Poll is YES then Turn Around must also be YES

Meaning

You entered YES in the Poll field and NO in the Turn Around field for a given destination on the Manage Service Window Destinations screen.

Action

If you enter YES in the Poll field for a given destination, you must also enter YES in the Turn Around field for that destination.

Target system must have WSN with CNS installed to manage service windows

Meaning

You attempted to access the SERVICE WINDOWS configuration function through the Edit Service Definitions menu, and the target system for which you were creating or modifying the configuration file was not defined as having CNS installed in the directory.

Action

Designate a system with CNS installed to manage service windows.

Target system cannot be a least cost path

Meaning

You attempted to specify the target system as a least cost path to a destination through the manage routing function.

Action

Enter a system that is adjacent to the target system as the least cost path.

The given Target System is not defined in any area

Meaning

You attempted to create or edit a configuration file for a given target system and the system was not defined in the directory.

Action

You can continue to create the file even though the system is not defined in the directory.

Note - Target System in the configuration file is not defined in any area

Meaning

You continued to edit a configuration file for a target system not defined in the directory.

Action

You can continue editing the file.

Run X25 INSTALL software to convert the input configuration file or Press PF12 to delete PRIOR RELEASE X.25 Transport

Meaning

X.25 records for a transport labelled PRIOR RELEASE X.25 in the local-view configuration file have not been converted to make them compatible with the current WSN VS NETCORE release.

Action

There are two options available. A Wang analyst can run the X.25 conversion utility to update the existing records or, you can press PF12 on the Transport List menu to delete the incompatible transport records from the local-view configuration file. Once deleted, new X.25 configuration records can be created under the current WSN VS NETCORE release.

Run X25 INSTALL software to convert the input configuration file or press ENTER to delete systems from PRIOR RELEASE X.25 Transport

Meaning

The X.25 records for a transport labelled PRIOR RELEASE X.25 in the local-view configuration file have not been converted to make them compatible with the current WSN VS NETCORE release.

Action

There are two options available. A Wang analyst can run the X.25 conversion utility to update the existing records or, you can select the transport and press ENTER to display the systems on the transport. Once displayed, you delete the DTE addresses of the systems on the transport, press ENTER and return to the Transport List menu. When you return to the Transport List menu, the message "Run X25 INSTALL software to convert the input configuration file or press PF12 to delete PRIOR RELEASE X.25 Transport" appears. Refer to the description for this message.

Transport type is PRIOR RELEASE X.25. Please delete all systems

Meaning

You displayed the DTE addresses of systems on an X.25 transport labelled PRIOR RELEASE X.25 on the Transport List menu.

Action

Delete the DTE addresses of the systems on the transport, press ENTER and return to the Transport List menu. When you return to the Transport List menu, the message "Run X25 INSTALL software to convert the input configuration file or press PF12 to delete PRIOR RELEASE X.25 Transport" appears. Refer to the description for this message.

X.25 network file access error

Meaning

WSNEDIT could not read information from the X.25 network file (not to be confused with the local-view configuration file).

Action

Consult your Wang systems analyst.

X.25 network file open error

Meaning

WSNEDIT could not read information from the X.25 network file (not to be confused with the local-view configuration file).

Action

Consult your Wang systems analyst.

Required field must be alphanumeric

Meaning

You attempted to enter special characters for this particular field.

Action

Re-enter the appropriate information using alphanumeric characters only.

Required field must be yes or no

Meaning

You attempted to enter a value other than yes or no for this field.

Action

Re-enter the appropriate response.

Input File not found

Meaning

The file name that you entered for the WSN configuration file could not be located.

Action

Re-enter the correct location (file/library/volume) of the WSNEDIT configuration file.

Input file not valid

Meaning

You named an existing file that was not formatted for WSN configuration data.

Action

Re-enter the appropriate WSNEDIT configuration file name.

Please begin again with the latest version of WSNEDIT

Meaning

You attempted to edit a WSNEDIT configuration file that was created on a system running a later release of NETCORE software.

Action

Configuration files are not backward compatible with earlier releases of NETCORE software. The WSNEDIT that you are running must be equal to or greater than the release used to create the configuration file.

The total of systems allowed on this transport has been exceeded

Meaning

You attempted to designate more than 16 secondary systems on a multipoint transport.

Action

Only 16 secondary systems or less can be designated per Multipoint transport.

Target system may not be deleted from the directory

Meaning

You attempted to delete the target system from the resident WSN directory.

Action

This is not permitted since the WSNEDIT configuration file defines the relationship that the target system shares with other systems in the network.

The maximum number of window destinations is 6500

Meaning

You attempted to specify more than 6500 Store and Forward destination systems on the target system. This limitation reflects the total number of destinations that can be reached through all of the service windows that are configured on the target system.

Action

Do not exceed this maximum.

System already assigned to a window

Meaning

You attempted to assign a destination system to more than one service window.

Action

Do not assign a destination system to more than one service window.

Transmit and Receive values must not be identical

Meaning

You attempted to enter identical values for IDS transmit and receive parameters. These values cannot be identical.

Action

Enter different values for these parameters.

Number selection must contain numeric data

Meaning

You attempted to enter non-numeric characters such as letters or special characters in a number selection field.

Action

Re-enter the value using only numbers.

Only one Direct Call allowed

Meaning

You attempted to specify a second system for direct call on the same DLP. Each DLP can support Direct call to only one system.

Action

Do not exceed this limit.

Modem must have associated autocal unit

Meaning

You did not enter an autocal unit in the field next to a modem entry on the MLTC Line Group Definition screen.

Action

Enter an autocal unit for each modem entry, except for Hayes modem.

801A, 801C or V25 must immediately follow modem

Meaning

You entered an autocal unit in a field that does not follow a modem entry.

Action

Enter the autocal unit in a field adjacent to the modem it serves.

No lines are available for this transport

Meaning

You attempted to create a WSN Point-to-Point transport and specify a DLP address associated with an MLTC that has no lines available.

Action

You can change the DLP address to configure the transport on another MLTC that has available lines.

There is no primary specified for this transport

Meaning

You did not assign a primary system for the Multipoint transport that you were defining.

Action

Each Multipoint transport requires a primary system, which is designated by a poll address of 01 on the Multipoint System Designation screen.

Please enter a valid system from this area

Meaning

You attempted to enter a system name in the Admin system field on the Area Definition screen and the system name was not defined in the directory for the area that you were defining.

Action

Enter a system name for a system in the area that you are configuring.

WSNEDIT2 module is missing; please reinstall WSNEDIT on your system

Meaning

The WSNEDIT2 module cannot be accessed.

Action

Use a backup copy of the WSNEDIT library containing the WSNEDIT2 module.

WSNINPUT module is missing; please reinstall WSNEDIT on your system

Meaning

The WSNINPUT module cannot be accessed.

Action

Use a backup copy of the WSNEDIT library containing the WSNINPUT module.

A.3 WSNDIRM ERROR MESSAGES

The following error messages are for directory errors that can occur while running WSN Directory Maintenance functions. Each message is followed by a description explaining the condition that accounts for its appearance and the action needed to resolve the condition. For some messages, more than one condition and action are described.

Directory Not Found

Meaning

The directory was not located where indicated by DIRPTR.

Action

Run DIRPTR and specify the file, library, and volume of the directory or use WSNDIRM to create a new directory.

Invalid Directory

Meaning

The file specified by DIRPTR was not a valid directory.

Action

Run DIRPTR and specify the file, library, and volume of a valid directory or use WSNDIRM to create a new directory.

No network records have been defined in the directory

Meaning

NETCORE has not been properly installed using the directory specified by DIRPTR.

Action

NETCORE must be reinstalled with the proper directory specified. Consult your Wang analyst.

The network center has not been defined in the directory

Meaning

There was no Network Center defined for an existing directory while you were performing WSNDIRM functions.

Action

Define the Network Center using WSNDIRM.

The network record has not been defined in the directory

Meaning

NETCORE has not been properly installed using the directory specified by DIRPTR.

Action

NETCORE must be reinstalled with the proper directory specified. Consult your Wang analyst.

The Local DIAG1 application has not been defined

Meaning

NETCORE has not been properly installed using the directory specified by DIRPTR.

Action

NETCORE must be reinstalled with the proper directory specified. Consult your Wang analyst.

The local system has not been defined in the directory

Meaning

There was no local system defined in the existing directory while you were performing WSNDIRM functions.

Action

Use WSNDIRM to correct the local system definition.

The local area has not been defined in the directory

Meaning

The area for the local system was deleted.

Action

Use WSNEDIT to define the local system or use WSNDIRM to start the network definition manually.

Record not found, please enter name(s) and/or ID(s)

Meaning

The Network Center, specified in WSNDIRM, was not configured in the directory.

Action

Enter either the name or system and area IDs of a configured system.

Record with given ID(s) already exists, Press ENTER to accept

Meaning

WSNDIRM was used to start a network definition manually for an existing directory. When ENTER is pressed, all network records will be deleted.

This message also appears if WSNDIRM was used to import a starter kit into an existing directory (merge). When ENTER is pressed, with merge selected, the existing network definition will be lost if the selection "Replace all network records with starter kit" is chosen from the Starter Kit menu.

Action

The network configuration must be redefined using a starter kit or WSNEDIT.

The network center must be a VS and have WSN with CNS installed

Meaning

The system that was entered as the Network Center in WSNDIRM was not a VS with CNS installed.

Action

Specify a VS system with CNS installed as the Network Center.

Starter Kit not found

Meaning

The starter kit was not found at the location specified on the Starter Kit screen.

Action

Enter the correct file, library, and volume for the location of the starter kit on the Starter Kit screen.

The local system has not been defined in the starter kit

Meaning

The local system was not defined in the starter kit.

Action

Define your local system using WSNDIRM at the system where the starter kit was exported. Once this is done you can import this starter kit on your local system.

Starter Kit merge aborted

Meaning

Conflicts were encountered while attempting to merge a starter kit with the existing directory.

Action

Press PF16 to cancel the merge operation and correct the conflicts as necessary. (Refer to Chapter 5 for instructions.)

File access error

Meaning

If this message occurred while importing a starter kit, the starter kit did not have the local system defined. (See the message "The local system has not been defined in the starter kit" for details.)

Action

If the directory is suspected of being damaged, run WSNREORG.

APPENDIX B NETWORK PLANNING CONFIGURATION CHECKLISTS

B.1 INTRODUCTION

The forms on the following pages indicate the network configuration and reference information needed by network administrators at VS sites. A Wang representative should be consulted to assist in the network planning and design process.

Some forms may not apply to a particular site, depending upon the transport(s) in use. The forms are as follows:

| Form | Title |
|------|---|
| B-1 | Network Configuration Planning Forms -- Cover Sheet |
| B-2 | Network Personnel Data |
| B-3 | Network Schematic Diagram -- Page for drawing map of network |
| B-4 | Network Directory Information |
| B-5 | Network Area/System Information |
| B-6 | VS Transport Record: Wang Band |
| B-7 | VS Transport Record: Multipoint |
| B-8 | VS Transport Record: Point-to-Point Dedicated |
| B-9 | VS Transport Record: Point-to-Point Switched |
| B-10 | VS Transport Record: IEEE 802.3 |
| B-11 | VS Transport Record: X.25 |
| B-12 | VS Transport Record: IDS 3271 BSC |
| B-13 | VS Transport Record: IDS 3274 SNA |
| B-14 | WSN Routing Information (For CNS-Based Systems Only) |
| B-15 | Store and Forward Routing Information |
| B-16 | Service Window Parameters |
| B-17 | Create Service Windows |

B.2 NETWORK PLANNING CONFIGURATION FORMS

Use the following forms to record the network configuration information required to configure and maintain your VS in a WSN network.

CNS/WANG OFFICE
NETWORK CONFIGURATION PLANNING FORMS

NETCORE Release _____

FOR LOCAL SYSTEM _____ (WangNet ID)

COMMUNICATIONS File _____ Library _____ Volume _____

WANG NETWORK SUPPORT PERSONNEL

Wang Representative

Name _____ Position _____ Phone _____

Address _____

Name _____ Position _____ Phone _____

Address _____

NETWORK SCHEMATIC DIAGRAM

(Use this page to draw a network map. Identify the systems by System Name, System ID, and Area ID. Label each transport by its type, for example, Wang Band, Multipoint, and so forth.)

NETWORK DIRECTORY INFORMATION

(This information must be filled in during directory creation in the WSNDIRM utility.)

For Local System

Local System Name (WangNet ID) _____ SID _____
Local Area Name _____ AID _____

For Network Center (NCC for DMF)

Network Name _____
Network Center System Name (WangNet ID) _____
SID _____
Network Center Area Name _____ AID _____

Directory File _____ Library _____
Volume _____

SERVICE WINDOW PARAMETERS

Define window parameters in this screen. These parameters are used by any application that uses the Store and Forward Manager. Defaults may be taken, but consider the network configuration before using any numbers.

Window Name _____

Maximum Number
of Retries _____ (0 - 99)
(How many times to try to establish a session with a remote system
associated with this window)

Time between
Retries _____ (hh:mm)
(Time to wait between the retries in above parameter)

Time between Sessions
within an Open Window _____ (hh:mm)

Immediate Priority
Postponement Time _____ (hh:mm)

CREATE SERVICE WINDOWS

for

Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

Under each hour time slot, there are four 15-minute time slots. Each slot is an autonomous unit in itself. Even though the form here shows a straight line under the hour-slot, keep in mind that an hour-slot actually comprises four different time slots.

Enter an 'X' in each 15-minute interval to be included in the open Service Window **WINDOWNAME**.

Select only one priority per 15-minute interval. The priorities have the following meanings:

- High** -- Only High-priority information is sent.
- Medium** -- Both Medium- and High-priority information is sent.
- Low** -- Low-, Medium-, and High-priority information is sent.

WINDOWNAME: _____

DAY(S): _____

| Priority | Time: AM | | | | | | | | | | | |
|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| | <u>12</u> | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> |
| High: | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Med: | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Low: | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ |

| Priority | Time: PM | | | | | | | | | | | |
|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| | <u>12</u> | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> |
| High: | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Med: | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| Low: | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ |



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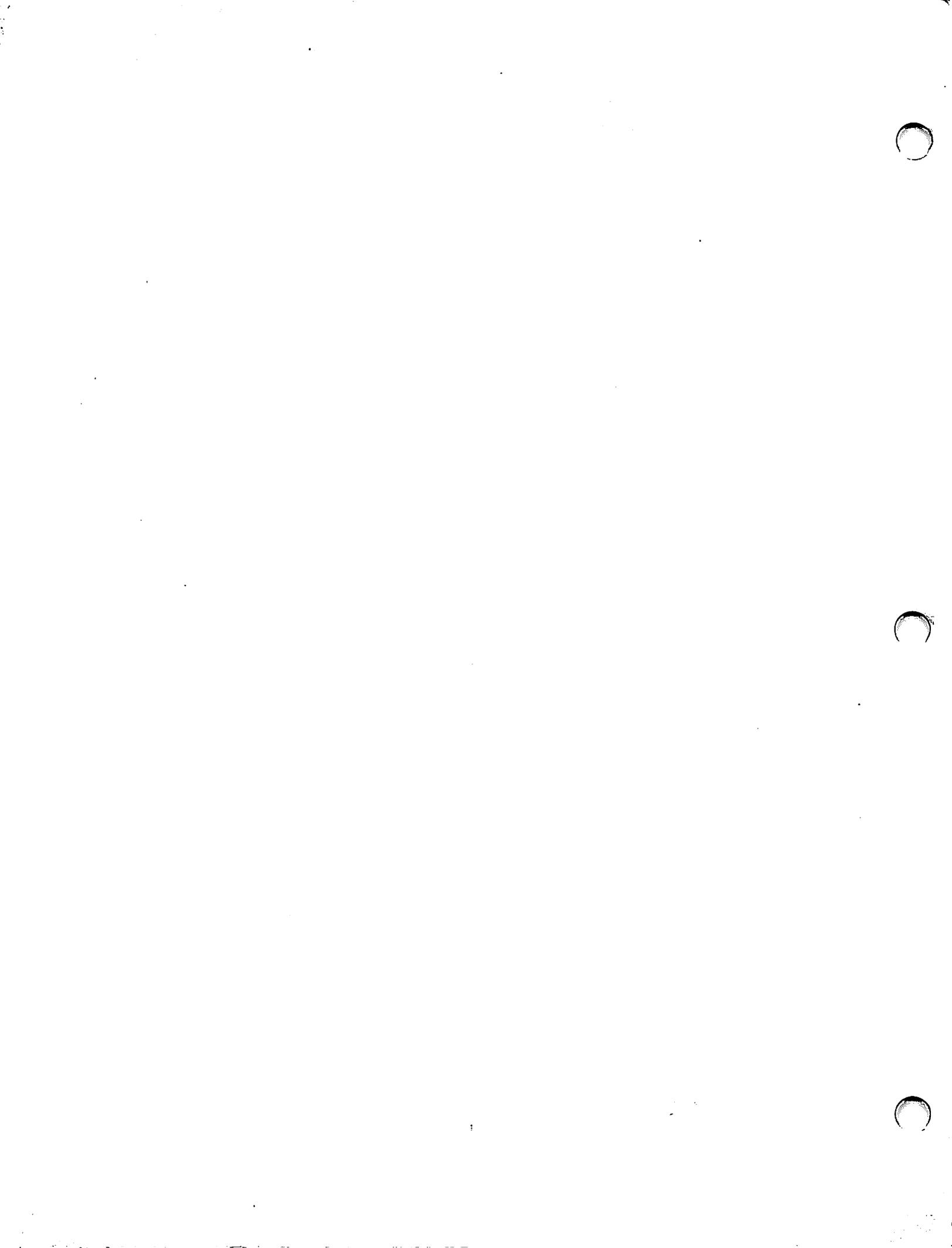


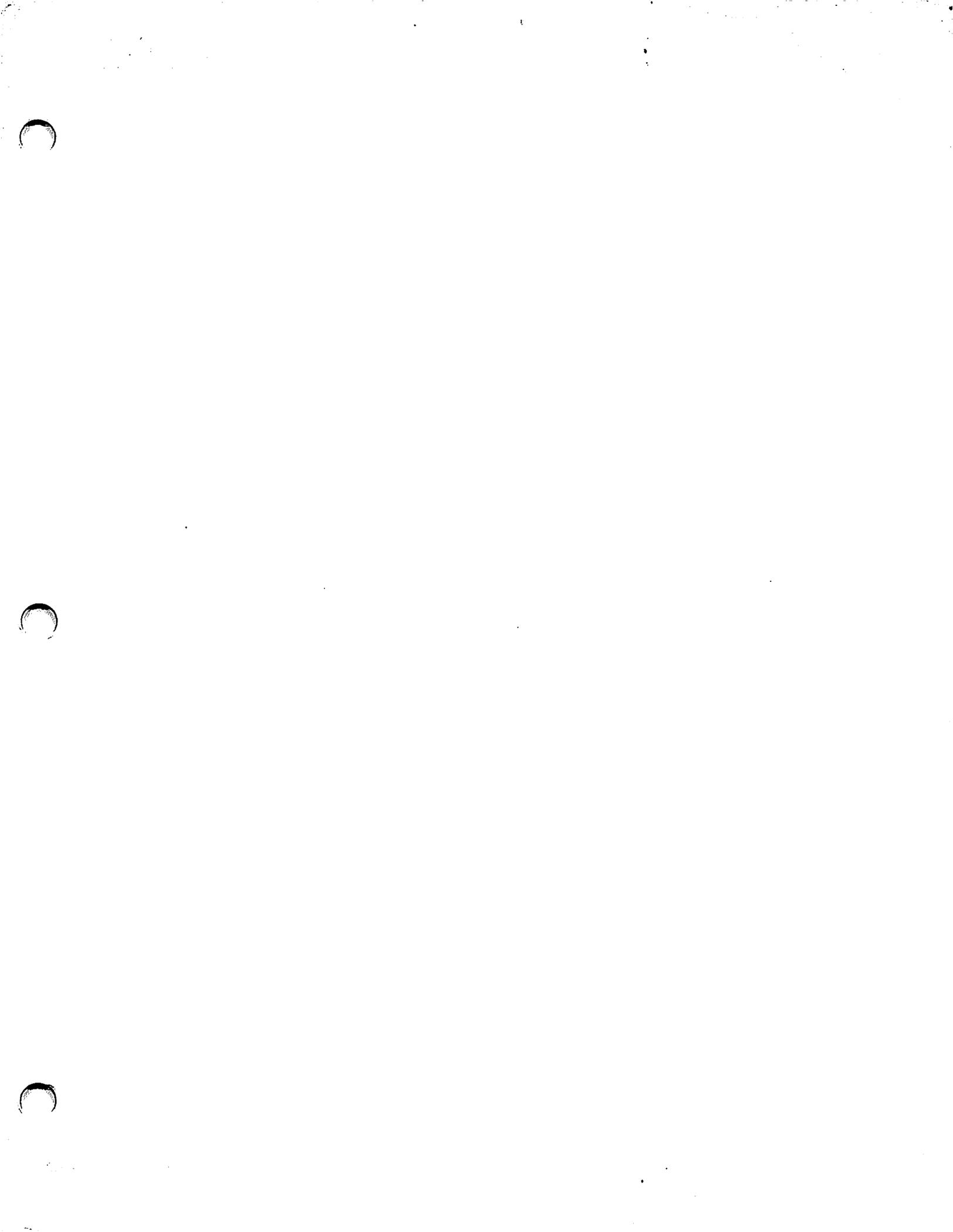
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