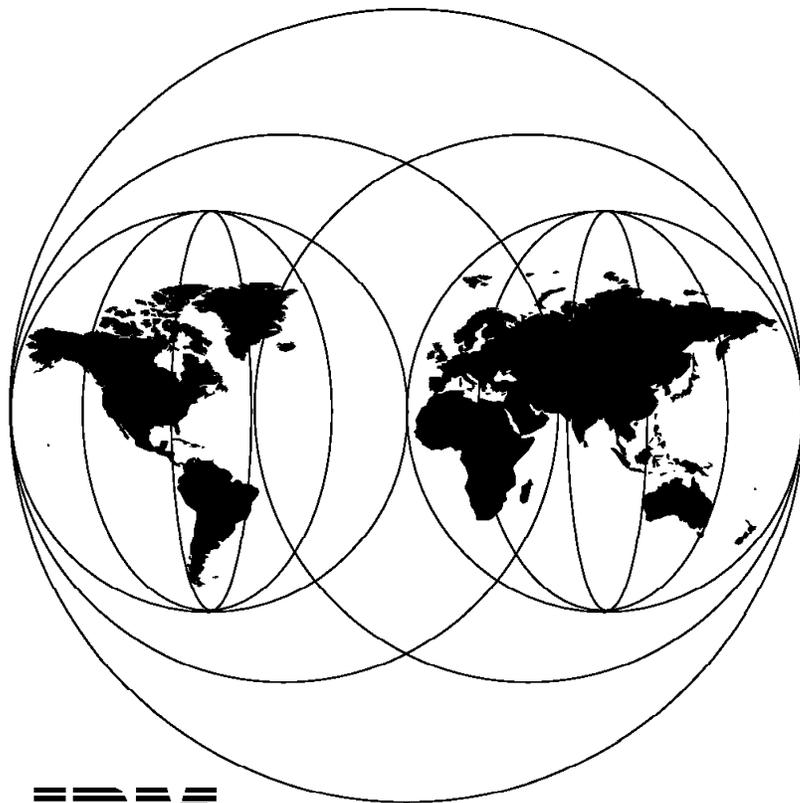


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Connectivity on a PC Server System/390

January 1996



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Abstract

This document describes the connectivity options that are currently available using the communications device managers on the PC Server System/390. It focuses on various scenarios using SNA/APPN, TCP/IP, and LAN protocols; each involving the PC Server System/390, AIX, DOS, OS/2, and UNIX workstations, as well as an MVS mainframe environment, respectively. It provides a basic understanding of the communications device managers, some SNA/APPN and TCP/IP terminology that is used throughout the book, and a step by step approach on how to set up the PC Server System/390 in different networking environments. Setting up the PC Server System/390 for communications entails; working with the PC Server System/390 Configurator, MVS Hardware Configuration Definition tool, LAN Adapter Protocol Support, ACF/VTAM, ACF/NCP, TCP/IP, MVS/ESA, and JES/2 definitions.

This document was written for IBM systems engineers and customer personnel who are planning to implement the PC Server System/390 into a networking environment. Some knowledge of MVS/ESA, JES/2, SNA/APPN, TCP/IP, and LAN connectivity is assumed.

(181 pages)

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Special Notices

This publication is intended to help IBM systems engineers and customer personnel who are planning to implement the PC Server System/390 into a networking environment. The information in this publication is not intended as the specification of any programming interfaces that are provided by the PC Server System/390. See the PUBLICATIONS section of the IBM Programming Announcement for the PC Server System/390 for more information about what publications are considered to be product documentation.

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Preface

This document is intended to provide information on the connectivity options that are available on the PC Server System/390. It contains descriptions of the communications device managers and the necessary steps needed to set up various LAN connections, along with the appropriate SNA/APPN and/or TCP/IP definitions.

This document was written for IBM systems engineers and customer personnel who are planning to implement the PC Server System/390 into a networking environment.

How This Document Is Organized

The document is organized as follows:

- Chapter 1, "Introduction and Overview"

- Chapter 2, "Planning and Preinstallation"

This chapter discusses considerations that should be taken into account when planning for the implementation of the PC Server System/390 into the network. It also describes the preliminary steps and definitions needed prior to customizing the networking products on the PC Server System/390.

- Chapter 3, "Functions and Flow Control of the LAN Drivers"

This chapter provides a basic description of the flow control for the two device managers for the LAN environment; AWS3172 for SNA, and LCS3172 for TCP/IP.

- Chapter 4, "Hardware and Software Configuration"

This chapter introduces the environment that was used to support the scenarios, which are explained in this document.

- Chapter 5, "The PC Server System/390 in a Subarea Environment"

This chapter describes the Subarea connectivity scenarios conducted with the PC Server System/390.

- Chapter 6, "The PC Server System/390 in an APPN LAN Environment"

This chapter describes the APPN LAN connectivity scenarios conducted with the PC Server System/390.

- Chapter 7, "The PC Server System/390 in an APPC Environment"

This chapter identifies the tasks that are needed to set up an APPC environment and describes the APPC scenarios conducted with the PC Server System/390.

- Chapter 8, "The PC Server System/390 in a TCP/IP LAN Environment"

This chapter shows the TCP/IP LAN connectivity options of the PC Server System/390 using the token-ring and Ethernet adapters.

- Chapter 9, "Useful Tools"

This chapter describes some of the tools we have used throughout the scenarios. These tools are easy to use, and could save you a considerable amount of time when debugging or verifying connections.

- Appendix A, “Listings”

This appendix contains some examples of the configuration profiles used in several of the scenarios.

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *PC Server 500 System/390 Installation, Configuration and User's Guide for MVS/ESA*, SA22-7210
- *TCP/IP for MVS Customization and Administration Guide*, SC31-7134-00
- *VTAM 4.2 for MVS/ESA, VM/ESA, VSE/ESA Resource Definition Reference*, SC31-6498
- *NCP V7R1 SSP V4R1 & EP R12 Resource Definition Reference*, SC31-6224

International Technical Support Organization Publications

- *MVS and the PC Server 500 System/390*, GG24-2538
- *Network Product Examples*, GG24-3649
- *Multiprotocol Networking with the 3172 Model 3*, GG24-4252

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Chapter 1. Introduction and Overview

The IBM PC Server System/390 is a combination of the System/390 and the PC Server architectures that provides access and use of both in a single platform. While the S/390 instructions execute natively on a dedicated CMOS chip on the Microprocessor Complex, the executions of the S/390's I/O is handled by OS/2 device managers, device drivers, and S/390 channel emulation. The S/390 design point in the PC Server System/390 is unique compared to other S/390 processors. In this implementation, S/390 devices (tapes and printers) are either channel attached (through S/370 Channel Emulator/A) or emulated on PC devices in a manner that is transparent to the S/390. In addition to emulating the S/390 I/O, the high performance Pentium processor also supports OS/2 applications and advanced local area network (LAN) functions.

It provides connectivity by using any of the following adapters:

- Token-ring adapter
- Ethernet adapter
- S/370 Channel Card

While this mix creates an environment with many options for I/O attachment and support, some S/390 capabilities are not available with this technique. For example, the I/O design point for the PC Server System/390 does not support multiple channels attached to the same physical device, a capability that is exploited in other S/390 systems.

The PC Server System/390 has the following features and benefits:

- A dual processing platform integrating the S/390 ESA architecture and Pentium technology in a PC Server
- A CMOS S/390 Microprocessor Complex that supports S/390 architecture and runs the VM/ESA, VSE/ESA, and MVS/ESA operating systems unmodified
- A PC Server 500 with a high-performance 90 MHz Pentium processor supporting advanced LAN functions and OS/2 Warp
- Standard Storage - 4.5 GB to 11.25 GB capacity using SCSI-2 Fast/Wide 2.25 GB disk drives with RAID 0, 1, and 5 (array model), 32 MB memory, CD-ROM drive, 4 mm DAT drive, and a 2.88 MB diskette drive
- Multiple user capability for application developers and system programmers with OS/2 multitasking, windowing, and editing for improved productivity
- 32 MB ECC memory standard on the S/390 Microprocessor Complex, expandable to 128 MB
- 32 MB-70 ns ECC memory expandable to 256 MB on system board (PC Server)
- RAID 0, 1, 5 support in Array system
- Choice of 6.75 GB (1000 Million Bytes) (3 x 2.25 GB) or 11.25 GB (5 x 2.25 GB) hard disk drives in array models
- 4.5 GB (1000 Million Bytes) (2 x 2.25 GB) hard disk drives in a non-array model

1.1 PC Server System/390 Connectivity Options

This document provides an overview of the components that are important when clarifying the connectivity options available with the PC Server System/390. This includes both existing products, and new OS/2 based device managers needed specifically for the PC Server System/390, when using these adapters together with the System/390 card installed in the PC Server 500. This document provides a step by step approach on how to implement the PC Server System/390 in various communications environments, so in many cases you are able to use it as a cookbook. It also gives a short overview of the SNA and TCP/IP architectures to help you better understand the terms used throughout this book.

The device managers provided with the PC Server System/390 are OS/2 based and are written in channel C (C++ or PL/I), or in PC assembly language. The device managers are needed to emulate various mainframe devices and are mapped to MVS/ESA through the PC Server System/390 Configurator as described in 2.3, "PC Server System/390 Configurator" on page 16.

The majority of scenarios in this document are based on LAN usage, which use the AWS3172 or LCS3172 device manager. However, a scenario based on the S/370 channel usage is also included, which uses the CHAN370 device driver.

The other device managers mentioned below are covered in more detail in *MVS and the IBM PC Server 500 System/390*, GG24-2538.

1.1.1 AWS3274 Device Manager

This device manager allows the PC Server System/390 to emulate a 3274 non-SNA control unit to support 3270 devices. AWS3274 uses Communications Manager/2 for this purpose. AWS3274 supports up to five DFT sessions. These are configured as a local or a host session, and can be used both as the basic MVS console and the TSO session on the PC Server System/390 OS/2 display itself. This does not provide workstation support.

1.1.2 LAN3274 Device Manager

This device manager allows OS/2 client workstations on the LAN to have Communications Manager/2 3270 sessions on the PC Server System/390. This support is based on NetBIOS protocol and additional code must be installed on the client OS/2 workstation to give you this support.

This is very easy to set up, but only works in this specific environment. To MVS, these sessions appear as normal non-SNA terminals (DFT).

1.1.3 AWS3172 Device Manager

This device manager emulates a 3172 with the Interconnect Control Program (ICP) and provides connectivity between VTAM in the PC Server System/390 and the LAN. AWS3172 can provide both APPN node support and dependent LU support (3270 emulation) for workstations. To establish a peer-to-peer connection from the PC Server System/390 to a mainframe, a 3172, 3174 or 3745 is used. On the PC Server System/390 the LAN adapter is shared between Communications Manager/2 and the AWS3172 Device Manager. The LAN must have an IEEE802.2 compatible adapter and driver suitable for OS/2 Warp.

The AWS3172 device manager can work with an IBM Token-Ring Adapter or Ethernet adapter. Each adapter has its own address defined in MVS as a 3088 (CTC).

1.1.4 LCS3172 Device Manager

This device manager emulates a 3172 with the Interconnect Control Program (ICP) and provides connectivity between TCP/IP in the PC Server System/390 and the LAN. The LCS3172 can work with an IBM Token-Ring Adapter or Ethernet adapter. Each adapter has its own address pair defined in MVS as 3088s (CTCs).

1.1.5 AWSICA Device Manager

The PC Server System/390 support programs include this device manager that emulates an integrated communications adapter (ICA). An ICA is supported by VSE and VM, and is a common way to connect SDLC lines to smaller mainframes.

MVS VTAM does not support an ICA, and the AWSICA device manager is normally not used with MVS systems.

An example of the use of this device manager with MVS/ESA is described in A.8, "The AWSICA Device Manager and BSC NJE" on page 176.

1.1.6 LAN3088 Emulation Manager

This device manager allows communication between two PC Server System/390s over the LAN. The LAN appears to the PC Server System/390 system as a 3088 channel-to-channel communication unit that provides a parallel channel-to-channel (CTC) connection from one PC Server System/390 to another PC Server System/390. Unlike the AWS3172, described in 1.1.3, "AWS3172 Device Manager" on page 2, LAN3088 allows only PC Server System/390-to-PC Server System/390 connectivity. It cannot be used to connect to a mainframe.

Normally, AWS3172 would be used to emulate an SNA/APPN environment where connectivity between two mainframes is required.

1.1.7 CHAN370 Emulation Manager

This device manager allows you to attach real S/370 control units to the PC Server System/390. It supports both selector, block multiplexor and byte multiplexor modes. It supports speed up to 4.5 MB/sec, however it does not support attachment of DASD.

1.2 Introducing SNA and APPC Concepts

In this section the *Systems Network Architecture* (SNA), including *Advanced Program-to-Program Communication* (APPC), is introduced along with the basic concepts required to provide a foundation for understanding the system definition requirements.

1.2.1 What Is SNA?

Systems Network Architecture (SNA) is a data communications architecture established by IBM to specify common conventions for communicating among a vast array of hardware and software products.

It is vital for successful data communications that network components agree on message structures and the actions they take on messages they receive. The structures are called *formats* and the actions are called *protocols*. The formats and protocols together make up the *architecture*.

1.2.2 What Is APPC?

APPC, also known as LU 6.2, is software that allows high-speed communications between programs on different computers, from portables and workstations to midrange and host computers. APPC software is available for many different IBM and non-IBM operating systems, either as part of the operating system or as a separate software package.

APPC serves as an interface between application programs and the network. When an application on your computer passes information to the APPC software, APPC translates the information and passes it to a network interface, such as a token-ring adapter card. The information travels across the network to another computer, where the APPC software receives the information from the network interface. APPC translates the information back into its original format and passes it to the corresponding partner application.

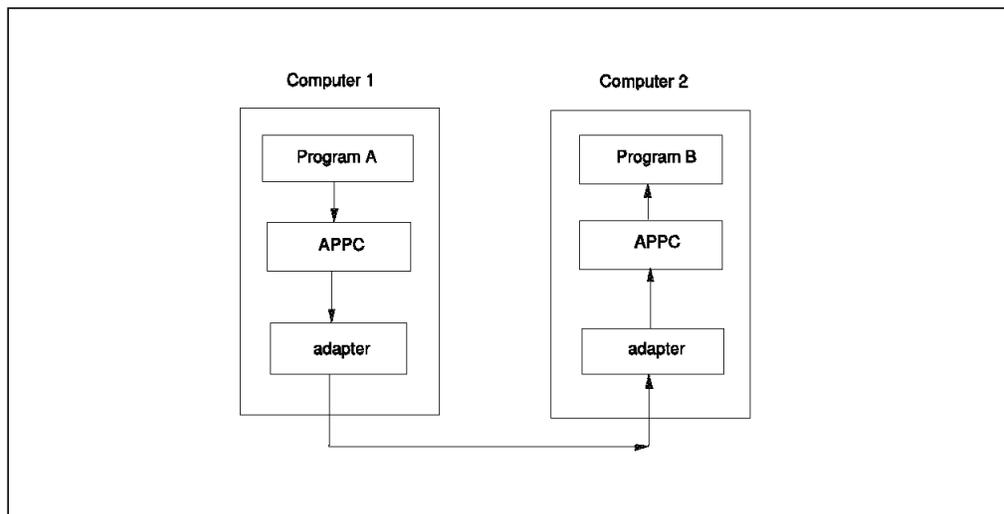


Figure 1. APPC Communication. APPC serves as an interface between application programs and the network.

1.2.3 What Are Transaction Programs and Conversations?

The part of an application that initiates or responds to APPC communications is called a *transaction program* or TP. A transaction program on your workstation is not an entire, stand-alone program. Instead, it is the part of the program that handles transactions (exchanges of data) with another program.

When people talk with each other, we say that they are having a conversation. The communication between two transaction programs is also called a *conversation*.

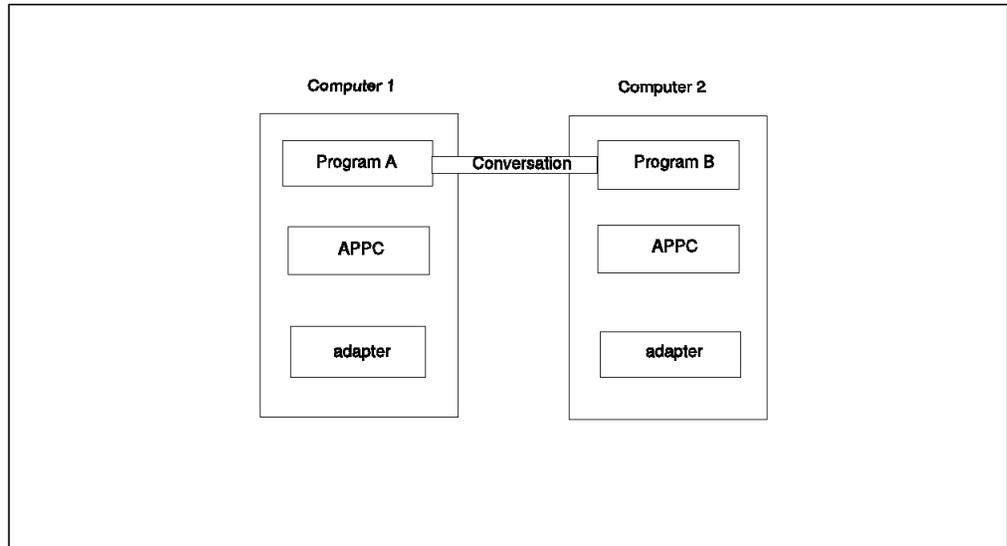


Figure 2. An APPC Conversation

A conversation between two programs is similar to a conversation between two people. When you have a conversation with another person, you follow unwritten rules that govern how you begin and end the conversation, take turns speaking, and exchange information. Similarly, APPC is called a *protocol* because it provides the rules that govern how conversations between transaction programs start and stop, which program “speaks” first, and how data is exchanged.

A program in your computer may have several conversations active at one time, with the same transaction program or with different transaction programs.

1.2.4 What Are Logical Units and Sessions?

When two people in different buildings want to talk to each other, they must use their telephones. Similarly, transaction programs in different computers cannot talk directly to each other. Instead, they converse over sessions between two logical units.

A *logical unit*, or LU, is APPC software that serves as an interface or translator between a transaction program and the network. A logical unit manages the exchange of data between transaction programs.

An *LU* is located on your computer. A *partner LU* is located on a partner computer.

Before a transaction program can start a conversation with a partner transaction program, APPC must establish a *session*, the session that connects the local LU and the partner LU.

There is a one-to-one relationship between a conversation and a session. A session can support only one conversation at a time. However, when that conversation ends, another conversation can use the session. So, compared to conversations, sessions are long-lived connections.

In this book we talk about the following LU types:

LU Type 2	This type is used by an application program to talk interactively with a display station using the SNA 3270 data stream.
LU Type 6.2	This is used with Advanced Program-to-Program Communication (APPC). Though it is often found in association with APPN, LU Type 6.2 sessions can also be used over a traditional subarea network.

1.2.5 What Are Physical Units?

The various networking nodes in SNA are often referred to as physical units (PUs). In this book we are talking about the following types:

PU Type 2	This type is represented by a cluster controller such as a 3174 or a device emulating it. It is a peripheral node that is attached to a subarea. It is used to attach printers and workstations to the network.
PU Type 2.1	This is a type associated with APPN. It is also often called LEN node, Peer node, Type 2.1, T2.1 and so forth. It can perform all the function of an ordinary PU Type 2. While a PU Type 2 (dependent) requires the higher PUs to communicate, a PU Type 2.1 (independent) can communicate with other independent PUs on a peer basis without using services from a PU Type 4 or PU Type 5.
PU Type 4	This type is represented by a communication controller node and is implemented with ACF/NCP or by microcode in the newer 3746/900.
PU Type 5	This type is the host node also often called VTAM or SSCP.
XCA	An External Communication Adapter (XCA) is used to establish a connection between VTAM and a LAN attached through a 3172.

1.2.6 What Is the Difference Between APPC and APPN?

APPC is a *communications protocol* that allows programs on different computers to “talk to” each other. APPC provides the interface between the programs and the networking hardware and software and defines the rules that programs use to exchange information.

Advanced Peer-to-Peer Networking (APPN) is the underlying *networking protocol* that routes APPC traffic through intermediate nodes called network nodes.

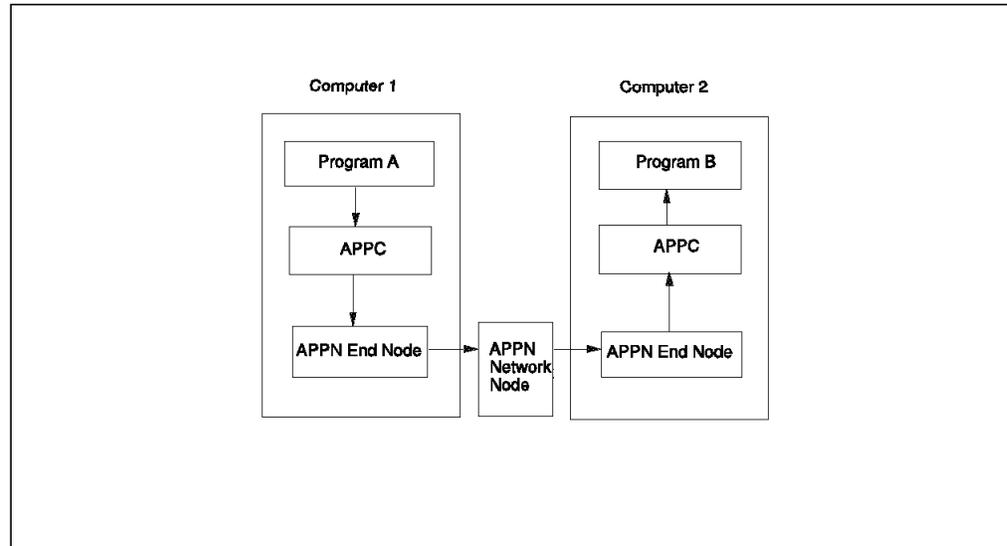


Figure 3. APPC and APPN

1.2.7 What Is a Mode?

A mode is a set of parameters that defines the characteristics of a session between two LUs. Modes have names that must match exactly. There are four modes predefined on most platforms that are used by most applications. (Two more modes, SNASVCMG and CPSVCMG, are also defined, but they are not intended to be used directly by applications.) The SC suffix in the mode name means the definitions include security. The four modes are as follows:

#INTER

Interactive job

#BATCH

Batch job

#INTERSC

Interactive job with security

#BATCHSC

Batch job with security

1.2.8 What Is CPI-C?

APPC provides a consistent set of functions for program-to-program communications across different platforms. However, the architecture did not specify a common application programming interface (API) for implementing these functions. As a result, each operating system that supports APPC developed its own API, a set of verbs that closely resembles the operating system itself. These differences do not pose a problem if you are writing programs for two computers that use the same operating system. Most client/server applications, however, run on different types of computers to take advantage of the strengths of each computer. So, if you are designing programs for different operating systems, you must learn how to use two or more different sets of verbs.

The *Common Programming Interface for Communications* (CPI-C) eliminates this problem. CPI-C provides one set of standard verbs, known as CPI-C calls, for all systems that support CPI-C. Although these calls correspond to APPC verbs,

they are easier to use, since the names of the calls, constants, and variables are the same across all platforms and programming languages. As a result, you learn only one set of calls to write client/server applications for different systems.

1.2.9 What Is CPI-C Side Information?

CPI-C programming provides a mechanism, called side information, which associates a set of parameters with a specified symbolic destination name. The CPI-C program then uses the symbolic destination name to initiate a conversation. This information includes:

CPI-C Symbolic destination name

The name used to refer to the CPI-C side information entry

TP name

The name used to identify which program to start on the partner computer

LU name

The name of the partner LU

mode name

The characteristics associated with the session between the LUs

1.2.10 What Is a Network?

Transaction programs in different computers must use a network to communicate with each other. APPC provides the interface between the programs and networking software and hardware.

In simplest terms, a network consists of components that connect computers. The following are these components:

Node

A node is any computer in the network. For example, if your DOS workstation is connected to an OS/2 workstation, both computers are nodes.

Link

A link is a physical or logical connection between two adjacent nodes.

Before data is sent between two nodes, a link must be active between them.

1.2.11 What Are APPN Nodes ?

As previously discussed, *Advanced Peer-to-Peer Networking* (APPN) provides networking functions for APPC applications.

When configuring a node in a network, you must decide which type of node to configure. The following are types of nodes in an APPN network:

Low-Entry Networking Node (LEN)

Low-entry networking nodes are the simplest node type and have the least function. A LEN must be an end point in the network; it cannot function as an intermediate node. A LEN is capable of peer-to-peer communication, but unable to make direct use of APPN functions. Most end-user computers should be end nodes (see below); however, some platforms can only be LEN nodes, for example, MS/DOS.

End Node (EN)

An end node provides the functions of a low-entry networking node plus the ability to register information about itself with a network node. This ability helps reduce the amount of network configuration required.

Network Node (NN)

A network node is used to locate partners in an APPN network. If there is a NN in the network, an EN can define one link to the network node. The EN then requires no other link definitions. Typically, there is at least one NN in a network, but the addition of more requires informed network analysis.

Interchange Node (ICN)

A network node that at the same time gives support for subarea networks as well.

Composite Network Node (CNN)

A network node in an environment where both NCP V6.2 or higher *and* ACF/VTAM V4.1 or higher are providing the NN support together. This is the only way where 3745 Communication Controllers can participate in an APPN environment. First with the announcement of 3746/900 and 3746/950 the NN support was provided without the help of ACF/VTAM.

1.2.11.1 What Is a Control Point (CP)?

In APPN, a control point is responsible for managing the node and its resources and, in an APPN end node, for communicating with an adjacent network node server's control point to obtain APPN network services. A control point is an LU, and it might be the only LU at that node. *Whenever possible, the CP should be the only LU at a node.* Platforms that are LEN only do not use the control point.

1.2.11.2 What Is Subarea Networking?

Subarea networks existed before APPN. As opposed to APPN, subarea networks are hierarchical in nature. The software that carries out subarea networks runs in host computers and communication controllers attached to those hosts. The host software is called Virtual Telecommunications Access Method (VTAM), and the communication controller software is called Network Control Program (NCP).

Nodes in APPN networks can have links to subarea networks and can establish sessions and conversations with LUs and TPs in those networks. From the perspective of the APPN node, the entire subarea network is viewed as a LEN node. Resources in the subarea network can then be defined in the APPN node as though they all were contained in one LEN node.

1.2.11.3 What Is a Node Identifier?

Some SNA products require partner systems to code a specific value for a parameter called the *node identifier*, or *node ID* for short. The two systems pass this node identifier during the link activation in a message unit called exchange identification, or XID.

We discourage use of node identifiers, preferring the CP name because it is more generic and less confusing.

1.3 Introducing TCP/IP

TCP/IP is a multivendor interoperability protocol with a large community of users and an increasing number of vendors. It is used in very large networks including the Internet. It is also the communications protocol for UNIX based systems.

TCP/IP allows communications between hosts, from portables and workstations to midrange and host computers. TCP/IP software is available for many different IBM and non-IBM operating systems, either as part of the operating system or as a separate software package.

TCP/IP is not one protocol, but is a suite of many protocols. The protocols define applications, transport controls, networking, routing, network management, and other subjects such as how NetBIOS should run over TCP/IP. It is today's most widely used interoperability protocol. Originally it was a Department Of Defense standard, now TCP/IP has become a de-facto multivendor standard.

Many excellent publications have been written on the topic of TCP/IP, so this section only provides a short introduction to the terminology used throughout this document.

For more detailed or advanced knowledge of the topic, please refer to the following publications:

- *TCP/IP Tutorial and Technical Overview, GG24-3376*

This publication provides a good introduction to TCP/IP and an overview of the implementations of the IBM TCP/IP products in heterogeneous networks.

- *Network Product Examples, GG24-3649*

This publication provides very good SNA and TCP/IP definition examples.

- The Request For Comments (RFCs)

There are over 1000 RFCs today. For those readers who want to keep up-to-date with the latest advances and research activities in TCP/IP, the ever-increasing number of RFCs is the best source of this information.

1.3.1 IP Addressing

TCP/IP uses IP addresses to specify source and target hosts. This is comparable with a fully-qualified Netid.PU_name in SNA.

An IP address consists of 32 bits, which is usually represented in the form of four decimal numbers. For example 9.12.2.18

An IP address consists of two logical parts: a network address and a host address. The network addresses are assigned by a central authority. Network addressing structure is divided in classes as shown in Figure 4 on page 11.

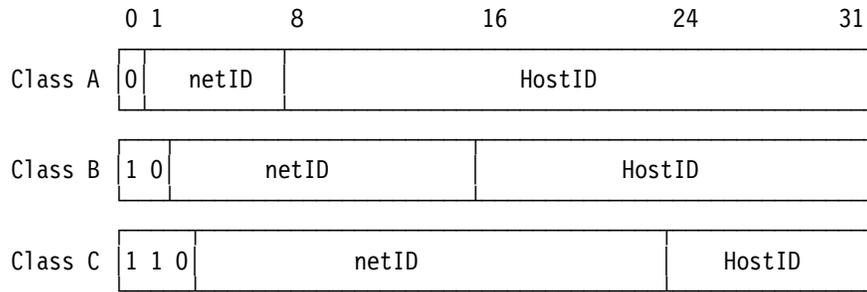


Figure 4. IP Addressing Classes

Class	Addressing Range
A	Allows up to 127 networks and up to 16,777,216 hosts.
B	Allows up to 16,384 networks and up to 65,536 hosts.
C	Allows up to 2,097,152 networks and up to 256 hosts.

1.3.2 Network and Host Names

Because TCP/IP hosts are addressed by 32-bit IP addresses, which are represented in decimal notation, you would have to enter this address every time you needed to access a host.

Very quickly, this evolved to the use of symbolic high-level machine names, so instead of typing the IP address you could enter the symbolic name. However, this introduced the problem of maintaining the mappings between IP addresses and high-level machine names in a coordinated and centralized way. A Domain Name Server was introduced to coordinate this. In the Figure 5 the structure of the naming concept is shown in a hierarchical tree.

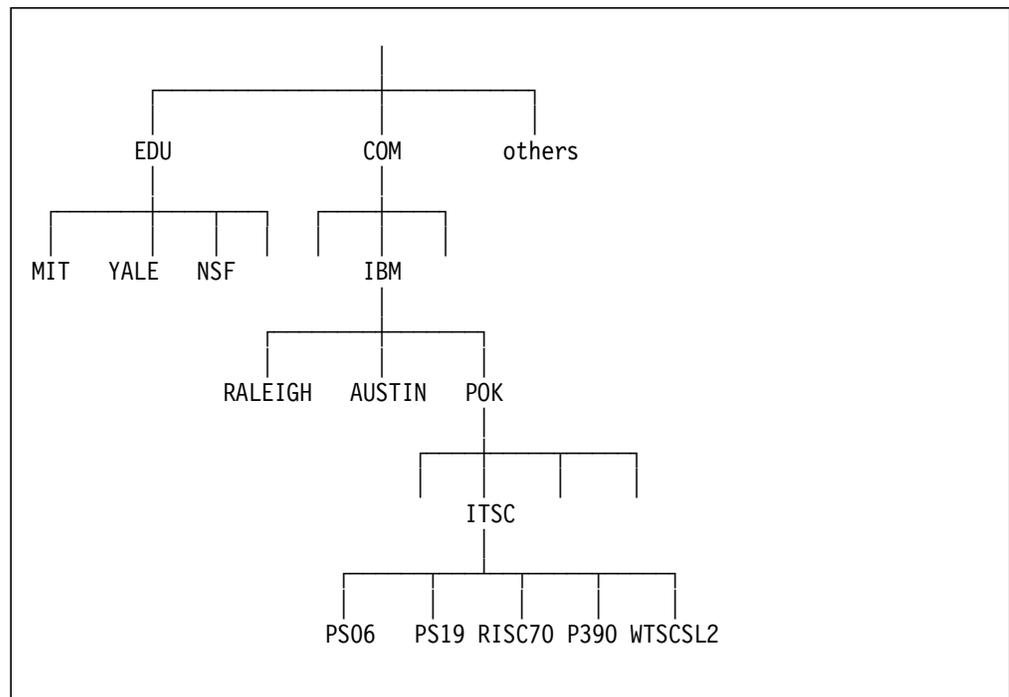


Figure 5. Hierarchical Name Structure

An example of a host name is ps06.itsc.pok.ibm.com, and from Figure 5, you can see how this unique name is constructed.

1.3.3 Subnetworks and Masks

In large TCP/IP networks it is common to make subnetworks, also called subnets. Nearly everybody with a Class A or Class B address makes subnets, some also with Class C. This is done by taking some of the bits from the host part and assigning them to the network part of the address. The reasons for doing this are the following:

- Different media (for example, Ethernet and token-ring)
- Flexibility in your network
- Reducing the size of the routing tables required in the gateways

Instead of keeping one entry per host, the gateway only has to keep one entry per network and examine only this part when making routing decisions.

This is implemented by a network mask (for example 255.255.255.0), which in this example defines the first 3 bytes in the address as the network and only the fourth byte as the host address. All hosts in this subnet must then have the same network mask.

1.3.4 IP Routing

There are two types of IP routing defined, direct and indirect.

1.3.4.1 Direct Routing

If the destination host is attached to a physical network to which the source host is also attached, data is sent directly.

1.3.4.2 Indirect Routing

Indirect routing occurs when the destination host is *not* on a network directly attached to the source host. The only way to reach the destination is through one or more IP gateways. The address of the first of these gateways is called an indirect route. The address of the first gateway is the only information needed by the source host. In Figure 6, host A has a direct route to host B and host D, but an indirect route to host C.

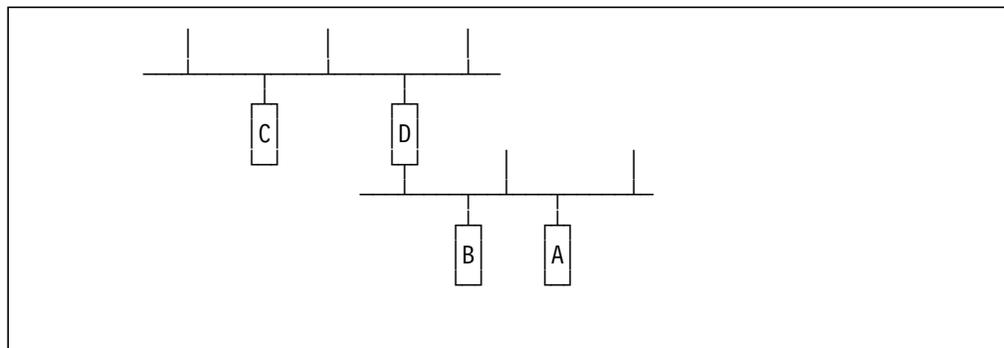


Figure 6. Direct and Indirect IP Routes

Each host has an IP routing table with the following information:

- Destination IP network address
- Route to next gateway

From this IP routing table the following is determined:

1. The direct routes, for locally attached networks.
2. The indirect routes, for networks reachable through one or more gateways.
3. The default route, which contains the (direct or indirect) route to be used in case the destination IP network is not found in the table.

1.3.5 TCP/IP Applications

One of the reasons why TCP/IP is so popular is that there are many simple and useful applications available. Among these we have used the following:

- PING (Packet INternet Groper) is perhaps one of the most useful commands available on all TCP/IP implementations. PING sends an ECHO to a specified IP address and waits for it to return. This is very useful for debugging purposes and also for knowing if a remote host is reachable for the local host.
- Telnet (Teletypewriter network) is the virtual terminal protocol in TCP/IP. It allows users of one host to log into a remote host and interact as normal terminal users of that host.

You can compare it with the terminal emulators (3270 or 5250 types) in SNA. In fact, all of the IBM TCP/IP product implementations provide Telnet support of 3270 terminal emulation in addition to the many other terminal emulation protocols.

- FTP (File Transfer Protocol) is used to transfer or receive a copy of a file from one host to another. To access remote files, the user must identify himself to the remote host.
- SMTP (Simple Mail Transfer Protocol) provides message exchange between hosts. Mail can be sent to or received from other hosts via the network.

Chapter 2. Planning and Preinstallation

This chapter discusses considerations that should be taken into account when planning for the implementation of the PC Server System/390 into the network. It also describes the preliminary steps and definitions needed prior to customizing the networking products on the PC Server System/390.

2.1 Network Planning

Before implementing the PC Server System/390 into the network, you need to plan the layout of the network. Several important issues need to be addressed including a routing concept, an addressing scheme, a naming convention, a design of the network topology, and if applicable, performance and availability considerations.

It is beyond the scope of this document to discuss the planning and designing aspects of networks; there are more appropriate sources of information for that. But, to give you an idea of some of the several factors involved here, you might ask yourself questions such as:

- How does the inclusion of the PC Server System/390 fit into my overall network topology?
- Do I need to review any user, system, and connectivity requirements?
- What networking protocols will I use and how will they affect my network?
- Is there an existing LAN and TCP/IP addressing scheme that I might have to conform to?
- Is there an existing naming convention that I might have to adhere to?
- Do I need to define a new routing concept or update an existing one?
- Are there any system-wide administration issues that should be considered?
- What operational procedures have to be created or updated?
- Do I need to define or update performance and availability criteria?

2.2 Preinstallation

This section will describe the necessary steps that must be completed before the actual connectivity options are used. Below is a list of items which must be customized:

- PC Server System/390 Configurator
- Hardware Configuration Definition
- LAN Adapter and Protocol Support
- MVS/ESA Missing Interrupt Handler

2.3 PC Server System/390 Configurator

The PC Server System/390 Configurator is an OS/2-based tool used to set up the PC Server System/390 for use with MVS/ESA. It is menu-driven and enables you to map the device managers to the S/390 I/O devices they emulate.

This section shows the various panels you need to go through to define the hardware addresses to the PC Server System/390. However, first you have to decide on which addresses to use.

2.3.1 Hardware Addresses

We have decided on the following hardware addresses. The device manager codes in brackets might be subject to change. Please check your configurator panel.

Address	Use
E20	AWS3172 (Mgr Code 9), for token-ring and Ethernet SNA use. Must be defined as 3088.
E22	LCS3172 (Mgr Code A), for token-ring TCP/IP use (read channel). Must be defined as 3088.
E23	LCS3172 (Mgr Code A), for token-ring TCP/IP use (write channel). Must be defined as 3088.
E24	LCS3172 (Mgr Code A), for Ethernet TCP/IP use (read channel). Must be defined as 3088.
E25	LCS3172 (Mgr Code A), for Ethernet TCP/IP use (write channel). Must be defined as 3088.
82E	CHAN370 (Mgr Code L), for 3745 attached to the S/370 Channel Card. Must be defined as 3745.

Note: Please see the readme file for important information regarding the channel card. This was called CHAN370.DOC and was located in the P390 directory, however this might be subject to change.

2.3.2 Use of PC Server System/390 Configurator

Double-click on the **P/390** icon on the desktop. This will open a folder with the different options. If you select **Configuration**, you get the panel shown in Figure 7 on page 17.

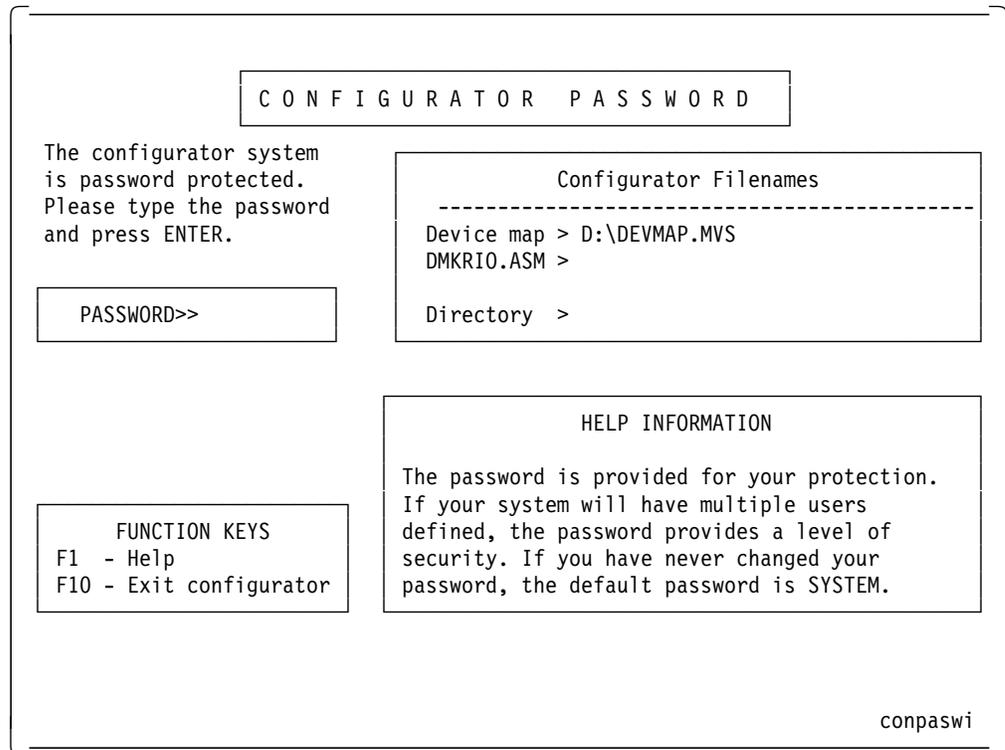


Figure 7. PC Server System/390 Configurator Entry Screen

This is the entry screen, where you have to enter a password if you have defined one.

You will then receive the panel shown in Figure 8 on page 18, which is a menu showing the various functions you can choose from.

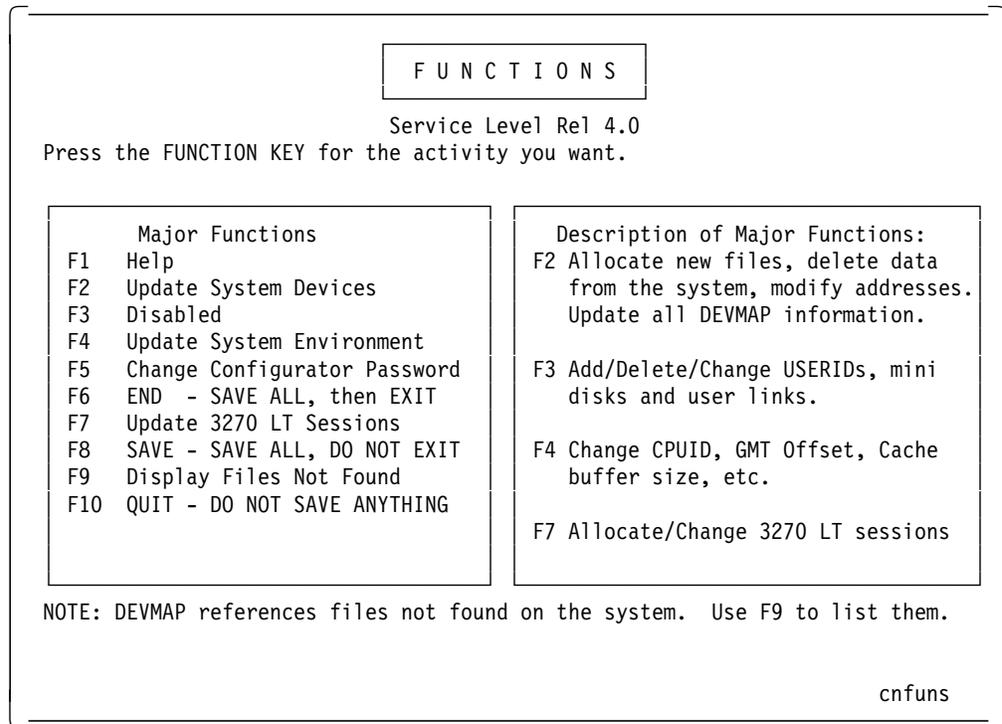


Figure 8. PC Server System/390 Configurator Menu

The only option you need to work with at this point is the Update System Devices functions. Following are the steps needed to define devices to the PC Server System/390:

1. Press F2, Update System Devices.

Use this to add, delete or modify devices to the system, known as Hardware Unit Control Blocks (UCB).

We added the addresses, Mgr codes, and device types to be used for connectivity as defined in 2.3.1, "Hardware Addresses" on page 16.

```

UPDATE SYSTEM DEVICES Mode = ESA

Available disk space in Kbytes: 311,741
-----
Addr Device Label Atype Size Mgr FN/P PATH:>E:\MVS <
-----
> > > > > > >
700 3278 DSPY 3 MVS Master Console
702 3278 DSPY 0 Local 1
703 3278 DSPY 0 Local 2
704 3278 DSPY 0 Local 3
82E 3745 L
901 3278 DSPY 3 Local 901
902 3278 DSPY 3 Local 902
E20 3088 9
E22 3088 A
E23 3088 A
E24 3088 A
E25 3088 A

Mgr Codes: 1=AWSFBA 2=AWSCKD 3=AWS3274 4=LAN3274 5=AWS3215 6=AWS2821
7=AWS2540 8=LAN3088 9=AWS3172 A=LCS3172 B=AWS2703 C=AWSICA D=AWSFEP
E=AWSTAPE F=SCSI3480 G=SCSI3420 H=AWSOMA I=AWS9346 J=AWSTFA K=AWSPCSR
L=CHAN370

F1 Help ALT+F1 Key Definitions F10 Main Menu ESC Cancel Input | cnsysdev

```

Figure 9. PC Server System/390 Configurator Update System Devices

We have added the necessary addresses for our connectivity scenarios, by entering the values for Addr, Device, and Mgr in the fields beginning with the > symbol.

When you are finished press F10.

2. Press F4, Update System Environment.

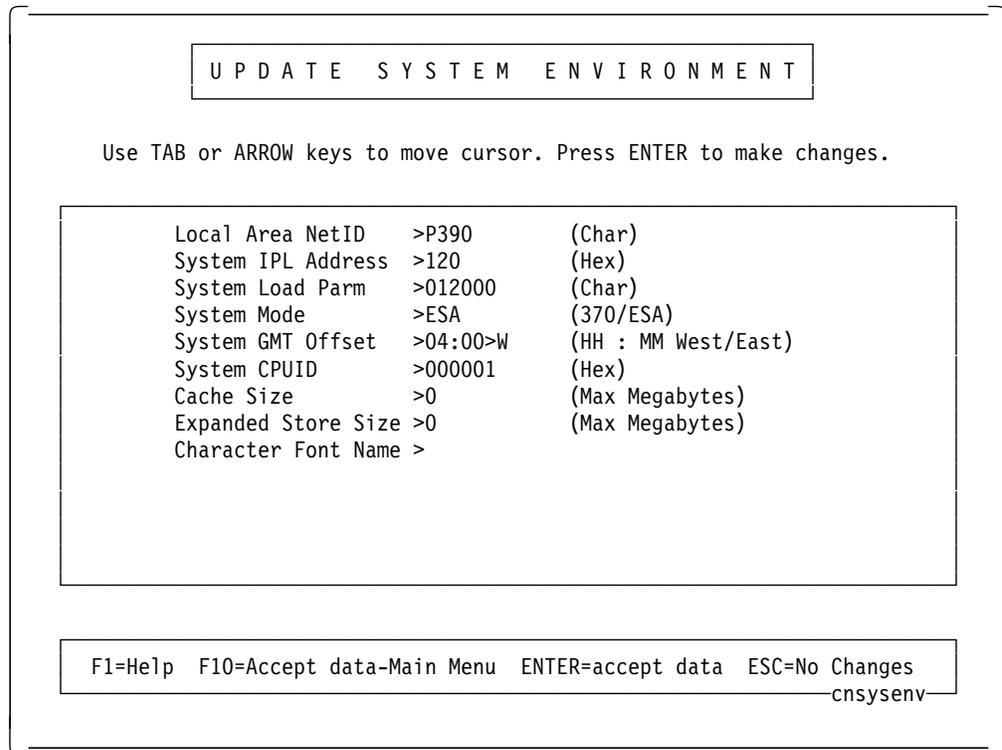


Figure 10. PC Server System/390 Configurator Update System Environment

This panel is used to specify information such as the following:

- Address of the volume to IPL from
- System Load parameters

The first four characters are the address of the volume where the IODF data set resides. The next two characters are the suffix of the LOADxx member in SYS1.PARMLIB. The next two characters are for the prompt feature. And the last two characters are for the alternate NUCx.

To read more about this format see, *MVS/ESA System Commands, GC28-1442*.

- Hours West or East of GMT
- CPUID. Certain OEM software manufacturers need to know this value to allow the OEM software to work on the PC Server System/390.

When you are finished, press F10, and you will return to Figure 8 on page 18 where you select one of the following:

3. Press F6, END - SAVE ALL, then EXIT.
If you are done.
4. Press F8, SAVE - SAVE ALL, DO NOT EXIT.
If you want to save and then continue.
5. Press F10, QUIT - DO NOT SAVE ANYTHING.
If you want to undo the changes you made.

2.4 PC Server System/390 MVS/ESA Configuration

The following process is required when a new hardware address is going to be made known to the MVS system.

Starting with MVS/ESA V5, the only way to define I/O devices to MVS is to use Hardware Configuration Definition (HCD).

We now need to add the addresses to HCD that were just entered in the PC Server System/390 Configurator, as described in 2.3.1, "Hardware Addresses" on page 16.

This section shows the necessary steps to define I/O devices to MVS/ESA on the PC Server System/390. These steps are not the same as for a normal MVS/ESA mainframe system, because here we do not have to define any control units.

Before changing the IODF data set used by MVS/ESA, it is recommended to check which is the currently active definition. This is done by issuing the display command `d ios,config(all)` on the MVS console. You will receive a reply such as the following:

```
19.26.51          IOS506I 19.26.51 I/O CONFIG DATA 327
ACTIVE IODF DATA SET = SYS1.IODF00
CONFIGURATION ID = CBIPO          EDT ID = 00
HARDWARE SYSTEM AREA DATA COULD NOT BE OBTAINED
```

Here you can see which IODF data set is the active one, in our case it was SYS1.IODF00.

If you have Hardware Configuration Definition on your ISPF panel, you can select this. If not, you have to issue the command `CBDCHCD` from the TSO command line and you will receive the following screen:

```

MVS/ESA HCD Version 5 Release 2
Command ==> _____
Hardware Configuration
Select one of the following.
1_ 1. Define, modify, or view configuration data
   2. Activate or process configuration data
   3. Print or compare configuration data
   4. Create or view graphical configuration report
   5. Migrate configuration data
   6. Maintain I/O definition files
   7. Query supported hardware and installed UIMs
   8. Getting started with this dialog
   9. What's new in this release
For options 1 to 5, specify the name of the IODF to be used.
I/O definition file . . . 'SYS1.IODF01'          +
```

Figure 11. MVS/ESA HCD Hardware Configuration

HCD suggests to define a temporary data set (SYS1.IODF01.WORK) and copy the definition to that data set. We changed it directly into the production data set,

because it will not be saved until you build your new IODF file, and at that point you can specify a new production IODF data set, so you will have the old one as a backup.

After this, you have to change the LOADxx member in SYS1.PARMLIB and System Load Parm in Figure 10 on page 20 to point to this new IODF data set.

Select 1, to define configuration data. You will then be taken to Figure 12.

```
----- Define, Modify, or View Configuration Data -----  
  
Select type of objects to define, modify, or view data.  
  
5_ 1. Operating system configurations  
    consoles  
    system-defined generics  
    EDTs  
    esoterics  
    user-modified generics  
2. Switches  
    ports  
    switch configurations  
    port matrix  
3. Processors  
    partitions  
    channel paths  
4. Control units  
5. I/O devices  
  
F1=Help   F2=Split  F3=Exit   F9=Swap   F12=Cancel  
-----  
F8=Forward F9=Swap   F10=Actions F11=Add   F12=Cancel
```

Figure 12. Define, Modify, or View Configuration Data

We only want to add more I/O devices, therefore, we select option 5 for the I/O Device List, shown in Figure 13 on page 23.

```

I/O Device List          Row 246 of 261 More:
Command ==> _____ Scroll ==> PAGE

Select one or more devices, then press Enter. To add, use F11.

-----Device-----      -----Control Unit Numbers + -----
/ Number Type +          OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
- 0700 3278              Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0702 3278              Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0703 3278              Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0704 3278              Y  ___ ___ ___ ___ ___ ___ ___ ___
- 082E 3745              Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0901 3278              Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0902 3278              Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0E20 CTC                Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0E21 CTC                Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0E22 CTC                Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0E23 CTC                Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0E24 CTC                Y  ___ ___ ___ ___ ___ ___ ___ ___
- 0E25 CTC                Y  ___ ___ ___ ___ ___ ___ ___ ___
F1=Help      F2=Split      F3=Exit      F4=Prompt      F5=Reset      F7=Backward
F8=Forward   F9=Swap       F10=Actions  F11=Add       F12=Cancel

```

Figure 13. I/O Device List

By pressing F11, we are able to add additional devices. This takes us to the Add Device panel, shown in Figure 14 on page 24.

In our example, we received message CBDA488I indicating that our SYS1.IODF00 should be upgraded to the current HCD version. If this happens you will have to return to the panel, shown in Figure 11 on page 21 and do the following:

1. Select 6, then press Enter to maintain I/O definition files.
2. Select 6, then press Enter to upgrade I/O definition file to new format.
3. Type a new data set name, then select 1 to upgrade it to a new data set. We used SYS1.IODF01.

The IODF will now be upgraded to the current version and at the same time copied to the new data set.

After this, you have to change the LOADxx member in SYS1.PARMLIB and System Load Parm in Figure 10 on page 20 to point to this new IODF data set.

```

----- Add Device -----

Specify or revise the following values.

Device number . . . . . ____ (0000 - FFFF)
Number of devices . . . . . ____
Device type . . . . . _____ +

Serial number . . . . . _____
Description . . . . . _____

Connected to CUs . . ____ ____ ____ ____ ____ ____ ____ ____ +

F1=Help   F2=Split   F3=Exit   F4=Prompt   F5=Reset   F9=Swap
F12=Cancel
-----

```

Figure 14. Add Device

Here you have to enter the hardware address and the type of machine you want to add, then press Enter. Unlike mainframe systems, you do not have to enter any value in the Connected to CUs fields.

Enter the address one by one. For example, for address 82E:

- Enter 82E in Device number.
- Enter 1 in Number of devices.
- Enter 3745 in Device type.
- Press Enter.

This will bring you to the panel shown in Figure 15.

```

----- Define Device to Operating System Configuration -----
                                                    Row 1 of 1
Command ==> _____ Scroll ==> 0001

Select OSs to connect or disconnect devices, then press Enter.

Device number . . : 082E           Number of devices : 1
Device type . . . : 3745

/ Config. ID   Type   Description           Defined
- CBIPO       MVS
***** Bottom of data *****

F1=Help   F2=Split   F3=Exit   F4=Prompt   F5=Reset
F6=Previous F7=Backward F8=Forward F9=Swap   F12=Cancel
-----

```

Figure 15. Define Device to Operating System Configuration

Type / to add the device to the operating system, then press Enter. This will take you to Figure 16 on page 25.

```

----- Actions on selected operating systems -----

Select by number or action code and press Enter.

_ 1. Select (connect, change) . . . . . (s)
  2. Disconnect from OS . . . . . (n)

F1=Help   F2=Split   F9=Swap   F12=Cancel

```

Figure 16. Actions on Selected Operating Systems

Type 1, and press Enter. This will take you to Figure 17.

```

Define Device Parameters / Features                               Row 1
Command ==> _____ Scroll ==> 0001

Specify or revise the values below.

Configuration ID . : CBIPO
Device number . . : 082E           Number of devices : 1
Device type . . . : 3745

Parameter/ Value  P Req.  Description
Feature
ADAPTER   TYPE7    + Yes  Channel adapter type
OFFLINE   No          +      Device considered online or offline at IPL
DYNAMIC   Yes          +      Device supports dynamic configuration
OWNER     VTAM          +      Subsystem or access method using the device
***** Bottom of data *****

F1=Help   F2=Split   F4=Prompt   F5=Reset   F7=Backward
F8=Forward F9=Swap    F12=Cancel

```

Figure 17. Define Device Parameters / Features

Here you can change default values. We had to change the channel adapter type:

Value	Description
TYPE7	Buffer Chaining Channel Adapter (BCCA)
TYPE6	Channel Adapter (CA)

Our 3745 was equipped with a CA, therefore we pressed F4, which gave us the option to chose TYPE6. Press Enter to accept, and you are taken to the panel in Figure 18 on page 26.

```

                                Assign/Unassign Device to Esoteric                Row 1 of 7
Command ==> _____ Scroll ==> PAGE

Specify Yes to assign or No to unassign. To view devices already assigned
to esoteric, select and press Enter.

Configuration ID : CBIPO
Device number . : 082E                Number of devices : 1
Device type . . : 3745                Generic . . . . . : 3745

/ EDT.Esoteric Assigned Starting Number Number of Devices
_ 00.CART      No      _____ _____
_ 00.CTAPE     No      _____ _____
_ 00.DASD      No      _____ _____
_ 00.SYSDA     No      _____ _____
_ 00.TAPE      No      _____ _____
_ 00.TSO       No      _____ _____
_ 00.VIO       No      _____ _____
***** Bottom of data *****

F1=Help      F2=Split      F4=Prompt      F5=Reset      F6=Previous
F7=Backward  F8=Forward    F9=Swap        F12=Cancel

```

Figure 18. Assign/Unassign Device to Esoteric

Here you can assign the device to an esoteric name (a group name). This is most useful for DASD and tape. After making the assignments press Enter. This brings you back to the Define Device to Operating System Configuration panel, but now you can see that the device has been defined to the operating system.

```

----- Define Device to Operating System Configuration -----
                                Row 1 of 1
Command ==> _____ Scroll ==> 0001

Select OSs to connect or disconnect devices, then press Enter.

Device number . : 082E                Number of devices : 1
Device type . . : 3745

/ Config. ID  Type  Description                Defined
_ CBIPO      MVS   _____                Yes
***** Bottom of data *****

F1=Help      F2=Split      F3=Exit      F4=Prompt      F5=Reset
F6=Previous  F7=Backward  F8=Forward   F9=Swap        F12=Cancel
-----

```

Figure 19. Define Device to Operating System Configuration

Press Enter from here, and you are back on the I/O Device List, where you can see your newly added devices.

You have to go through this sequence for every device you want to add.

If you are satisfied with the devices you have added, press PF3 and you will see the Define, Modify, or View Configuration Data panel as shown in Figure 12 on page 22. PF3 from here will bring you back to the Hardware Configuration panel shown in Figure 11 on page 21, again.

To activate your new configuration, select 2 from the Hardware Configuration panel as shown in Figure 11 on page 21, and this will bring you to Figure 20.

```
----- Activate or Process Configuration Data -----

Select one of the following tasks.

  1. Build production I/O definition file
  2. Build IOCDs
  3. Build IOCP input data set
  4. Create JES3 initialization stream data
  5. View active configuration
  6. Activate configuration dynamically
  7. Activate switch configuration
  8. Save switch configuration
  9. Build HCPRIO input data set
 10. Build and manage S/390 microprocessor
      IOCDs and IPL attributes

F1=Help   F2=Split   F3=Exit   F9=Swap
F12=Cancel
```

Figure 20. Activate or Process Configuration Data

From this panel select option 1 to build a production IODF. This takes you to Figure 21.

```
----- Build Production I/O Definition File -----@

Specify the following values, and choose how to continue.

Work IODF name . . . : 'SYS1.IODF01'

Production IODF name . _____
Volume serial number . _____ +

Continue using as current IODF:
2  1. The work IODF in use at present
   2. The new production IODF specified above

F1=Help   F2=Split   F4=Prompt  F9=Swap   F12=Cancel
```

Figure 21. Build Production I/O Definition File

From here you can chose to create a new IODF file, so you always have the old one as a backup. After you have entered the data set name and volume, you are asked to verify your entries, and if you press Enter, the new production IODF is created.

You will then have to update the System Load Parm field shown in Figure 10 on page 20 to point to the new LOADxx member in SYS1.PARMLIB (the old LOADxx member is used as a backup) and update the new LOADxx member to reflect the new IODF data set.

When this is done, you are ready to IPL.

2.5 PC Server System/390 LAN Adapters

Since the PC Server System/390 hardware is Micro Channel Architecture (MCA) and the LAN device managers are OS/2 based, to be able to connect it to a LAN, an MCA LAN adapter and an OS/2 based LAN support program are required.

LAN Adapter and Protocol Support (LAPS) is the support program necessary to use the token-ring and Ethernet adapter. LAPS is delivered together with Communications Manager/2, but can also be acquired from other sources.

After a short description of the two LAN adapters that were used in our scenarios, the necessary customization of LAPS is described.

2.5.1 The Auto LANStreamer MC 32 Adapter

The LANStreamer MC 32 utilizes on-board microcode, but it has no RAM on the board. All transmit and receive buffers are maintained in system memory. This is the primary reason why the LANStreamer runs at near "media speed." Transferring data directly from the LAN to PC system memory allows the adapter to avoid the intermediary step of buffering the data on the adapter and hence greatly improves performance. The LANStreamer also supports data streaming at the rate of 40 MB/second. Data streaming is a special function of the Micro Channel architecture which was designed to speed data transfers between bus masters and slaves and is only available on specific models of Micro Channel PS/2s. The primary benefit of the data streaming feature is that the performance of the Micro Channel itself is greatly improved when multiple LANStreamer cards are installed in a single machine and are competing for bandwidth on the Micro Channel.

The adapter also has a priority queueing function that is part of the IEEE 802.5 standard. Potential applications for using this feature are multimedia which must deliver sound and image quickly. In addition to the priority queueing the LANStreamer has two channels for send/receive of data which improves its performance in server applications and also benefits multimedia applications.

2.5.2 The Dual EtherStreamer MC 32 Adapter

The IBM EtherStreamer MC 32 Adapter is a 32-bit bus master adapter for server systems and clients where high performance is required. The EtherStreamer Adapter provides 40 MB/second data streaming and supports full-duplex operations, which provides 20 Mbps Ethernet capabilities when used with a full-duplex hub. The adapter supports transparent or source routing bridging and can detect and configure itself to the media type installed. Microcode

upgrades are handled through flash EPROMS and connectors are supplied for all three common Ethernet media.

2.6 PC Server System/390 LAPS Customization

LAPS is started from the command prompt by typing LAPS from the directory where LAPS is installed. After the first two panels, you receive the following screen:

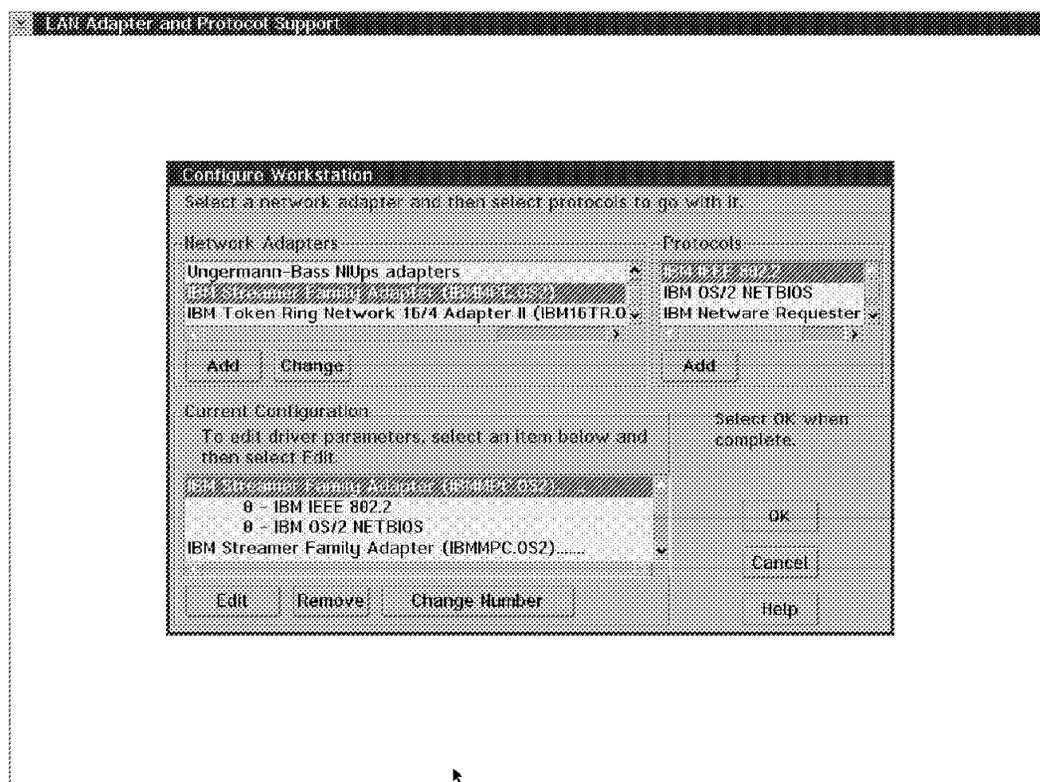


Figure 22. Configure Workstation Panel 1

On this screen you have to add the adapter or adapters you are going to use. In our installation we installed one Auto LANStreamer MC 32 Adapter for our token-ring connection and one Dual EtherStreamer MC 32 Adapter for the Ethernet connection. We followed the instruction in the manual *Installation and Testing Instructions* that were included with the product.

We selected the following protocols for both adapters.

- NetBIOS
- IEEE802.2

Note: We did not have to install the TCP/IP protocol, because the LCS3172 device manager is using a subset of the IEEE 802.2 protocol. This part is called IEEE 802.2 Direct. You can read more about this in *LAN Technical Reference IEEE802.2 and Netbios APIs, SC30-3587*.

In Figure 22 the token-ring adapter is shown. From the lower white field on the panel you can see LAPS assigned the number zero to the token-ring adapter.

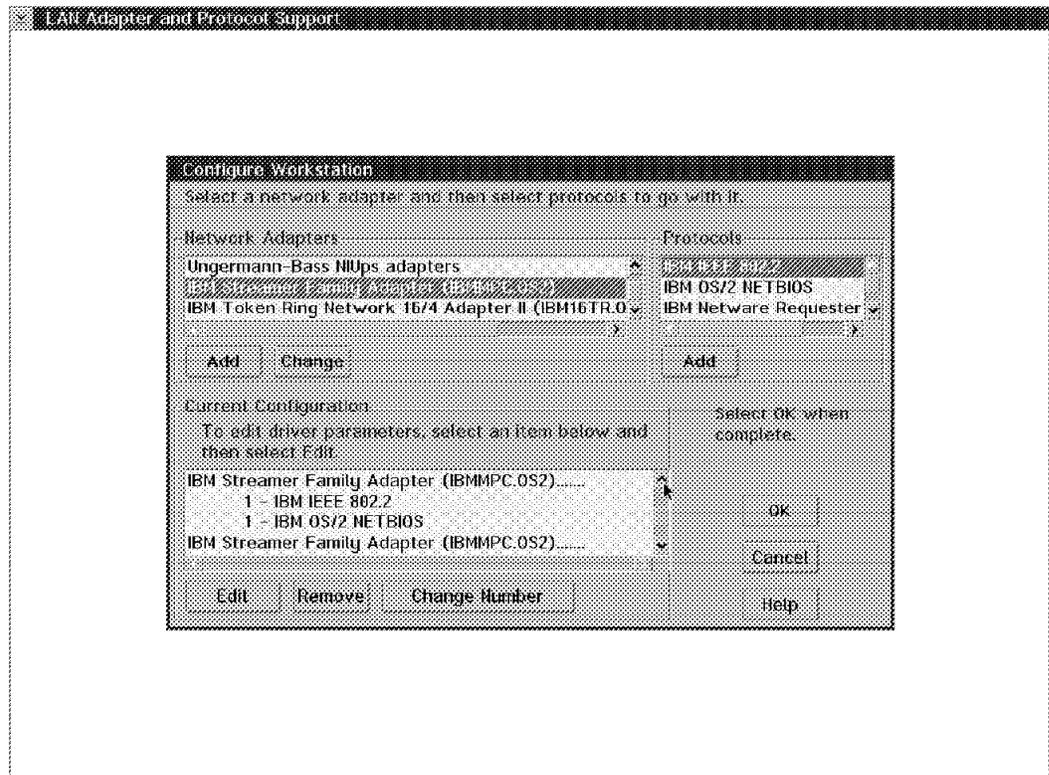


Figure 23. Configure Workstation

In Figure 23 the Ethernet part is shown. In the lower white field on the panel you can see LAPS assigned the number one to the Ethernet adapter.

For other adapter types you will see a different adapter type for Ethernet and token-ring. This is not the same for the LANStreamer adapters. Here you will see, that both the Ethernet adapter and the token-ring adapter appear with the same adapter name (IBM Streamer Family Adapter (IBMMPC.OS2)).

Now you have to change some of the default values. Double-click on IBM Streamer Family Adapter in the lower white field. This will bring you to Figure 24 on page 31.

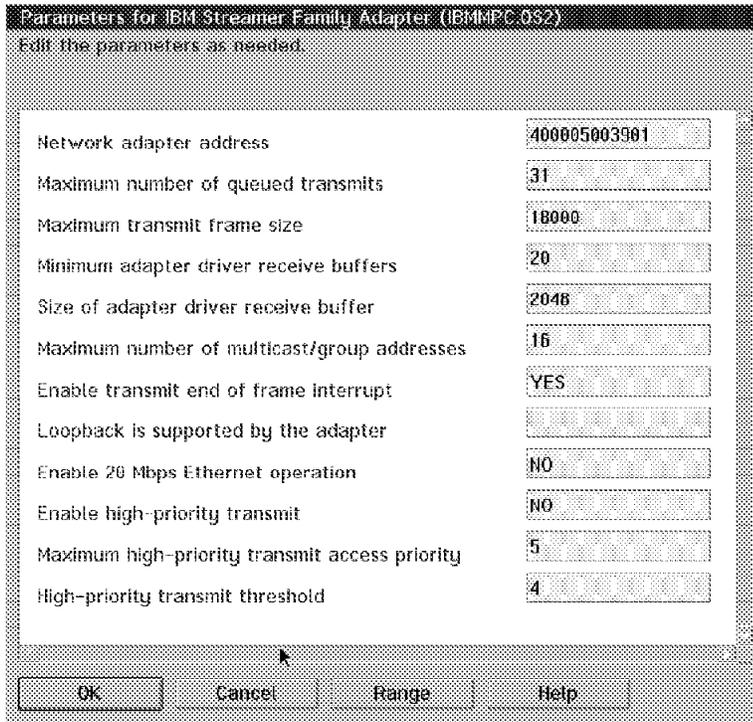


Figure 24. Configure Token-Ring Parameters

Enter your MAC address or LAN Network Address for the PC Server System/390 in the Network adapter address field. We did the same for the Ethernet adapter, but this is not shown.

Click on **OK** to save your changes, and you will return to Figure 23 on page 30. Double-click on IBM IEEE 802.2 and you are able to change default values for this protocol as shown in Figure 25 on page 32.

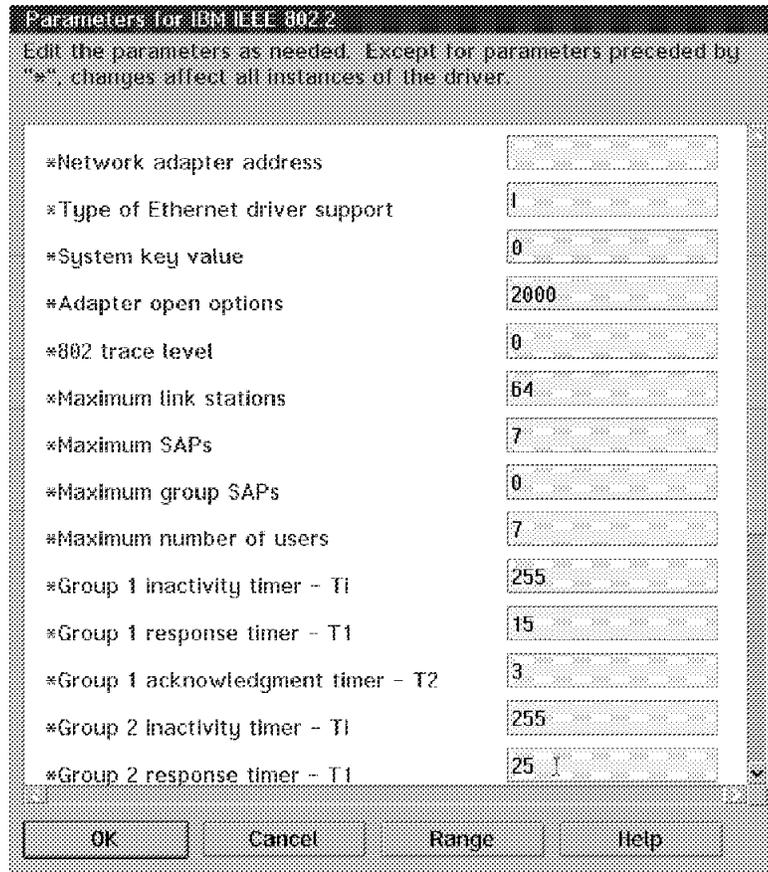


Figure 25. Parameters for IBM IEEE 802.2

Change/verify the default values for the following:

- Type of Ethernet driver support = 1
I is for IEEE802.3, D is for DIX 2.0
- Maximum link stations = 64
- Maximum SAPs = 7
- Maximum number of users = 7

These are the values we used, but you may need larger numbers, if you are running additional LAN applications.

Click on **OK** to save your changes, and you will return to Figure 23 on page 30. Double-click on IBM OS/2 NetBIOS and you are able to change default values for this protocol as shown in Figure 26 on page 33.

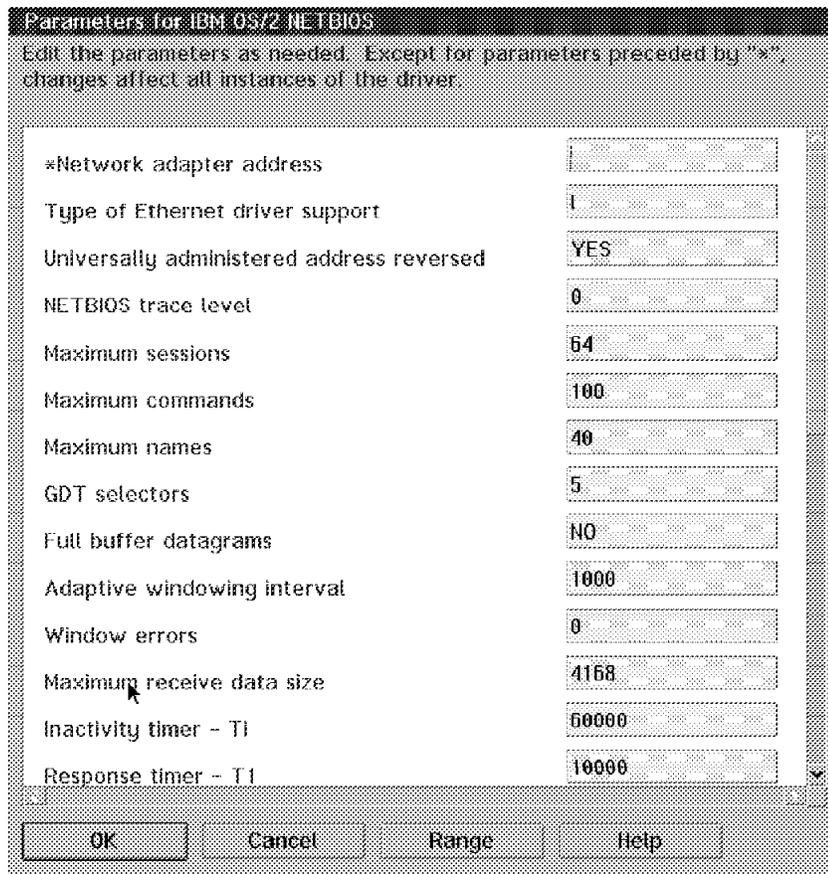


Figure 26. Parameters for IBM OS/2 NetBIOS

Change/verify the default values for:

- Type of Ethernet driver support = 1
I is for IEEE802.3, D is for DIX 2.0
- Maximum sessions = 64
- Maximum commands = 100
- Maximum names = 40

These are the values we used, but you may need larger numbers if you are running additional LAN applications.

Click on **OK** to save your changes, and you will return to Figure 23 on page 30.

Click on **OK** to save your changes. This will bring you back to the Install or Configure panel again.

Click on **Exit** and you will receive a panel asking if LAPS is allowed to update your CONFIG.SYS.

Click on **Continue...** and the updates are done and confirmed by the CONFIG.SYS Updated Successfully panel.

Click on **OK** and you will receive the Exiting Laps panel, asking you to reboot the machine.

Click on **Exit**, and reboot the PC Server System/390 to allow the changes to be activated.

2.7 Missing Interrupt Handler

Now that you have defined the addresses you are going to use for the AWS3172 and LCS3172 device managers, it is required to disable the Missing Interrupt Handler (MIH) for these addresses. If you fail to do this you might get the following messages, and the addresses will not work until the next system IPL.

```
*IOS002A 0E22,NO PATHS AVAILABLE
*IOS002A 0E24,NO PATHS AVAILABLE
EZY2272I (VTAM) VTAM interface task initialization complete
EZB6473I TCP/IP initialization complete.
EZB4466E PCCA3 device LCS2: Unexpected CSW from SenseId command on
device 0E22
EZB4465E PCCA3 shutting down:
EZB4466E PCCA3 device LCS1: Unexpected CSW from SenseId command on
device 0E24
EZB4465E PCCA3 shutting down:

*IOS002A 0E20,NO PATHS AVAILABLE
IOS000I 0E20,**,IOE,17,0000,,,VTAM
IST259I INOP RECEIVED FOR SLL1 CODE = 02
IST619I ID = SLL1 FAILED - RECOVERY IN PROGRESS
IST129I UNRECOVERABLE OR FORCED ERROR ON NODE SLL1 - VARY INACT SCHED
```

When the MVS system issues an I/O operation, it expects the I/O to complete within a certain length of time. If MVS is not notified of the I/O completing, then it simulates the missing interrupt and issues a HALT I/O. When using the AWS3172 and LCS3172 device drivers a read operation is always pending in order to receive data. The MIH must be turned off to prevent MVS halting the device. This is the same for a real 3172.

To avoid this you have to update your IECIOSxx member in SYS1.PARMLIB by adding the address range, such as we have done here for the addresses E20 to E28.

```
***** Top of Data *****
MIH TIME=00:00,DEV=(E20-E28)
***** Bottom of Data *****
```

Figure 27. SYS1.PARMLIB(IECIOS00) Member

If you do not want to wait until the next system IPL, you can change the MIH values dynamically and display them afterwards by using the following commands. We have also shown the replies.

```
SETIOS MIH,DEV=(/E22),TIME=00:00
IOS090I SETIOS. MIH UPDATE(S) COMPLETE
```

```
D IOS,MIH,DEV=(/E22)
IOS086I 17.37.42 MIH DEVICE TIMES 847
0E22=00:00.
```

Chapter 3. Functions and Flow Control of the LAN Drivers

This chapter provides a basic description of the functions and flow control for the two device managers; AWS3172 for SNA and LCS3172 for TCP/IP.

3.1 AWS3172 Device Manager

The AWS3172 device manager is based on the code from a DATAEX RPQ called Link Services Architecture (LSA), which was developed for OS/2. This code was then further developed to be implemented the same way SNA support is available today with 3172 Model 3.

The following diagram provides an overview of the different components AWS3172 is build upon. It shows the tasks in the device driver code that provide the gateway function and illustrates how data flows through the LAN driver.

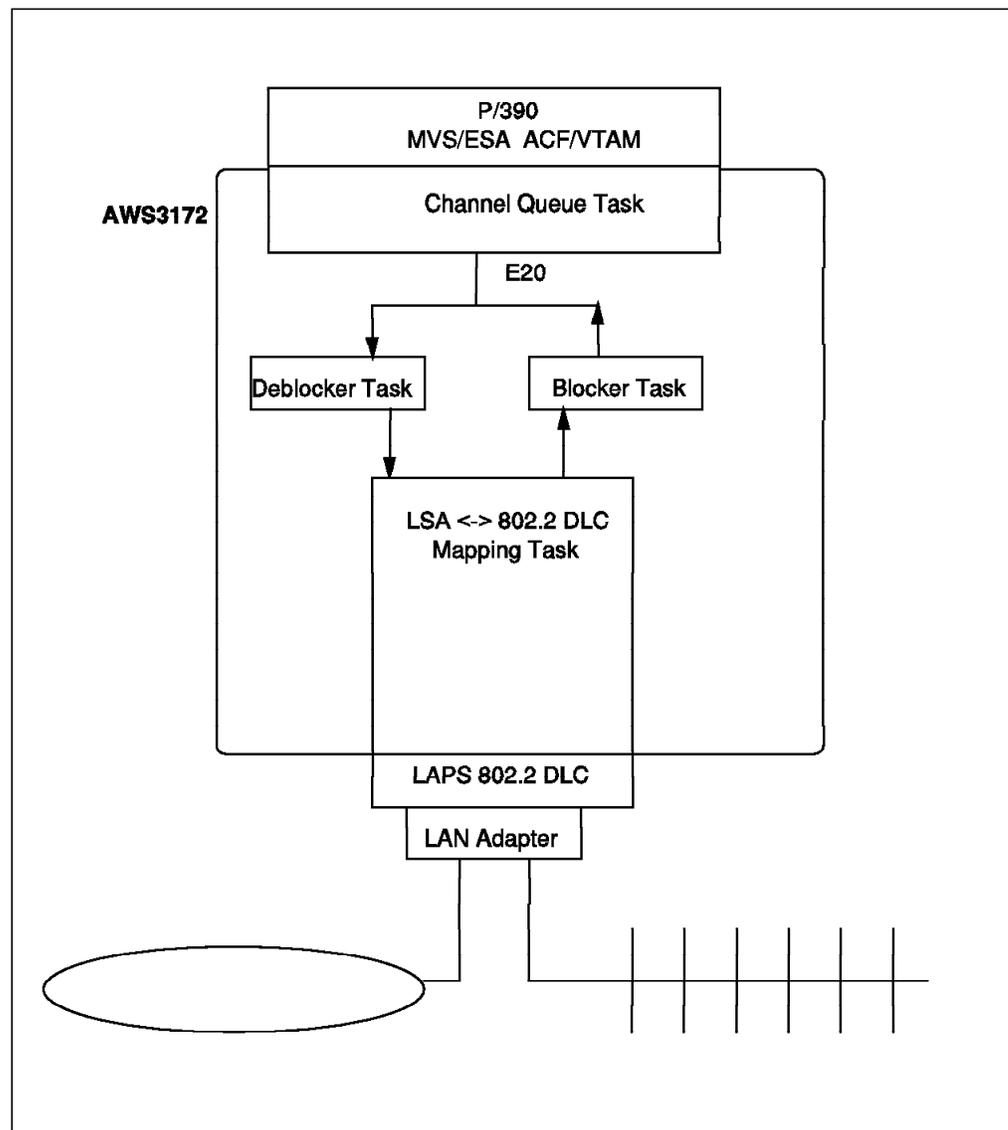


Figure 28. AWS3172 Diagram

3.1.1 AWS3172 SNA Flow Control

The Channel Queue Task is the entity that monitors and controls the channel adapter. It receives Channel Command Words (CCW) from MVS/ESA because it believes it is writing to a channel. The CCWs are then sent to the Deblocker Task, which formats channel blocks into DLC frames and passes them to the Link Services Architecture 802.2 Data Link Control Mapping Task (LSA 802.2 DLC Mapping Task). The LSA 802.2 DLC Mapping Task forms the DLC end point to which VTAM has a path. It also forms the DLC end point to which the SNA based workstation has a path. If there is congestion on this connection, it asks VTAM to handle it. From this task MAC frames are passed through LAPS 802.2 DLC to the LAN adapter. The most important function of the LAPS 802.2 DLC Task is to give Logical Link Control support for VTAM for a connection-oriented session. This is the mechanism used for guaranteed delivery of data. This task also monitors the delivery of frames to the specific destination. Sequencing and retransmission are also handled by this task.

It is basically the same in reverse when data is coming from the LAN, but then it passes through the Blocker Task.

AWS3172 has only one channel address defined to it, so it has to share this address between reads and writes. It only supports half duplex communication.

In the IEEE802.2 standard there are a number of parameters that control the way the link operates, such as window sizes and timers. We did not change any of the default values, but if you have a large network maybe with remote bridges, you have to check if the default values are sufficient. These values are found in the LAPS customization. For a real 3172 you would change these values by using the 3172 Operator Facility.

3.1.2 AWS3172 SNA Support

VTAM identifies the LAN through the channel address, defined for AWS3172. It is the definitions to MVS/ESA as a channel-to-channel (such as a 3088) that gives us the physical connection with the LAN. Over this path VTAM and LAN stations establish switched connections.

Service Access Points (SAPs) are a way where traffic destined for different applications are multiplexed over the same LAN adapter by extending the network address with the SAP.

The diagram shown in Figure 29 on page 37 uses different SAPs, so two applications can share the same adapter.

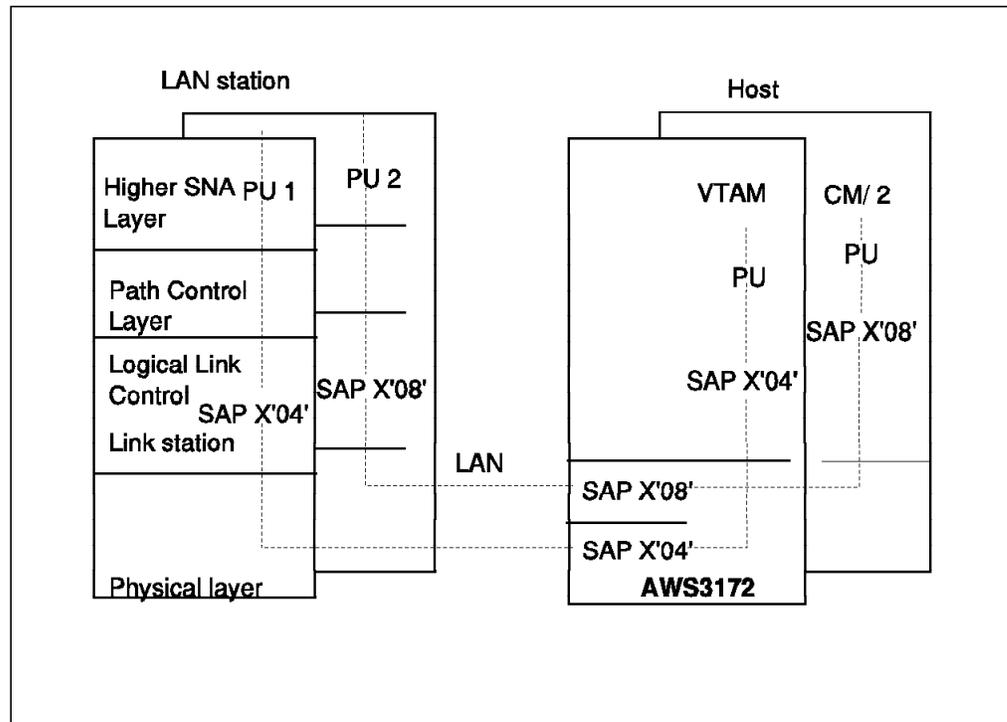


Figure 29. AWS3172 SNA Support Logical View

SNA supports multiple SAPs. The SAP allows traffic to pass to and from different end-to-end logical connections. AWS3172 requires one SAP address. This means traffic to and from VTAM through AWS3172 with SAP address 04 can pass on the same LAN adapter and single MAC address, as Communications Manager/2 using SAP address 08.

Note: TCP/IP does not support multiple SAPs.

An example of the VTAM definitions are shown in Figure 37 on page 50. One XCA major node is required for each LAN adapter that will carry SNA traffic.

3.2 LCS3172 Device Manager

The LCS3172 device manager is based on the same code as the ICP program used for the 3172. The ICP code was written using a special operating system called MTEX or MultiTasking EXecutive. This code has been ported or rewritten to execute on the OS/2 operating system. The functions provided by ICP are also provided by LCS3172.

The following diagram provides an overview of the different components LCS3172 is build upon.

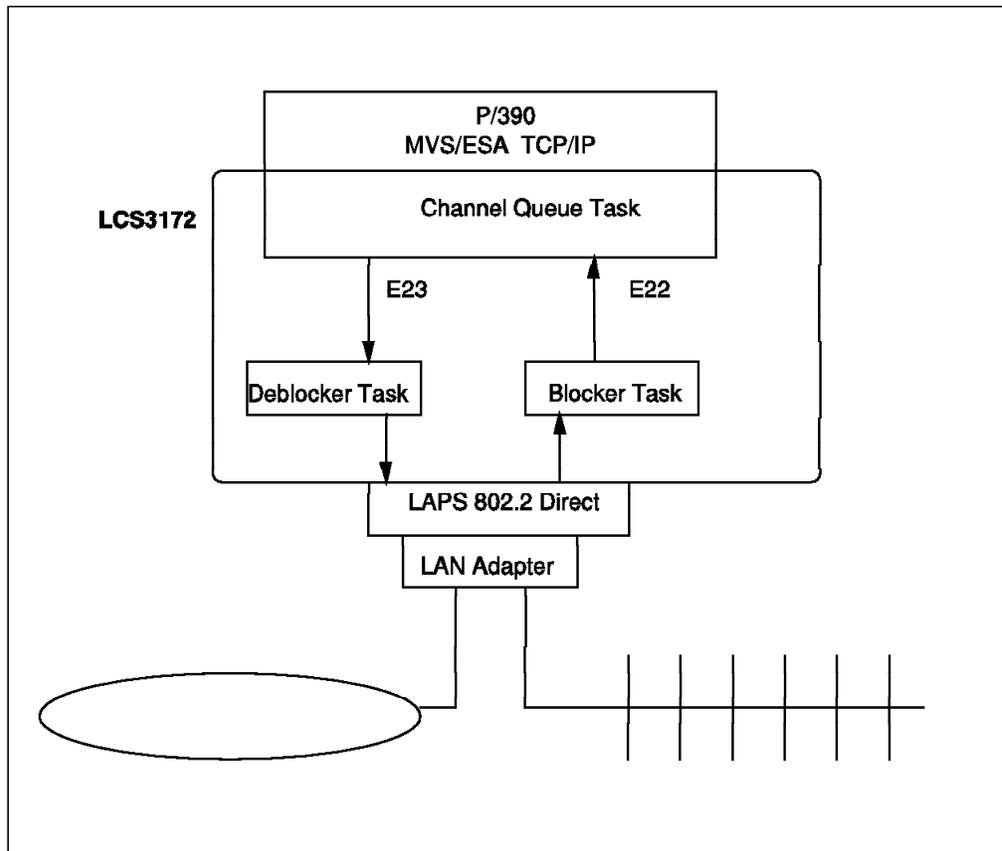


Figure 30. LCS3172 Diagram

3.2.1 Data Flows for the TCP/IP Gateway Function

For TCP/IP traffic going to the LAN the LCS3172 device manager performs several steps.

These are the steps for data going from the host to the LAN:

1. LCS3172 device manager receives a channel block from the host and transmits it through the send channel, which is the odd address of the address pair.
2. The data is deblocked into MAC frames for the particular LAN adapter
3. The frames are routed to this adapter through LAPS (IEEE802.2 Direct) and then transmitted.

These are the steps for data coming from the LAN to the host:

1. The LAN frames are received on the LAN adapter and sent through LAPS (IEEE802.2 Direct).
2. The frames are formatted into channel blocks.
3. LCS3172 device manager receives the channel blocks and transmits them through the read channel, which is the even address of the address pair.

Unlike the AWS3172, the LCS3172 device manager has two addresses, one for read and the other for write. It supports full duplex communication.

3.2.2 LCS3172 TCP/IP Support

The relationship between the different components in this environment are shown in Figure 31.

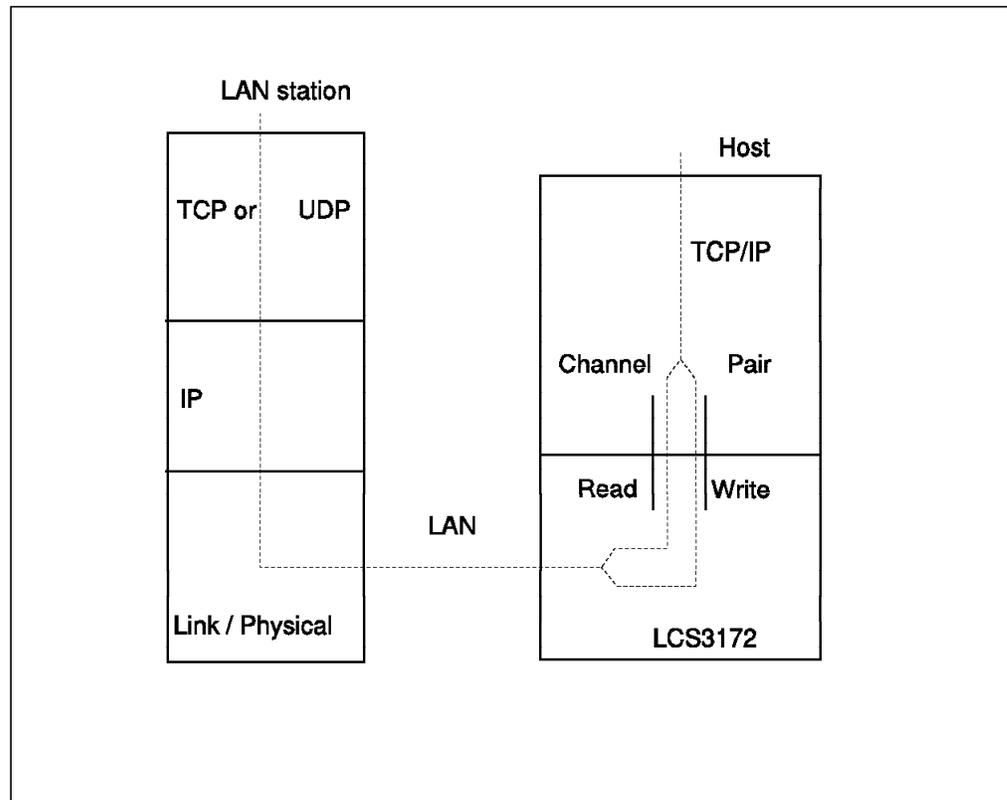


Figure 31. LCS3172 TCP/IP Support Logical View

A LAN station is seen by a TCP/IP host as an IP address. Given this, there are two possibilities:

1. It can reach the other TCP/IP host directly because it has a connection on the same network. If this is the case then the host can determine the MAC address of the LAN station by using the Address Resolution Protocol (ARP). Subsequent messages can address the LAN station directly by its adapter address.
2. It knows that the LAN station is on another network that cannot be directly addressed. Here, the host uses an IP gateway (either explicit or default) that it can address directly. The TCP/IP host sends all traffic to that gateway (having, if necessary, established its MAC address using ARP). The gateway forwards the traffic according to the same algorithm.

TCP/IP for MVS sees the network as a pair of subchannel addresses. The LCS3172 acts purely as the physical interface to the LAN; taking datagrams from a channel, placing them on the LAN and the same in reverse.

An example of the definitions for TCP/IP for MVS is shown in Figure 127 on page 128.

3.2.3 Gateway View and Definitions

From the above we can see that, apart from configuring the LCS3172 and LAPS, the only definition necessary to complete the link is to establish the relationship between a channel and LAN adapter combination. Through the use of the relative adapter number, it is possible for a channel pair to be associated with more than one LAN adapter. Thus, TCP/IP would appear as though it was attached to multiple networks and had an IP address for each one. It is not possible for one LAN adapter to be associated with multiple channels and therefore, multiple TCP/IPs.

3.2.4 LAN Station View and Definitions

There is no difference in how a LAN station views a host. It knows the IP address it wants to access, and this will either be in the same network and directly addressable, or belong to another network and will need routing through an IP gateway.

In both cases, the host will eventually be identified by a MAC address, that of the LCS3172 LAN adapter, which corresponds with this IP address.

Chapter 4. Hardware and Software Configuration

This chapter introduces the environment used for the scenarios described in this document. The following two diagrams depict both the token-ring and the Ethernet environments. For some of the systems, there was additional software installed, but if it is not relevant to our scenarios, it is not mentioned.

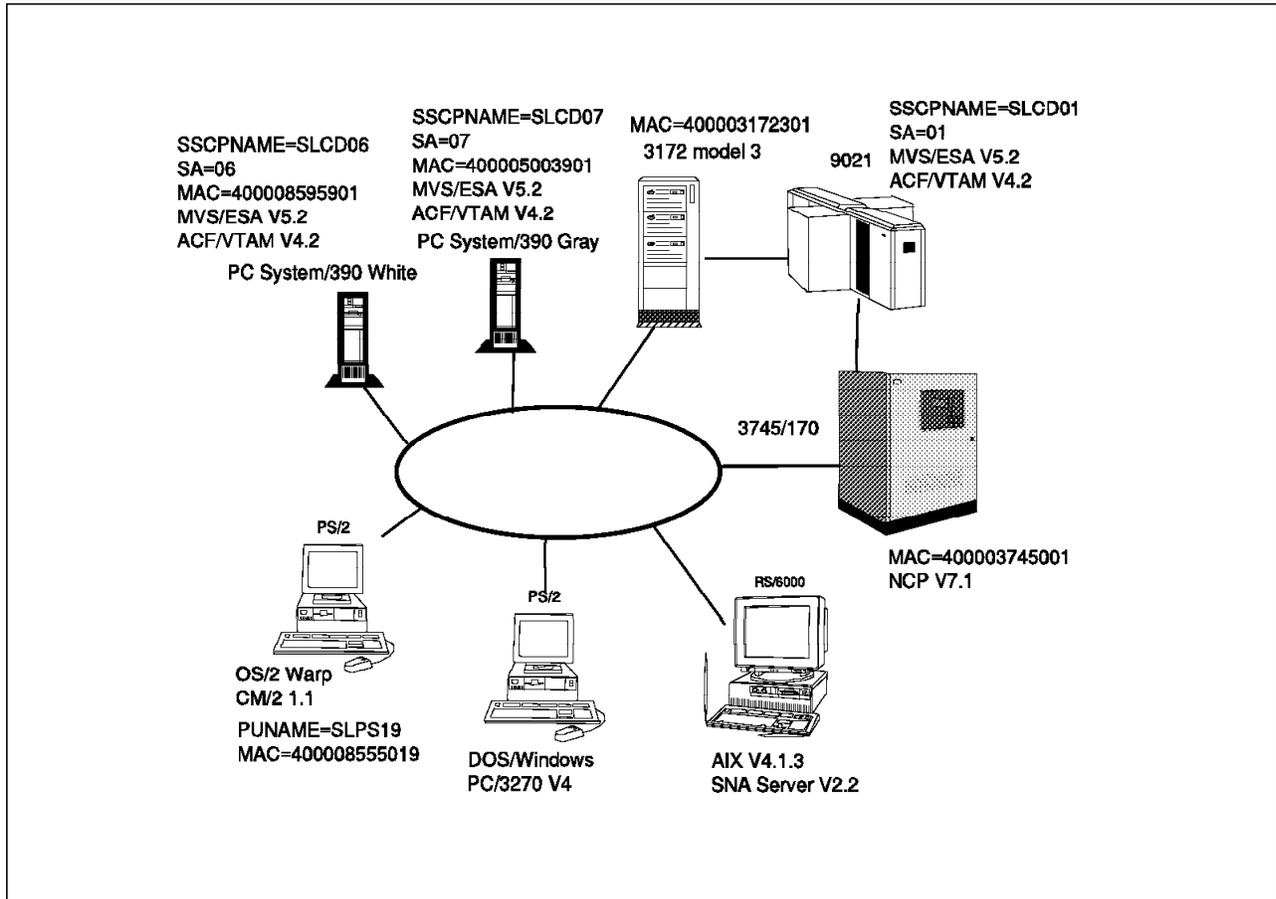


Figure 32. The SNA LAN Environment

The SNA environment above, shows only the token-ring LAN, but it could be an Ethernet LAN because we used the same configuration.

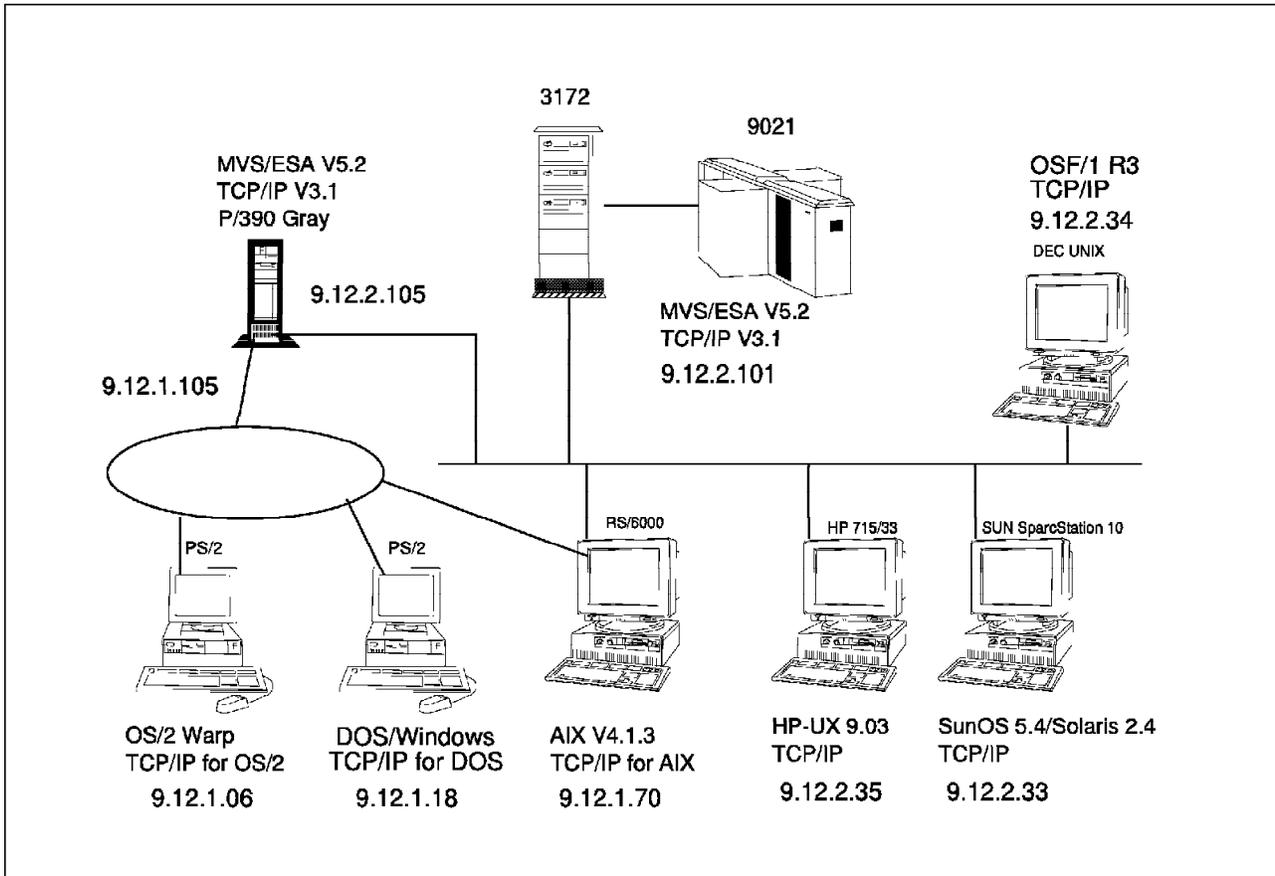


Figure 33. The TCP/IP LAN Environment

The TCP/IP environment above, illustrates both the token-ring and Ethernet LANs and their corresponding IP addresses.

4.1 Hardware

This section describes the hardware used during our scenarios.

4.1.1 PC Server System/390 White and PC Server System/390 Gray

The PC Server System/390 systems were equipped with:

- 90 Mhz processor
- 32 MB OS/2 storage
- SCSI Adapter with 7 GB disk and an Overland 3480 compatible tape drive
- S/390 Processor card attached with 128 MB storage
- S/370 channel card
- Auto LANStreamer MC 32 Adapter
- Dual EtherStreamer MC 32 Adapter
- Display adapter

4.1.2 9021

We were using the A-side of an IBM 9021 Model 942. MVS/ESA was running in a logical partition (LPAR) with 64 MB central storage and 128 MB expanded storage.

4.1.3 Workstations

The workstations used are listed below each with a short description of the hardware.

Machine	Description
PS/2 SLPS06	486 processor with 8 MB memory
PS/2 SLPS17	486 processor with 8 MB memory
PS/2 SLPS18	486 processor with 8 MB memory
PS/2 SLPS19	486 processor with 8 MB memory
RS/6000 RISC70	Model 570 with 256 MB memory
HP	Hewlett Pachard Apollo Model 715/33
Sun	Sun SparcStation 10
Dec 3000	Digital 3000 AXP

4.2 Software

This section describes the software on the machines used during our scenarios.

4.2.1 PC Server System/390 White and PC Server System/390 Gray

In addition to OS/2 Warp Connect and Communications Manager/2 V1.11, we installed the following MVS products:

Product	PID	Version
MVS/ESA JES 2 w/ Open Edition Feature Debug Feature Shell/Utilities DCE Base Services	5655-068	V5R2.0
DFSMS/ MVS Full Func	5695-DF1	R2.0
ISPF	5655-042	V4R1.0
SMP/E	5668-949	R8.1
TSO/E	5685-025	V2R4.0
RACF	5695-039	V2R1
ACF/VTAM ESA	5695-117	V4R2
High Level Assembler	5696-234	R2.0
TIOC	5752-VS2	V3R8.0
ICKDSF	5655-257	R16
EREP	5658-260	V3R5.0
SDSF/MVS	5665-488	R5.0
RMF	5655-084	V5R2
3270PC File Transfer	5665-311	R1.1
Print Service Fac (PSF)	5695-040	V2R2
TCP/IP for MVS/ESA	5655-HAL	V3R1
ACF/NCP	5648-063	V7R1

ACF/SSP APINGD program	5655-041	V4R1 Version dated 14. March 1995
---------------------------	----------	--------------------------------------

4.2.2 9021

The following products that were on the 9021, were used for all the mainframe scenarios.

Product	PID	Version
MVS/ESA JES 2 w/ Open Edition Feature Debug Feature Shell/Utilities DCE Base Services	5655-068	V5R2.2
DFSMs/ MVS Full Func	5695-DF1	R2.0
ISPF	5655-042	V4R1.0
SMP/E	5668-949	R8.1
TSO/E	5685-025	V2R4.0
RACF	5695-039	V2R1
ACF/VTAM ESA	5695-117	V4R2
High Level Assembler	5696-234	R2.0
TIOC	5752-VS2	V3R8.0
ICKDSF	5655-257	R16
EREP	5658-260	V3R5.0
SDSF/MVS	5665-488	R5.0
RMF	5655-084	V5R2
3270PC File Transfer	5665-311	R1.1
ACF/NCP	5648-063	V7R1
ACF/SSP	5655-041	V4R1
TCP/IP for MVS/ESA	5655-HAL	V3R1

The base for this installation was the custom built installation process offering (CPIPO), level 95C.

4.2.3 Workstations

The workstations used are listed below each with a short description of the software.

Machine	Description
PS/2 SLPS06	OS/2 Warp Connect, CM/2 V1.11 and TCP/IP V3.0 for OS/2
PS/2 SLPS17	OS/2 V2.1, TCP/IP V2.0 for OS/2 and CM/2 V1.1
PS/2 SLPS18	DOS/Windows and PC/3270 V4.0
PS/2 SLPS19	OS/2 V2.1, TCP/IP V2.0 for OS/2 and CM/2 V1.1
RS/6000 RISC70	AIX V4.1.3, TCP/IP 4.1.3 and SNA Server/6000 V2.2
HP	HP/UX 9.03 and TCP/IP
Sun	SunOS 5.4/Solaris 2.4 and TCP/IP
Dec	OSF/1 R3.0 with TCP/IP

4.3 Addresses and Names

The addresses and names below are used throughout the document. For example, we will refer to definitions made on SLCD01, and from this table you can see which machine it is, and find more information about the appropriate hardware and software in this chapter.

Table 1. Addresses and Names

Machine	CP Name	IP Address	Host Name	Subarea Number
9021	SLCD01	9.12.1.101	WTSCSL2	01
PC Server S/390 Gray	SLCD07	9.12.1.105	P390	07
PC Server S/390 White	SLCD06	9.12.1.106	P390W	06
PS/2	SLPS06	9.12.1.06	PS06	
PS/2	SLPS17	9.12.1.17	PS17	
PS/2	SLPS18	9.12.1.18	PS18	
PS/2	SLPS19	9.12.1.19	PS19	
RS/6000	RISC70	9.12.1.70	RISC70	
HP		9.12.2.35	HP715	
SUN		9.12.2.33	SPARC10	
DEC		9.12.2.34	DEC3000	

4.4 Connectivity Scenarios

The following tables show which connectivity scenarios that are discussed in this document. They are broken down into the appropriate adapter categories.

Table 2 shows the connectivity used with SNA. This involves establishing sessions from terminals (LU2) to the PC Server System/390, cross domain sessions, sending files between systems, and establishing APPC sessions between hosts (LU6.2), using the various adapters.

Table 2 (Page 1 of 2). SNA Connectivity

Token-Ring	Ethernet	S/370 Channel
NJE (SNA)	NJE(SNA)	NJE (through 3745)
SNA host	SNA host	SNA host
APPN host (NN)	APPN host (NN)	
APPN host (BN)	1	
SNA OS/2	SNA OS/2	
APPN OS/2	APPN OS/2	
SNA DOS	1	
SNA RS/6000	SNA RS/6000	

<i>Table 2 (Page 2 of 2). SNA Connectivity</i>		
Token-Ring	Ethernet	S/370 Channel
APPN RS/6000	APPN RS/6000	
3745 PUT4		

Table 3 shows the connectivity used with TCP/IP. For all the scenarios we have used PING and Telnet to verify connectivity to the other hosts.

<i>Table 3. TCP/IP Connectivity</i>	
Token-Ring	Ethernet
TCP/IP Host.	TCP/IP Host.
TCP/IP OS/2	TCP/IP OS/2
TCP/IP DOS	1
TCP/IP RS/6000	TCP/IP RS/6000

Notes:

1 The Ethernet scenarios not shown or discussed in this document are achieved by using the token-ring definitions with minimum changes. Please refer to the appropriate product documentation for the proper definition statements.

Chapter 5. The PC Server System/390 in a Subarea Environment

This chapter describes the subarea connectivity scenarios conducted with the PC Server System/390 and ACF/VTAM 4.2. Also shown are the base configurations of a NJE connection and of the workstations on the LAN using 3270 emulation programs, which were used to verify the connectivity scenarios.

To avoid the duplication of product definitions, only the scenario definitions using the token-ring LAN are shown. All scenarios were also done on an Ethernet LAN and where applicable, the statements that need to be changed to support an Ethernet environment are pointed out.

5.1 PC Server System/390 As a Subarea Node

In this section the base VTAM definitions are shown and explained. We have chosen to use a traditional subarea network as our starting point.

We have created a multi-domain subarea network. A multi-domain subarea network contains more than one system service control point (SSCP). Control of the resources in the network is divide among the SSCPs. Defining your VTAM network involves identifying your domains and defining your resources in those domains to the SSCPs. The traditional SNA definitions used, include:

- Cross Subarea Links (CSL)
- Cross Domain Manager (CDRM)
- Adjacent SSCP Table (ADJSSCP)
- Path Table

Figure 34 on page 48 depicts the environment used, with the appropriate VTAM names, subarea numbers, and network addresses.

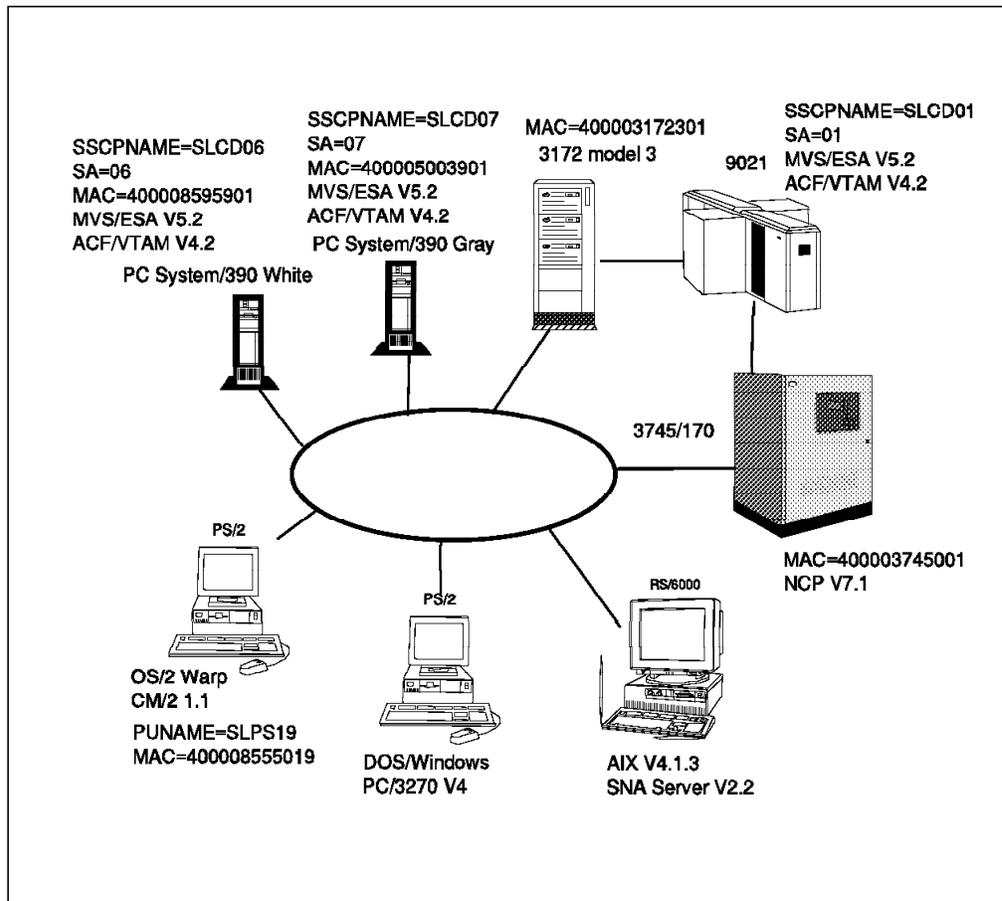


Figure 34. Our SNA Base Environment

The definitions created on SLCD01 to set up the link with the PC Server System/390 are described in this section. These definitions are necessary to start VTAM and activate the link with the PC Server System/390. With the connection between both systems, we will be able to access applications on both systems. This means, terminals and applications owned by the PC Server System/390 can establish sessions with applications running on SLCD01 and vice versa.

5.1.1 ATCSTRxx Start Parameters on SLCD01

The VTAM start parameters defined on SLCD01 are shown in Figure 35 on page 49.

ATCSTRxx was customized on SLCD01 to work as an Interchange Network Node (ICN). For more information on ICN, see 6.1, "APPN Parameters" on page 83.

SSCPID=01,NOPROMPT,		X
CONFIG=00,LIST=00,MAXSUBA=255,SUPP=NOSUP,		X
SSCPNAME=SLCD01,	1	X
NETID=SYSLAB,	2	X
HOSTSA=1,	3	X
DYNASSCP=NO,		X
SSCPDYN=NO,		X
SSCPORD=DEFINED,		X
NODETYPE=NN,	3	X
CPCP=YES,		X
DYNLU=YES,		X
CRPLBUF=(208,,15,,1,16),		X
IOBUF=(400,240,19,,1,20),		X
LFBUF=(104,,0,,1,1),		X
LPBUF=(64,,0,,1,1),		X
SFBUF=(163,,0,,1,1),		X
TRACE,TYPE=VTAM,MODE=INT,OPT=(APPC,CIO,PIU)		X

Figure 35. ATCSTRxx Start Parameters on SLCD01

Note:

- 1** Defines the PU_name that this host is known as by others.
- 2** Identifies the network that this host resides in.
- 3** Both subarea address (HOSTSA=1) and Network Node (NODETYPE=NN) are defined, which means VTAM is supporting both environments (Subarea Node and Network Node).

5.1.2 ATCCONxx List of Major Nodes on SLCD01

ATCCONxx contains the list of the major nodes defined to set up the link between SLCD01 and SLCD07 (PC Server System/390).

SL3172,	XCA Majnode definition	X
SLTS0,	Applications TSO	X
SLPATH39	Path statements	X
SLADJ39,	Adjacent table	X
SLCDRM39,	CDRM Definitions	X
SLCDRS39	Cross domain resources	

Figure 36. ATCCONxx List of Major Nodes on SLCD01

These major nodes are activated when VTAM is started.

5.1.3 XCA Major Node on SLCD01

This External Communication Adapter (XCA) major node defines the line and PU_type to establish a connection between SLCD01 and the PC Server System/390.

SL3172	VBUILD	TYPE=XCA		
SLPORT	PORT	ADAPNO=0,	1	X
		CUADDR=207,	2	X
		MEDIUM=RING,	3	X
		SAPADDR=4,	4	X
		TIMER=60		
SLGRP1	GROUP	DIAL=NO	5	
SLL1	LINE	USER=SNA, ISTATUS=ACTIVE		
SLP1	PU	ISTATUS=ACTIVE,		X
		MACADDR=400005003901,	6	X
		PUTYPE=5,	7	X
		SAPADDR=4,	4	X
		SUBAREA=07,	8	X
		TGN=1		

Figure 37. XCA Major Node on SLCD01

Notes:

1 This is the actual adapter in the 3172 through which the connection is made. ADAPNO must correspond to the number assigned to the LAN adapter by the 3172 Operator Facility.

2 Defines the physical address of the channel.

3 Specifies the type of adapter that we want to use through the 3172. Figure 37 shows the definition using the token-ring adapter. To use the Ethernet adapter we need to specified MEDIUM=CSMACD.

4 Defines the service access point. This is used to allow the same adapter to be used between different applications. We chose SAPADDR=04 for the 3172.

5 For a PUTYPE5 connection, DIAL=NO must be specified. For PUTYPE2 connections, DIAL=YES must be specified. This is needed to connect to VTAM on the PC Server System/390.

6 This is the destination MAC address of the system we are going to connect to. Because this definition is for SLCD01, MACADDR is the MAC address of the PC Server System/390 as defined through LAPS on that machine. See 2.6, "PC Server System/390 LAPS Customization" on page 29.

To use the Ethernet adapter we needed to specify the MAC address defined in LAPS. The network address defined for the Ethernet adapter was 020005003901.

7 Defines the connection to be a PUTYPE5 (host).

8 Defines the subarea address for this host.

5.1.4 PATH Major Node on SLCD01

The PATH major node defines the paths needed to reach the PC Server System/390.

SLPATH39	PATH	DESTSA=6,	To White P/390	*
		ER0=(6,1),		*
		ER1=(6,1),		*
		VR0=0,		*
		VR1=1		
	PATH	DESTSA=7,	To Gray P/390	*
		ER0=(7,1),		*
		ER1=(7,1),		*
		VR0=0,		*
		VR1=1		

Figure 38. PATH Major Node

In the PATH table we define how our SSCP can reach SUBAREA=07, which is the PC Server System/390. Looking at the ER0 statement we can determine that we have a direct connection (same subarea as the destination subarea). If the route would have been through an adjacent subarea, you would have to specify that adjacent subarea address.

5.1.5 ADJSSCP Major Node on SLCD01

The Adjacent SSCP Major Node contains a list of other domains that VTAM should ask if it does not have the requested resource itself or have a cross domain resource definition defined for it. ADJSSCP also defines the sequence to use for searching other domains.

SLADJ39	VBUILD	TYPE=ADJSSCP
	NETWORK	NETID=SYSLAB
SLCD06	ADJCDRM	
SLCD07	ADJCDRM	

Figure 39. ADJSSCP Major Node

5.1.6 CDRM Major Node on SLCD01

The Cross Domain Resource Manager (CDRM) major node defines the other VTAM systems in the network to which it will allow sessions to be established.

SLCDRM39	VBUILD TYPE=CDRM					
SLCD01	CDRM	SUBAREA=01,	1			X
		ISTATUS=ACTIVE,				X
		CDRSC=OPT,	2			X
		CDRDYN=YES,	2			X
		RECOVERY=YES				
SLCD07	CDRM	SUBAREA=07,	1	Gray	P/390	X
		ISTATUS=ACTIVE,				X
		CDRSC=OPT,	2			X
		CDRDYN=YES,	2			X
		RECOVERY=YES				
SLCD06	CDRM	SUBAREA=06,		White	P/390	X
		ISTATUS=ACTIVE,				X
		CDRSC=OPT,				X
		CDRDYN=YES,				X
		RECOVERY=YES				

Figure 40. CDRM Major Node

Notes:

1 Defines both the name of this VTAM and other VTAM systems (defined there through SSCPNAME parameter) and the corresponding subarea address.

2 Allows this VTAM to define resources dynamically. If you specified CDRDYN=NO and CDRSC=REQ, every resource must then be defined in the Cross Domain Resource table (CDRSC), such as the definitions shown in Figure 41.

5.1.7 CDRSC Major Node on SLCD01

The Cross Domain Resource (CDRSC) major node defines the CDRSCs to SLCD01. Here we have defined TSO applications installed on SLCD07 and SLCD06.

SLCDRS39	VBUILD TYPE=CDRSC				
	NETWORK NETID=SYSLAB				
A07TSO	CDRSC	CDRM=SLCD07		TSO on Gray	P/390
A06TSO	CDRSC	CDRM=SLCD06		TSO on White	P/390

Figure 41. CDRSC Major Node

5.1.8 ATCSTRxx Start Parameters on SLCD07

The definitions created on SLCD07 to set up the link with SLCD01 are described in this section. These definitions are necessary to start VTAM and activate the PC Server System/390 connection with SLCD01.

With the connection between both systems, we were able to access applications on both systems. This means, terminals and applications owned by the PC Server System/390 can establish sessions with applications running on SLCD01 and vice versa.

The diagram in Figure 34 on page 48 shows the environment.

The definitions for the PC Server System/390 to set up the link between it and SLCD01 are below.

The ATCSTRxx was customized to work in SA (subarea) mode.

CONFIG=00,		X
HOSTSA=7,	1	X
IOINT=3600,		X
NETID=SYSLAB,	2	X
NOPROMPT,		X
SSCPID=6,		X
SSCPNAME=SLCD07,	3	X
SUPP=INFO,		X
TRACE,TYPE=VTAM,MODE=INT,OPTION=(API,MSG,PIU,SMS),SIZE=30,		X
APBUF=(68,,7,,68,14),		X
CRPLBUF=(102,,10,,34,20),		X
IOBUF=(200,508,19,,1,20),	4	X
LFBUF=(34,,4,,34,8),		X
LPBUF=(96,,10,,4,20),		X
SPBUF=(39,,4,,39,8),		X

Figure 42. ATCSTRxx Start Parameters on SLCD07

Notes:

- 1** Defines the subarea address.
- 2** Identifies the network that this host resides in.
- 3** Defines the PU_name that this host is known as by others.
- 4** We changed the IOBUF size to the same as on SLCD01, but because of a software problem, which made VTAM create a dump every time the 3172 definitions were activated, we had to change the IOBUF size to 508. If you have the PTF UW20007 installed, this is not required.

5.1.9 ATCCONxx Defined on SLCD07

ATCCONxx contains the list of major nodes defined on SLCD07

SL073172,	AWS3172 (XCA) Definitions	
SL07CDRM,	Cross Domain Manager	X
SL07PATH	Path statements	X
SL07ATSO,	Applications TSO	X
SL07NJE,	Cross Domain Resource NJE	X
SL07TRP2,	Swnet definitions for LU2	X
SL07TERM	LOCAL terminal controllers	

Figure 43. ATCCONxx List of Major Nodes on SLCD07

These major nodes are activated during startup.

5.1.10 XCA Major Node on SLCD07

The External Communication Adapter (XCA) major node was customized to work in SA (subarea) mode.

The following is the 3172 XCA major node for the PC Server System/390. Notice that in this definition we have defined a PUTYPE5 and two PUTYPE2.

SL073172	VBUILD	TYPE=XCA		
SLPORT	PORT	ADAPNO=0,	1	X
		CUADDR=E20,	2	X
		MEDIUM=RING,		X
		SAPADDR=4,	3	X
		TIMER=60		
SLGRP1	GROUP	DIAL=NO	4	
SLL1	LINE	USER=SNA, ISTATUS=ACTIVE		
SLP1	PU	ISTATUS=ACTIVE,		X
		MACADDR=400003172301,	5	X
		PUTYPE=5,	6	X
		SAPADDR=4,	3	X
		SUBAREA=01,	7	X
		TGN=1		
*				
SLGRP2	GROUP	DIAL=YES,	8	X
		DYNPU=YES,	9	
		CALL=INOUT, ANSWER=ON, ISTATUS=ACTIVE		
SLL2	LINE		10	
SLP2	PU		10	
SLL3	LINE			
SLP3	PU			

Figure 44. XCA Major Node on SLCD07

Notes:

1 This is the actual adapter in the 3172 device manager (AWS3172) through which the connection is made. ADAPNO must match the adapter number assigned during the customization of LAPS. See 2.6, "PC Server System/390 LAPS Customization" on page 29.

2 Defines the physical address of the channel. This needs to be defined to the I/O configuration through the PC Server System/390 Configurator (see 2.3, "PC Server System/390 Configurator" on page 16) and to MVS/ESA through HCD (see 2.4, "PC Server System/390 MVS/ESA Configuration" on page 21).

For Ethernet we used the same channel address (E20).

3 Defines the service access point, and will allow the same adapter to be used between different applications. We chose SAPADDR=04 for AWS3172, because most terminal emulation programs such as Communications Manager/2 and PC/3270 default to SAPADDR=04 for the remote SAP.

4 For a PUTYPE5 connection, DIAL=NO must be specified. For PUTYPE2 connections, DIAL=YES must be specified.

5 This is the MAC address of the system we are going to connect to. Because this definition is for the PC Server System/390, the MAC address of the 3172 model 3 was used to access SLCD01.

To use the Ethernet adapter we need to specify the MAC address of the 3172 Ethernet adapter, which was defined as 10005AD4BCB5.

6 Defines this connection to be to a PUTYPE5.

7 Defines the subarea address for SLCD01.

8 For a PUTYPE2 connection, DIAL=YES must be specified.

9 Defines that a PU can automatically be allocated when a call in or a call out is initiated.

10 One LINE and PU statement is used for each incoming or outgoing call.

5.1.11 CDRM Major Node on SLCD07

The Cross Domain Resource Manager (CDRM) major node defines the other VTAM systems in the network to which it will allow sessions to be established.

```
SL07CDRM VBUILD TYPE=CDRM
*
SLCD01 CDRM SUBAREA=01,CDRDYN=YES,CDRSC=OPT,ISTATUS=ACTIVE
SLCD06 CDRM SUBAREA=06,CDRDYN=YES,CDRSC=OPT,ISTATUS=ACTIVE
SLCD07 CDRM SUBAREA=07,CDRDYN=YES,CDRSC=OPT,ISTATUS=ACTIVE
```

Figure 45. CDRM Major Node on SLCD07

5.1.12 PATH Major Node on SLCD07

In the PATH table we define how our SSCP can reach SLCD01 (subarea 01).

```
SL07PATH PATH DESTSA=1,
          ERO=(1,1),
          VRO=0
          PATH DESTSA=6,
          ERO=(6,1),
          VRO=0
```

Figure 46. PATH Major Node on SLCD07

5.1.13 Definitions to Establish LU2 Connections

The Switched Network (SWNET) Major Node defines resources on the LAN. As long as we are in the Subarea Node scenario, every resource needs to be defined. This major node will allow the logical connection between workstations on the LAN and the PC Server System/390.

SL07TRP2 VBUILD TYPE=SWNET			
SLPS19	PU	ADDR=C3,	X
		IDBLK=05D,	X
		IDNUM=20019,	X
		CPNAME=CPPS19,	X
		IRETRY=YES,	X
		MAXPATH=1,	X
		MAXDATA=265,	X
		MAXOUT=7,	X
		PACING=0,	X
		VPACING=0,	X
		PUTYPE=2,	X
		DISCNT=(NO),	X
		ISTATUS=ACTIVE,	X
		MODETAB=ISTINCLM,	X
		DLOGMOD=SNX32702,	X
		USSTAB=USSSNA,	X
		SSCPFM=USSSCS	
SLPS190I	LU	LOCADDR=0	3
SLPS1901	LU	LOCADDR=2	4
SLPS1902	LU	LOCADDR=3	4
SLPS1903	LU	LOCADDR=4	4
SLPS1904	LU	LOCADDR=5	4
*Definitions fot the next workstation			
SLPS18	PU	ADDR=C3,	X
		IDBLK=05D,	X
		IDNUM=20018,	X
		CPNAME=CPPS18,	X
		IRETRY=YES,	X
		MAXPATH=1,	X
		MAXDATA=265,	X
		MAXOUT=7,	X
		PACING=0,	X
		VPACING=0,	X
		PUTYPE=2,	X
		DISCNT=(NO),	X
		ISTATUS=ACTIVE,	X
		MODETAB=ISTINCLM,	X
		DLOGMOD=SNX32702,	X
		USSTAB=USSSNA,	X
		SSCPFM=USSSCS	
SLPS180I	LU	LOCADDR=0	3
SLPS1801	LU	LOCADDR=2	4
SLPS1802	LU	LOCADDR=3	4
SLPS1803	LU	LOCADDR=4	4
SLPS1804	LU	LOCADDR=5	4

Figure 47. SWNET Major Node on SLCD07

Notes:

1 Identifies the type of workstation. This is a fixed value; check with the component documentation. For the Communications Manager/2, the value is 05D

2 Must be a unique value in the network, and this value must match IDNUM value specified in the emulation program on the workstation.

3 LOCADDR=0 is for an independent LU.

4 LOCADDR=2 is for a dependent LU.

5.1.14 Verification Results

The messages we received when VTAM was started, are shown in Figure 48.

```
19.57.52          s vtam
19.57.55 STC00770 $HASP373 VTAM   STARTED
19.58.24 STC00770 IST093I  ISTDYRDY ACTIVE
19.58.27 STC00770 IST315I  VTAM INTERNAL TRACE ACTIVE - MODE = INT, SIZE
= 050
IST199I OPTIONS = API MSG PIU SMS
IST314I END
19.58.28 STC00770 IST984I  USER EXIT ISTEEXCUV IS ACTIVE
19.58.28 STC00770 IST093I  ISTDYRDY ACTIVE
19.58.28 STC00770 IST093I  SL07PATH ACTIVE
19.58.28 STC00770 IST984I  USER EXIT ISTEEXCSD IS ACTIVE
19.58.29 STC00770 IST093I  SL07CDRM ACTIVE
19.58.29 STC00770 IST093I  SLCD07 ACTIVE
19.58.29 STC00770 IST984I  USER EXIT ISTEEXCGR IS ACTIVE
19.58.30 STC00770 IST093I  SL073172 ACTIVE
19.58.30 STC00770 IST093I  SL07ATSO ACTIVE
19.58.32 STC00770 IST093I  SL07NJE ACTIVE
19.58.33 STC00770 IST093I  SL07TERM ACTIVE
19.58.33 STC00770 IST093I  SL07TRP2 ACTIVE
19.58.34 STC00770 IST020I  VTAM INITIALIZATION COMPLETE FOR V4R2
19.58.34 STC00770 IST1349I COMPONENT ID IS 5695-11701-201
19.58.34 STC00770 IST1348I VTAM STARTED AS SUBAREA NODE 1
```

Figure 48. SLCD07 As a Subarea Node

Note:

1 SLCD07 is started as a Subarea Node.

The messages we saw when the connection was activated between SLCD07 and SLCD01 are shown in Figure 49.

```
19.59.23 STC00770 IST464I  LINK STATION SLP1 HAS CONTACTED SA 1
19.59.23 STC00770 IST093I  SLP1 ACTIVE 1
19.59.24 STC00770 IST093I  SLCD01 ACTIVE 2
```

Figure 49. SLCD07 to SLCD01 Connection

Notes:

1 The name of the PU defined in the XCA major node on SLCD07.

2 The CDRM defined in the adjacent system.

When we displayed the status of the CDRMs defined in SLCD07 we saw the following:

```

19.59.52          d net,e,cdrms
19.59.52 STC00770 IST097I DISPLAY ACCEPTED
19.59.52 STC00770 IST350I DISPLAY TYPE = CDRMS
IST089I SL07CDRM TYPE = CDRM SEGMENT      , ACTIV
IST482I SLCD01  ACTIV, SA          1, EL    1, NETID = SYSLAB
IST482I SLCD06  ACTIV, SA          6, EL    1, NETID = SYSLAB
IST482I SLCD07  ACTIV, SA          7, EL    1, NETID = SYSLAB
IST314I END

```

Figure 50. CDRMs on SLCD07

At this point we were able to access applications running on both systems.

5.2 3745 on the Token-Ring As a PU Type 4

This section describes the scenario created to connect the PC Server System/390 to the 3745 using the token-ring connection. In this scenario SLCD07 was configured as a subarea node. The VTAM start parameters were described in 5.1.8, "ATCSTRxx Start Parameters on SLCD07" on page 52.

Note: VTAM does not support ownership, activation or the loading of an NCP, using a token-ring connection through a 3172. This is also true for the AWS3172 device manager.

Figure 51 on page 59 shows the environment created to connect the PC Server System/390 to the 3745. The loading of the NCP module in the 3745 is performed from SLCD01. The 3745 is owned by SLCD01, this means that SLCD01 activates the NCP and establishes an SSCP-PU session with the NCP.

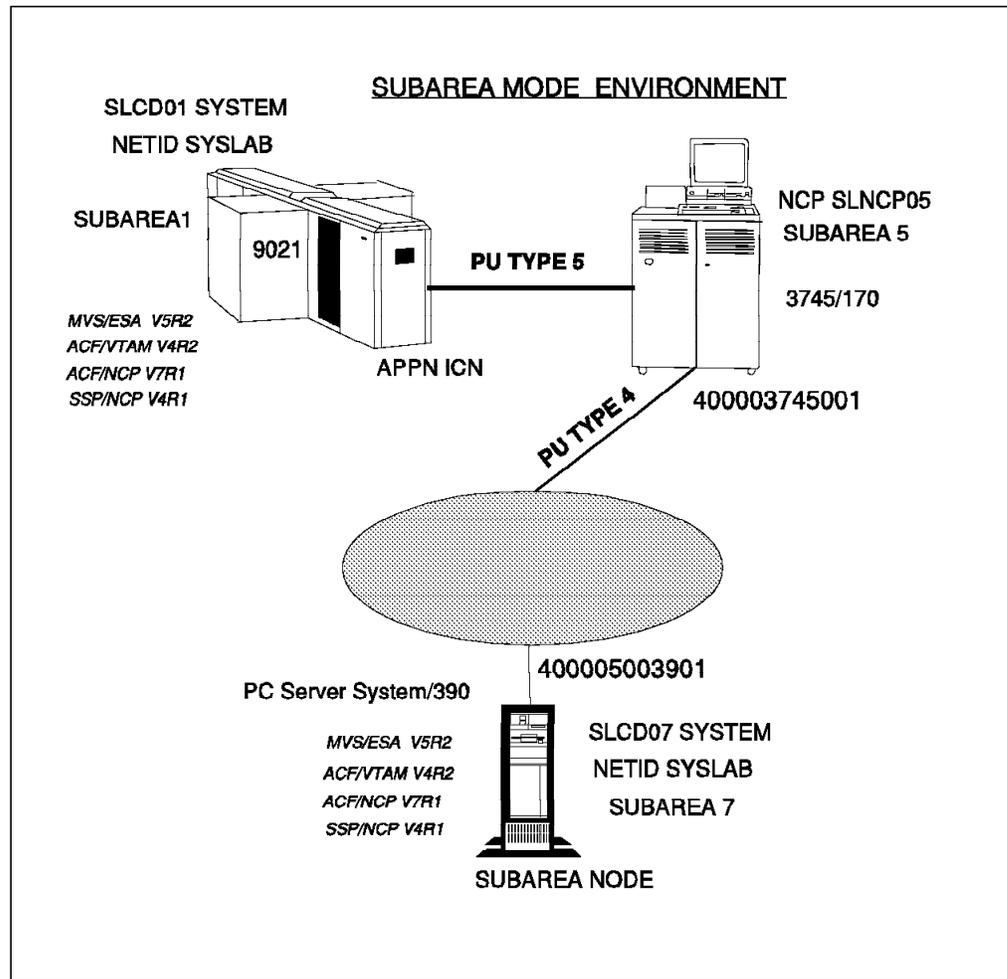


Figure 51. PC Server System/390 Connectivity Using a PU Type 4

The following section only provides information about the additional definitions that were needed to implement the 3745 into the subarea node environment.

5.2.1 Definitions for SLCD07

The only definitions needed on SLCD07 to connect this system with the 3745 are shown below.

	VBUILD	TYPE=XCA	
SLPORT	PORT	ADAPNO=0,	X
		CUADDR=E20,	X
		MEDIUM=RING,	X
		SAPADDR=04,	X
		TIMER=60	
SLGRP1	GROUP	DIAL=NO	
SLL1	LINE	USER=SNA, ISTATUS=ACTIVE	
SLP1	PU	ISTATUS=ACTIVE,	X
		MACADDR=400003745001, 1	X
		PUTYPE=4, 2	X
		SAPADDR=4,	X
		SUBAREA=5, 3	X
		TGN=1	

Figure 52. XCA Major Node for SLCD07

Notes:

- 1** Specifies the address of the token-ring port in the 3745. This 3745 has a channel connection with SLCD01.
- 2** Defines this PU as PU Type 4. This PU is to connect SLCD07 with the 3745.
- 3** Represents the subarea address of the NCP loaded in the 3745.

5.2.2 Definitions for SLCD01

On SLCD01 we generated the NCP module with the definitions needed to connect the 3745 with SLCD07. The relevant definitions coded on the NCP are shown in Figure 53 on page 61.

Notes:

- 1** 1088 is the physical address of the Token-Ring Interface Coupler (TIC) in the 3745.
- 2** This is the logical address for the TIC in the 3745. This address corresponds to the MACADDR in the XCA definitions shown in Figure 52 on page 60.
- 3** Definitions that a cross subarea connection can be established.
- 4** This PU is used for the connection to PC Server System/390. ADDR=044000005003901 is the destination MAC address defined for the PC Server System/390.
- 5** Defines this line to be used as a cross subarea link.

At this point we are able to verify the environment.

5.2.3 Verification Results

First we activated the NCP on SLCD01 and the XCA major node on SLCD07.

After the NCP was activated on SLCD01, we saw the messages shown in Figure 54 on SLCD07

```
IST464I LINK STATION SLP1 HAS CONTACTED SA 5 1  
IST093I SLP1 ACTIVE  
IST093I SLCD01 ACTIVE 2
```

Figure 54. Activating the XCA Major Node on SLCD07

Notes:

- 1** The PU SLP1 defined on SLCD07 has contacted the adjacent PU defined in the NCP. Also, these messages tell us that the subarea number for the adjacent NCP is 5.
- 2** Means that the SSCP-SSCP session between SLCD07 and SLCD01 has been established.

After these resources were activated we had to verify the following resources to ensure that the connection was active. First we displayed the status of the resources defined in the NCP SLNCP05 on SLCD01.

Figure 55 on page 63 shows the status of the line and PU defined under the physical group.

```

D NET,E,ID=EL051088
IST097I DISPLAY ACCEPTED
IST075I NAME = EL051088, TYPE = LINE 094
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST087I TYPE = LEASED , CONTROL = SDLC
IST134I GROUP = EG05P00, MAJOR NODE = SLNCP05
IST084I NETWORK NODES:
IST089I EP051088 TYPE = PHYSICAL UNIT , ACTIV
IST314I END

D NET,E,ID=EP051088
IST097I DISPLAY ACCEPTED
IST075I NAME = EP051088, TYPE = PU_T1 097
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST081I LINE NAME = EL051088, LINE GROUP = EG05P00, MAJNOD = SLNCP05
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST1067I LOGICAL LINES:
IST080I GL051088 ACTIV----G
IST172I NO LOGICAL UNITS EXIST
IST314I END

```

Figure 55. Resources Defined under the Physical Group

The Figure 56 shows the status of the line and PU defined under the logical group.

```

D NET,E,ID=GL051088
IST097I DISPLAY ACCEPTED
IST075I NAME = GL051088, TYPE = LINE 449
IST486I STATUS= ACTIV----G, DESIRED STATE= ACTIV
IST087I TYPE = LEASED , CONTROL = SDLC
IST134I GROUP = GG05L00, MAJOR NODE = SLNCP05
IST1068I PHYSICAL RESOURCE (PHYSRSC) = EP051088
IST396I LNKSTA STATUS CTG GTG ADJNODE ADJSA NETID
IST397I GP051088 ACTIV----E 1 1 1 7 SYSLAB
IST314I END

D NET,E,ID=GP051088
IST097I DISPLAY ACCEPTED
IST075I NAME = GP051088, TYPE = LINK STATION 452
IST486I STATUS= ACTIV----E, DESIRED STATE= ACTIV
IST081I LINE NAME = EL051088, LINE GROUP = EG05P00, MAJNOD = SLNCP05
IST396I LNKSTA STATUS CTG GTG ADJNODE ADJSA NETID
IST397I GP051088 ACTIV----E 1 1 1 7 SYSLAB
IST610I LINE GL051088 - STATUS ACTIV----G
IST314I END

```

Figure 56. Resources Defined under the Logical Group

Note:

1 Means that the link station has contacted SLCD07.

Figure 57 on page 64 shows the status of the XCA major node defined in SLCD07.

```

d net,e,id=s1317245
IST097I DISPLAY ACCEPTED
IST075I NAME = SL317245, TYPE = XCA MAJOR NODE
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST1021I MEDIUM=RING,ADAPNO= 0,CUA=0E20,SNA SAP= 4
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST170I LINES:
IST232I SLL1      , ACTIV----E 1
IST232I SLL2      , ACTIV
IST232I SLL3      , ACTIV
IST314I END

```

Figure 57. Display of the XCA Major Node on SLCD07

Note:

1 This line is used to establish the connection with SLNCP05. It is our cross subarea link.

Figure 58 shows the status of the line and PU defined in the XCA major node.

```

d net,e,id=s111
IST097I DISPLAY ACCEPTED
IST075I NAME = SLL1, TYPE = LINE
IST486I STATUS= ACTIV----E, DESIRED STATE= ACTIV
IST087I TYPE = LEASED           , CONTROL = SDLC
IST134I GROUP = SLGRP1, MAJOR NODE = SL317245
IST396I LNKSTA  STATUS  CTG GTG  ADJNODE  ADJSA  NETID
IST397I SLP1    ACTIV----E  1  1      1      5  SYSLAB
IST314I END

d net,e,id=s1p1
IST097I DISPLAY ACCEPTED
IST075I NAME = SLP1, TYPE = LINK STATION
IST486I STATUS= ACTIV----E, DESIRED STATE= ACTIV
IST081I LINE NAME = SLL1, LINE GROUP = SLGRP1, MAJNOD = SL317245
IST396I LNKSTA  STATUS  CTG GTG  ADJNODE  ADJSA  NETID
IST397I SLP1    ACTIV----E  1  1      1      5  SYSLAB
IST610I                LINE SLL1  - STATUS ACTIV----E
IST314I END

```

Figure 58. Display of the LINE and PU in SLCD07

Note:

1 Means that the PU defined in SLCD07 has contacted the adjacent subarea 5 (SLNCP05). To verify that the CDRM-CDRM session was active we displayed the CDRMs defined on SLCD07.

```

d net,e,cdrms
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = CDRMS
IST089I SLCDRM  TYPE = CDRM SEGMENT  , ACTIV
IST482I SLCD01  ACTIV, SA             1, EL   1, NETID = SYSLAB
IST482I SLCD07  ACTIV, SA             7, EL   1, NETID = SYSLAB
IST314I END

```

Figure 59. CDRM Defined on SLCD07

After this we were able to access applications running on both systems.

5.3 S/370 Channel Connectivity

This section describes the scenario that was created to connect the PC Server System/390 directly to the 3745. We used the S/370 Channel Emulator/A card in the PC Server System/390 to make the channel connection. The S/370 Channel Emulator/A card is controlled by the CHAN370 device manager. This emulator card allows you to attach a real S/370 I/O control unit directly to the PC Server System/390.

Figure 60 shows the environment created using the channel card in the PC Server System/390. The loading of the NCP module in the 3745 is performed from the PC Server System/390 (SLCD07). SLCD07 was the owner of the NCP and established an SSCP-PU session with the NCP.

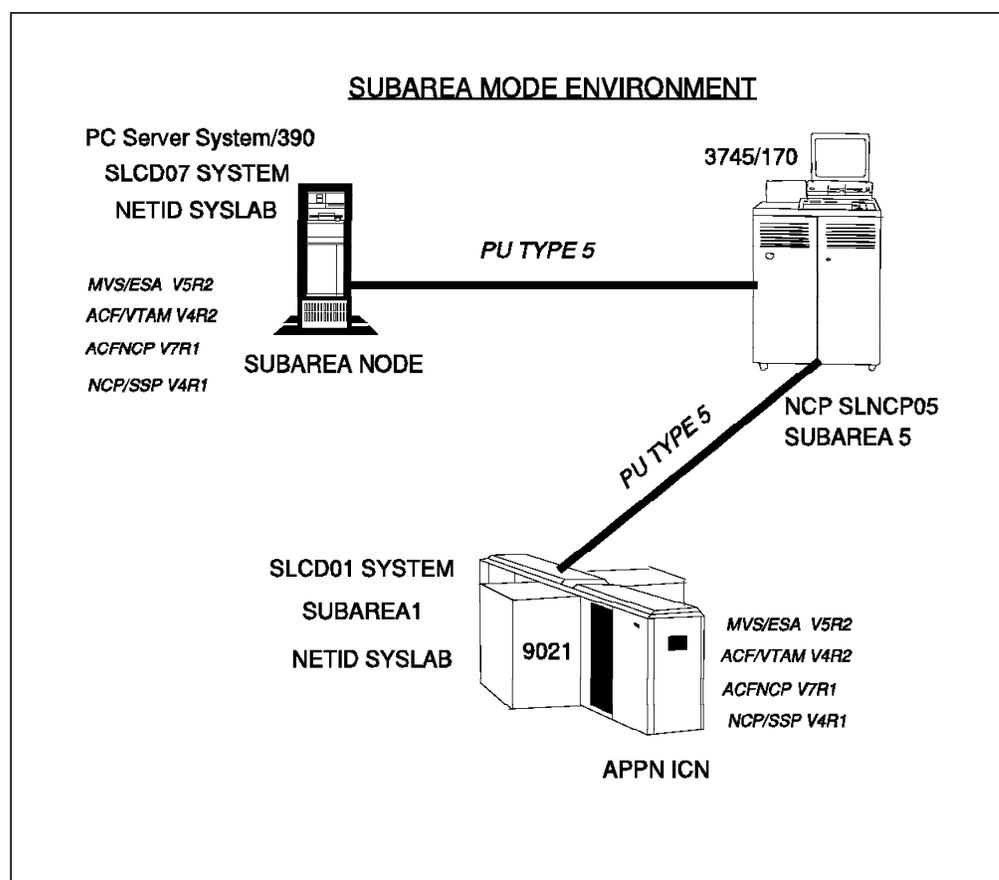


Figure 60. PC Server System/390 Connectivity to Channel Adapter (PU.T5)

In this scenario VTAM was configured as a subarea node as described in the beginning of this chapter. The following section discusses the additional definitions that we made to SLCD07 to support the channel attached 3745.

5.3.1 Path Major Node on SLCD07

The path statements needed to be updated to complement the connection between SLCD07 and SLCD01 through the 3745, as shown in Figure 61

PATH1	PATH	DESTSA=(1),	*
		ER0=(5,1),	*
		ER2=(1,1),	*
		ER1=(5,1),	*
		VR0=0,	*
		VR1=1,	*
		VR2=2	
	PATH	DESTSA=(5),	*
		ER0=(5,1),	*
		ER1=(5,1),	*
		VR0=0,	*
		VR1=1	

Figure 61. Path Major Node on SLCD07

5.3.2 NCP Definitions on SLCD07

Figure 62 on page 67 shows a subset of NCP definitions that pertain only to SLCD07.

```

SL7      PCCU AUTODMP=NO,      AUTOMATICALLY TAKE DUMP      *
          CUADDR=82E, 1    CHANNEL-ATTACHMENT ADDRESS  *
          DUMPSTA=82E-S,    DUMP STATION                 *
          LOADSTA=82E-S,    LOAD STATION                 *
          ...
          SUBAREA=7        HOST SUBAREA ADDRESS
*
NCP3745 BUILD MODEL=3745-170,  UPDATE MODEL IF 3745-130/150/170 *
          NETID=SYSLAB,     NETWORK IDENTIFIER           *
          SUBAREA=5,        SUBAREA ADDRESS FOR THE NCP             *
          NEWNAME=SLNCP05,  NCP LOAD MODULE NAME             *
          ...
*****
SLCD01  HOST INBFRS=10,MAXBFRU=18,SUBAREA=1,BFRPAD=0,UNITSZ=240
SLCD07  HOST INBFRS=10,MAXBFRU=18,SUBAREA=7,BFRPAD=0,UNITSZ=240
*****
          PATH DESTSA=1,
          ERO=(1,1),ER1=(1,1),
          VRO=0,VR1=1,
          VRPWS00=(1,9),VRPWS01=(1,9),VRPWS02=(1,9),
          VRPWS10=(1,9),VRPWS11=(1,9),VRPWS12=(1,9)
          PATH DESTSA=7,
          ERO=(7,1),ER1=(7,1),
          VRO=0,VR1=1,
          VRPWS00=(1,9),VRPWS01=(1,9),VRPWS02=(1,9),
          VRPWS10=(1,9),VRPWS11=(1,9),VRPWS12=(1,9)
*****
G5CA01  GROUP LNCTL=CA,        CHANNEL ADAPTER LINK PROTOCOL *
          CA=TYPE6,           CHANNEL ADAPTER TYPE             *
          NCPCA=ACTIVE,       ACTIVE CHANNEL ADAPTER           *
          ...
*****
*          LINE STATEMENT FOR CHANNEL SUBAREA LINK TO SA 01      *
*****
L5CA01  LINE ADDRESS=01,      LOGICAL CHANNEL ADAPTER     *
          CA=TYPE6,           CHANNEL ADAPTER TYPE             *
          CASDL=30,          CA SLOW DOWN TIME                 *
          ...
          NCPCA=ACTIVE,       ACTIVE CHANNEL ADAPTER           *
          NPACOLL=NO,        NO NPA DATA COLLECTION           *
          PUTYPE=5,          PHYSICAL UNIT TYPE                 *
          TGN=1,             TRANSMISSION GROUP NUMBER         *
          TIMEOUT=30,        CA ATTENTION TIMEOUT             *
          TRANSFR=18,        NO. OF BUFFERS FOR SINGLE TRANSFER *
*****
*          PU STATEMENT FOR CHANNEL SUBAREA LINK TO SA01        *
*****
P5CA01  PU PUTYPE=5,          PHYSICAL UNIT TYPE             *
          TGN=1,             TRANSMISSION GROUP                 *
*****
*          LINE STATEMENT FOR CHANNEL PERIPHERAL LINKS          *
*****
L5CA04  LINE ADDRESS=03,      LOGICAL CHANNEL ADAPTER     *
          TGN=1,             TRANSMISSION GROUP NUMBER         *
          CA=TYPE6,           CHANNEL ADAPTER TYPE             *
          CASDL=30,          CA SLOW DOWN TIME                 *
          ...
          NCPCA=ACTIVE,       ACTIVE CHANNEL ADAPTER           *
          NPACOLL=NO,        NO NPA DATA COLLECTION           *
          PUTYPE=5,          PHYSICAL UNIT TYPE                 *
          TIMEOUT=30,        CA ATTENTION TIMEOUT             *
          TRANSFR=18,        NO. OF BUFFERS FOR SINGLE TRANSFER *
          ISTATUS=ACTIVE      (V) VTAM
*****
*          PU STATEMENT FOR CHANNEL SUBAREA LINK TO SA07        *
*****
P5CA04  PU TGN=1,            TRANSMISSION GROUP                 *
          PUTYPE=5,          PHYSICAL UNIT TYPE             *

```

Figure 62. Subset of NCP Definitions for SLCD07

1 This channel address was defined to MVS/ESA (HCD) as well as the PC Server System/390 Configurator.

5.3.3 Verification Results

Before we loaded the NCP in the 3745, we first displayed the status of the 3745 channel address on MVS. The use of the display command is shown in Figure 63.

```
17.19.06          d u,,82e,1
17.19.06          IEE457I 17.19.06 UNIT STATUS 116
UNIT TYPE STATUS  VOLSER      VOLSTATE
082E 3705 0      1
```

Figure 63. Displaying the 3745 Channel Address on SLCD07

Note:

1 This means that the device is online and the 3745 can be loaded.

Figure 64 shows the status of the CDRMs on SLCD07 before we activated the NCP.

```
17.21.35          d net,cdrms
17.21.35 STC00793 IST097I DISPLAY ACCEPTED
17.21.35 STC00793 IST350I DISPLAY TYPE = CDRMS
IST089I SLCDRM   TYPE = CDRM SEGMENT      , ACTIV
IST482I SLCD01  PACDR, SA      1, EL      1, NETID = SYSLAB
IST482I SLCD07  ACTIV, SA      7, EL      1, NETID = SYSLAB
IST314I END
```

Figure 64. Display of CDRMs on SLCD07

Note:

1 SLCD01 is the name of the adjacent system; the status is pending activation. The status changed when the NCP was activated. Figure 65 shows that SLCD01 went active after the NCP was activated.

Figure 65 shows the messages that we received when the NCP was loaded.

```
17.16.52          V NET,ACT,ID=SLNCP05,U=82E
17.16.52 STC00793 IST097I VARY ACCEPTED
17.16.55 STC00793 IST461I ACTIVATE FOR U/RNAME ENTRY ID = 082E-S STARTED
17.16.55 STC00793 IST464I LINK STATION 082E-S HAS CONTACTED SLNCP05 SA 5
17.16.55 STC00793 IST093I SLCD01 ACTIVE
17.16.55 STC00793 IST093I SLNCP05 ACTIVE
17.16.57 STC00793 IST464I LINK STATION P5CA01 HAS CONTACTED SA 1 1
17.16.57 STC00793 IST093I P5CA01 ACTIVE 1
17.16.57 STC00793 IST464I LINK STATION P5CA07 HAS CONTACTED ISTPUS SA 7 3
17.16.57 STC00793 IST093I P5CA07 ACTIVE 2
```

Figure 65. Loading of the 3745 from SLCD07

Notes:

1 The NCP has contacted the subarea 01 (SLCD01) through its link station (channel connection).

- 2** The NCP has established connection with the subarea 07 (SLCD07).

After the NCP was active we were able to access applications running on SLCD01 from SLCD07 and vice versa.

5.4 Base Definitions to Establish an NJE Connection

In the previous section we described the definitions required to set up the link between SLCD07 and SLCD01. In this section we will describe the steps that are needed to create an NJE connection. The NJE connection will serve to transmit and receive files from both systems.

In general, only the following items need to define on both systems are:

1. The NJE application, which means we had to create an application major node where the ACBNAME for NJE is coded in VTAM.
2. CDRSC for the adjacent node, which defines the VTAM name of the applid of the adjacent NJE node.
3. JES2PARM customization, is where the local and remote NJE nodes are defined.

5.4.1 Application Major Node for SLCD07

This major node defines the name of the NJE node to VTAM. The name is also used in the JES2PARM when JES2 is customized.

```
SL07NJE  VBUILD TYPE=APPL
SLP39001 APPL  ACBNAME=SLP39001,AUTH=(ACQ,BLOCK,VPACE),          X
          VPACING=0,DLOGMOD=RJE3790A,MODETAB=MODETAB1
```

Figure 66. NJE Application for SLCD07

5.4.2 CDRSC Major Node for SLCD07

This major node specifies the VTAM name of the remote NJE node and the CDRM where it resides. This may not be necessary if VTAM is using adjacent SSCP major nodes.

```
SL07CDRS VBUILD TYPE=CDRSC
WTSCSL2  CDRSC  CDRM=SLCD01
```

Figure 67. CDRSC Major Node on SLCD07

5.4.3 JES2PARM for SLCD07

The definitions needed on the JES2 system to create the NJE application for SLCD07 are shown in Figure 68 on page 70.

NJEDEF LINENUM=10,NODENUM=10,OWNNODE=1,SRNUM=1,STNUM=1	1
LOGON1 APPLID=SLP39001	2
APPL(SLP39001) NODE=1	3
APPL(WTSCSL2) NODE=2	4
NODE(1) NAME=P390NJE,SUB=MVS	5
NODE(2) NAME=WTSCSL2,SUB=MVS	6
CONNECT NODEA=2,MEMBERA=1,NODEB=1,MEMBERB=1	7
LINE(1) UNIT=SNA	8
LINE(2) UNIT=SNA	8
LINE(3) UNIT=SNA	8

Figure 68. JES2PARM Definitions for SLCD07

We are only going to explain the JES2PARM parameters needed to set up the NJE application in our environment.

Notes:

1 Defines the network job entry (NJE) characteristics of this JES2 node. With this parameter we defined the name of this node. In this case the OWNNODE is the NODE(1).

2 Defines the applid used for our node, LOGON1.

3 This uses the VTAM ACBNAME defined in Figure 66 on page 69.

Defines the characteristics of the NJE application known to VTAM. This is defined as a local node, and we assigned NODE1 to this application name.

4 Defines the VTAM application name of the remote node. In this definition we need to specify the VTAM name defined for NJE in SLCD01 (see Figure 69).

5 NODE(1) is assigned to the local node.

6 NODE(2) is assigned to the remote node.

7 Defines the connection between the local node and the remote node.

8 Defines the characteristics of the line to be used for the connection. Our connection to SLCD01 can use any of these SNA lines to establish the NJE session.

5.4.4 Application Major Node for SLCD01

This major node defines the name for NJE. The name is also used on the JES2PARM when JES2 is customized.

SLANJE	VBUILD TYPE=APPL
WTSCSL2	APPL AUTH=(ACQ,PASS,BLOCK,VPACE),ACBNAME=WTSCSL2,VPACING=0, X DLOGMOD=MTNJE77,MODETAB=MODENJE

Figure 69. NJE Application for SLCD01

5.4.5 CDRSC Major Node on SLCD01

This major node specifies the VTAM name of the remote NJE node, and the CDRM where it resides.

```
SLCDSC39 VBUILD TYPE=CDRSC
          NETWORK NETID=SYSLAB
SLP39001 CDRSC CDRM=SLCD07                               Applid for NJE
```

Figure 70. CDRSC Major Node for SLCD01

5.4.6 JES2PARAM for SLCD01

The definitions done on SLCD01 to create the NJE application are shown below. Shown are only the definitions needed to set up the NJE application.

```
APPL(WTSCSL2) NODE=1          /* APPLICATION FOR VTAM TO OWN SYSTEM */
APPL(SLP39001) NODE=6        /* APPLICATION NAME FOR SERVER P/390 */
NODE(1) NAME=WTSCSL2,        /* NODES THIS SYSTEM IS ALLOWED TO */
      SUB=MVS
NODE(6) NAME=P390NJE,        /* SERVER P/390 */
      SUB=MVS,
      PATHMGR=YES
CONNECT NODEA=0006,MEMBERA=1,NODEB=0001,MEMBERB=1,REST=100
LINE(2) UNIT=SNA             /* VIA LOGON1 TO VTAM */
LINE(3) UNIT=SNA
LINE(4) UNIT=SNA
```

Figure 71. JES2PARAM Definitions for SLCD01

5.4.7 Verification Results

At this point we were able to start the NJE lines between both systems and establish the NJE connection.

The following figures show the commands used to verify the status of the resources that participated in the NJE connection.

It is important to verify the following resources before trying to activate the NJE connection.

- Status of the VTAM application name of the NJE node.
- Status of LOGON1 in JES2.
- Status of the SNA lines in JES2. Any SNA line defined in JES2PARAM can be used to establish the NJE connection.

Note: The resources listed above were checked on both SLCD01 and SLCD07.

The activation of NJE will be performed from SLCD07, assuming that the adjacent system is active (SLCD01). Now, we will describe the steps to activate the NJE.

1. Be sure that the applid for NJE is active as shown in the Figure 72 on page 72. If the applid for NJE is not in an active state, use the VTAM command `V NET,ACT,ID=SLNJE` to activate the major node.

```

D NET,E,ID=SLP39001
IST097I DISPLAY ACCEPTED
IST075I NAME = SYSLAB.SLP39001, TYPE = APPL
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST977I MDLTAB=***NA*** ASLTAB=***NA***
IST861I MODETAB=MODENJE USSTAB=***NA*** LOGTAB=***NA***
IST934I DLOGMOD=MTNJE77 USS LANGTAB=***NA***
IST597I CAPABILITY-PLU ENABLED ,SLU ENABLED ,SESSION LIMIT NONE
IST231I APPL MAJOR NODE = SLANJE
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST271I JOBNAME = JES2, STEPNAME = JES2, DSPNAME = IST9ECDD
IST1050I MAXIMUM COMPRESSION LEVEL - INPUT = 0, OUTPUT = 0
IST171I ACTIVE SESSIONS = 0000000000, SESSION REQUESTS = 0000000000
IST206I NO SESSIONS EXIST
IST314I END

```

Figure 72. Display of NJE Application on SLCD07

2. Be sure that the status of LOGON1 is active as shown in Figure 73.

```

00- 09.36.17      $dlogon1
      09.36.17      $HASP881 LOGON1
      $HASP881 LOGON1  APPLID=SLP39001,STATUS=ACTIVE,LOG=NO,
      $HASP881          PASSWORD=(NOTSET),SESSIONS=,TRACEIO=NO
IEE612I CN=01      DEVNUM=0700 SYS=P390

IEE163I MODE= RD

```

Figure 73. Display of LOGON1 on SLCD07

If the status of LOGON1 is DRAINED, use the JES2 command \$SLOGON1 to start it.

3. Verify the status of the NJE line. LINE1 was used to activated the NJE connection. Figure 74 shows how this was done.

```

00- 09.38.40      $du,line1
      09.38.40      $HASP880 LINE1
      $HASP880 LINE1  UNIT=SNA,STATUS=ACTIVE,COMPRESS=YES,DISCON=NO,
      $HASP880          LOG=NO,PASSWORD=(NOTSET),REST=0,RMTSHARE=YES,
      $HASP880          SESSIONS=,TRACEIO=NO,JRNUM=DEFAULT,
      $HASP880          JTNUM=DEFAULT,SRNUM=DEFAULT,STNUM=DEFAULT
IEE612I CN=01      DEVNUM=0700 SYS=P390

IEE163I MODE= RD

```

Figure 74. Display of LINE1 on SLCD07

If its status is DRAINED, use the JES2 command \$SLINE1 to activate it.

4. The last part is to activate the node. It is done with the JES2 command \$SN,A=WTSCSL2.

Note: WTSCSL2 is the name of the adjacent NJE node.

Figure 75 on page 73 shows the messages that appear on the MVS console when the node is started.

```

$SN,A=WTSCSL2
$HASP000 OK
$HASP200 WTSCSL2   STARTED ON LINE1   SESSION WTSCSL2   BFSZ=0520
$HASP524 L1.JT1   INACTIVE
$HASP534 L1.ST1   INACTIVE

```

Figure 75. NJE Activation on SLCD07

In this case NJE is using the LINE1. If we want to start the node over another line, we need to use the JES2 command \$SN,A=WTSCSL2,LINEx.

Note: x is the line number to be used.

Figure 76 shows the JES2 command \$DNODE2, used to verify the status of a specific NJE node.

```

$DNODE2
$HASP826 NODE(2) 784
$HASP826 NODE(2)   NAME=WTSCSL2,STATUS=(VIA/LINE1),
$HASP826           AUTH=(DEVICE=YES,JOB=YES,NET=NO,SYSTEM=YES),
$HASP826           TRANSMIT=BOTH,RECEIVE=BOTH,HOLD=NONE,
$HASP826           PENCRIPT=NO,ENDNODE=NO,REST=0,
$HASP826           SENTREST=ACCEPT,COMPACT=0,LINE=0,LOGMODE=,
$HASP826           PASSWORD=(VERIFY=(NOTSET),SEND=(NOTSET)),
$HASP826           PATHMGR=YES,PRIVATE=NO,SUBNET=MVS,TRACE=NO

```

Figure 76. Display of a NJE Node

In Figure 76 we can see the status of the node, and that our NJE connection is already active with the adjacent node, and is using the LINE1.

Figure 77 shows the use of the VTAM DISPLAY command to verify the status of the application for the adjacent NJE node. It also shows the status of the VTAM application name of NJE on SLCD07, and that it is active and has a session with the remote NJE node on SLCD01.

```

D NET,E,ID=SLP39001
IST097I DISPLAY ACCEPTED
IST075I NAME = SYSLAB.SLP39001, TYPE = APPL 834
IST486I STATUS= ACT/S, DESIRED STATE= ACTIV
IST977I MDLTAB=***NA*** ASLTAB=***NA***
IST861I MODETAB=MODENJE USSTAB=***NA*** LOGTAB=***NA***
IST934I DLOGMOD=MTNJE77 USS LANGTAB=***NA***
IST597I CAPABILITY-PLU ENABLED ,SLU ENABLED ,SESSION LIMIT NONE
IST231I APPL MAJOR NODE = SLANJE
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST271I JOBNAME = JES2, STEPNAME = JES2, DSPNAME = ISTBFC8B
IST1050I MAXIMUM COMPRESSION LEVEL - INPUT = 0, OUTPUT = 0
IST171I ACTIVE SESSIONS = 0000000001, SESSION REQUESTS = 0000000000
IST206I SESSIONS:
IST634I NAME      STATUS      SID      SEND RECV VR TP NETID
IST635I WTSCSL2  ACTIV-P   E003EDF2DD818BAE 0008 0009 0 0 SYSLAB
IST314I END

```

Figure 77. Display of NJE Application for SLCD07

5.5 Base Definitions of Communications Manager/2 for 3270 Emulation

This section describes the necessary customization of Communications Manager/2 to be able to establish LUTYPE2 sessions between Communications Manager/2 and VTAM applications.

To start the customization, select Communication Manager Setup from the Communication Manager/2 folder, or execute CMSETUP from an OS/2 window.

The values we have used for the configuration are shown in brackets in the appropriate steps.

1. Click on **OK** on the IBM Welcome panel.
2. On the Communications Manager Setup panel, click on **Setup...**, this will take you to the Open Configuration panel. There you enter a configuration name and a description, and click on **OK**. This will take you to the Communications Manager Configuration Definition panel, shown in Figure 78.

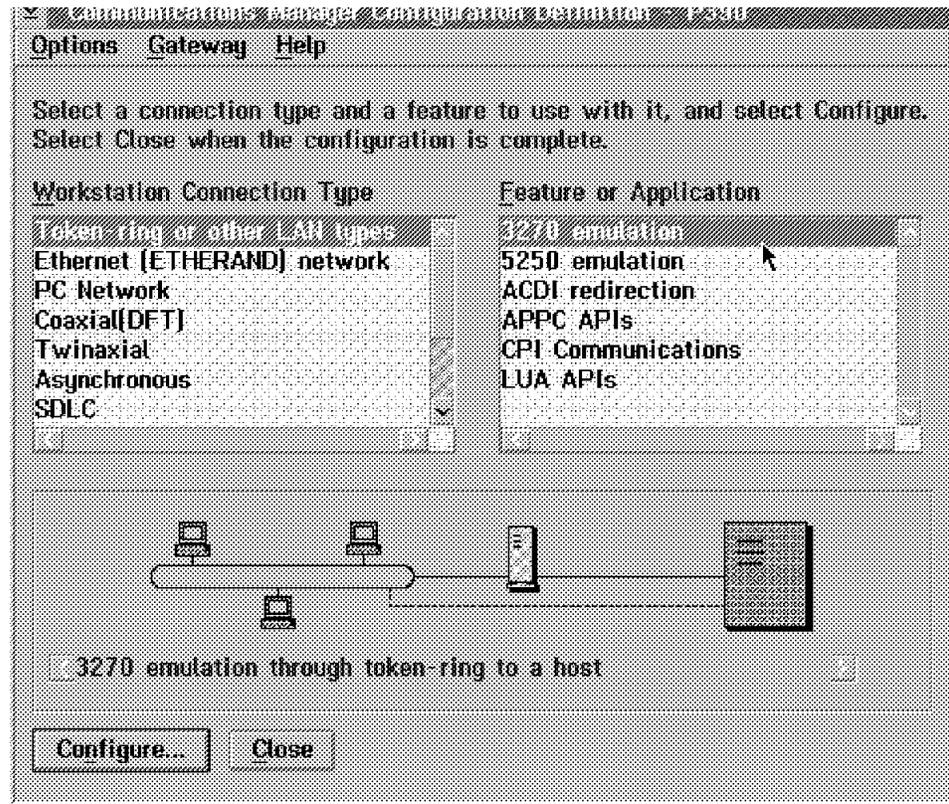


Figure 78. Initial Configuration Panel of Communications Manager/2

3. In Workstation Connection Type, select **Token-ring or other LAN types**.
4. In Feature or Application, select **3270 emulation**, this will take you to Figure 79 on page 75.

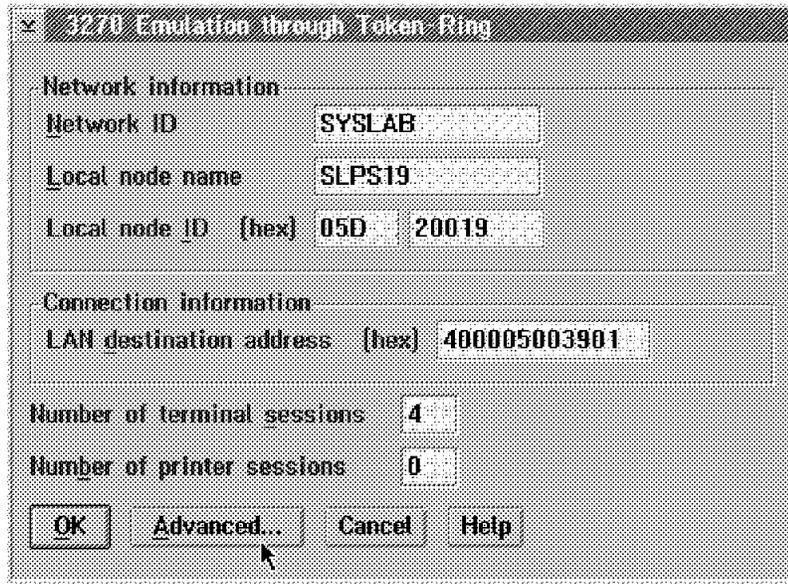


Figure 79. 3270 Emulation through Token-Ring

5. Enter the Network ID (SYSLAB).
6. Enter the Local node name (SLPS19).
7. Enter the Local node ID (05D and 20019).

This must match the IDBLK and IDNUM on the SWNET major node, as shown in Figure 47 on page 56.

8. Enter the LAN Destination Address (400050039001).

This must match the PC Server System/390 token-ring MAC address defined through LAPS. See 2.6, "PC Server System/390 LAPS Customization" on page 29.

9. Enter the number of terminal sessions (4).
10. Enter the number of printer sessions (0).

Note: This is normally the only customization panel you need to use. However, if you have to change the defaults for the SAP address, Max I-field size, and so forth, you will need to click on **Advanced...**

11. Click on **OK** and you will return to the Communications Manager Configuration Definition panel.

5.5.1 Verifying the Configuration

To verify the changes made to the configuration, click on **Close**.

Communications Manager will automatically check your updated values, and if they are OK, you are ready to start Communication Manager to make your definition active.

5.6 Base Definitions of SNA Server/6000 for 3270 Emulation

This section describes the necessary customization of SNA Server/6000 to be able to establish LUTYPE2 sessions between SNA Server/6000 and VTAM applications.

Before we started with the customization of the SNA Server/6000 we needed to define the SWNET major node for SLCD07, as shown in Figure 80.

	VBUILD TYPE=SWNET	
SLRISC7X	PU ADDR=C3,	X
	IDBLK=05D,	X
	IDNUM=20070,	X
	CPNAME=CPRISC70,	X
	IRETRY=YES,	X
	MAXPATH=1,	X
	MAXDATA=265,	MAX PIU SIZE INC TH + RU
	MAXOUT=7,	MAX PIU SENT BEFORE RESP REQ
	PACING=0,	SECONDARY RECEIVES
	VPACING=0,	(V) VTAM TO NCP PACING
	PUTYPE=2,	PHYSICAL UNIT TYPE TWO
	DISCNT=(NO),	NO DISC AFTER SESSION END
	ISTATUS=ACTIVE,	X
	MODETAB=ISTINCLM,	X
	DLOGMOD=SNX32702,	X
	USSTAB=USSSNA,	X
	SSCPFM=USSSCS	
SLRISC70	LU LOCADDR=0	LU 6.2 IND LU
SLRISC71	LU LOCADDR=2	3270 SESSION 1
SLRISC72	LU LOCADDR=3	3270 SESSION 2
SLRISC73	LU LOCADDR=4	3270 SESSION 3
SLRISC74	LU LOCADDR=5	3270 SESSION 4

Figure 80. SWNET Major Node for SNA Server/6000 on SLCD07

To start the customization we need to complete the following steps.

1. In a AIXTERM or dterm window, enter the command smit.
This will take you to System Management Interface Tool (SMIT).
2. Click on **Communications Applications and Services**.
3. Click on **SNA Server/6000**.
4. Click on **Configure SNA Profiles**.
5. Click on **Quick Configuration**.
6. Click on **Quick Configuration for a 3270 Communications Session**, and enter a name for your configuration. The name that we defined was SLRISC70.
Select **no** for the field "Do you wish to configure to an existing link station."
We assume that you do not have any links defined to host controller.
7. Select **token_ring**.
8. After you have typed in or selected the above fields, select or type in the values as shown in Figure 81 on page 77.

Quick Configuration for a 3270 Communications Session

* Quick configuration name: slrisc70

Link Station: slrisc70

Link station type: token_ring

Link address: 400005003901

Calling link station?: yes

System services control point (SSCP) ID (*, 0-65535): *

XID node ID: 05d20070

Provide LU addresses (values of 1 to 255) or address ranges for any of the following LU types:

LU 1: 1

LU 2: 2-5

LU 3: 1

Buttons: OK, Command, Reset, Cancel, ?, Help

Figure 81. Quick Configuration for a 3270 Communications Session

9. Enter your Link address (400005003901).

This is the MAC address defined for the token-ring adapter in LAPS on the PC Server System/390.

10. Enter the XID node ID (05d20070). This must match the IDBLK and IDNUM on the SWNET major node, as shown in Figure 80 on page 76.

11. Enter in LU 2, the range of addresses that you want to defined.

We defined 2-5, this means we will create four 3270 sessions.

12. Click on **OK**.

The quick configuration step creates all of the SNA profiles needed for the LU 2 connection to the host.

Note: Make sure the changes are executed and accepted, by pressing Enter.

13. Click on **DONE**, to exit.

14. Return to Configure SNA Profiles, and click on **Advanced Configuration**.

15. Click on **Control Point Profile**, and you will see the panel shown in Figure 82 on page 78.

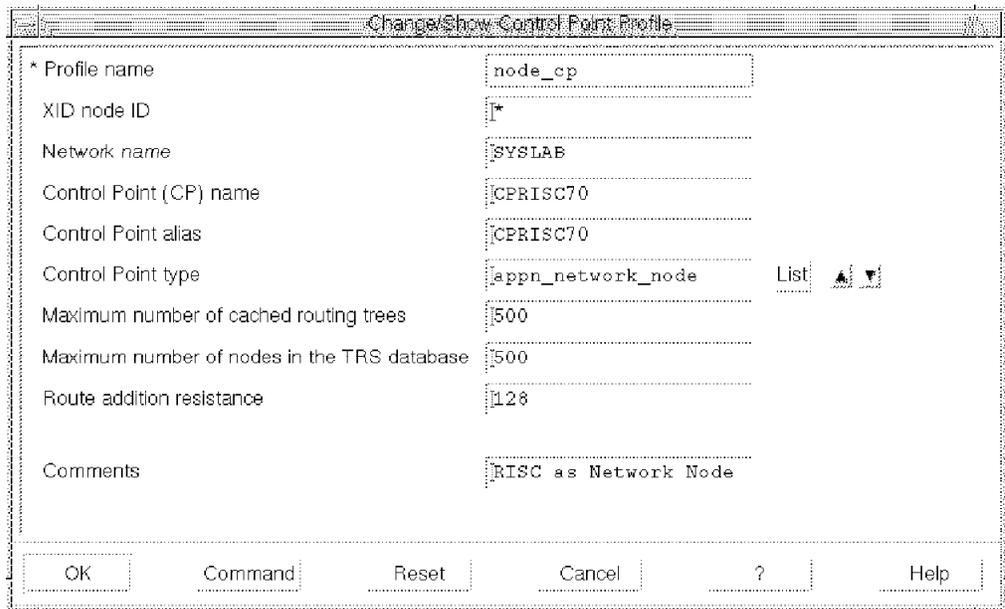


Figure 82. Control Point Profile

16. Enter your Network name (SYSLAB).
17. Enter your Control Point (CP) name.

The value that we specified here was coded in the SWNET major node defined on SLCD07. This parameter is called CPNAME and its value was CPRISC70.

18. Enter your Control Point alias (CPRISC70).
19. Select Control Point Type (appn_network_node).
20. Click on **OK**.
21. Click on **DONE**.

At this point we were ready to start the SNA Server/6000 environment.

5.6.1 Verifying the Configuration

We completed the following steps to verify the configuration discussed in this section.

1. Ran the following command on SNA Server/6000 to verify the SNA profiles:


```
VERIFYSNA -U
```
2. Started SNA Server/6000 with the following command:


```
SNA -S
```
3. Started the link station SLRISC70 with the following command:


```
SNA -S L -P SLRISC70
```
4. We had to configure HCON to be able to use the e789 3270 terminal emulation program, by completing the following steps:
 - a. Used the command `mkhconu -N <userid-ID>` to add a user ID as a HCON user.

- b. Used the SMIT fast path command `smit mkhcons_st` to go to the SMIT menu Add SNA Display Session. Added a HCON session for a user ID (normally starts from session a). Chose the appropriate session profile for an active local LU.
- c. 3270 terminal emulation may be started with the command `e789 a`. This must be done from a AIXTERM window.

5.7 Base Definitions of Personal Communications/3270

This section discusses the installation and customization of Personal Communications/3270 V4.0 for DOS (PC/3270) and the IEEE802.2 protocol support from Local Area Network Support Program V1.3 (DOS version).

5.7.1.1 Installation and Customization of PC/3270

To install and customize PC/3270 you have to go through the following steps:

1. From the command prompt issue the command `a:install`.
This will take you to the welcome panel, and further on to the Introduction panel.
2. Press F8, and you are taken to the PC/3270 Installation panel.
3. Select **Quick Installation** and press F8, and you are taken to the Install panel.
4. Press F8, and you are taken to the Attachment Type panel as shown in Figure 83.

```

                                     Attachment Type                               More --+
-----
Select one attachment-type

Attachment . . . {2}  1. Distributed Function Terminal (DFT)
                    2. LAN via 802.2 protocol
                    3. LAN via NETBIOS
                    4. 3174 Peer Communication
                    5. Synchronous Data Link Control (SDLC)
                    6. Asynchronous Data Link Control (ASYNC for IIN)

Number of host sessions
. . . . . {1}

F1=Help F3=Exit F7=Backward F8=Forward

```

Figure 83. PC/3270 Attachment Type

5. Select 2, for IEEE802.2 protocol and select the number.
6. Press F8, and you are taken to the LAN via 802.2 protocol panel as shown in Figure 84 on page 80.

```

                                LAN via 802.2 Protocol                                More -+
-----
Enter the required information.

Destination address . . . {400005003901}
Physical Unit ID . . . . {20018}
Block ID . . . . . . . . {05D}
PIU size . . . . . . . . . {0265}

F1=Help F3=Exit F7=Backward F8=Forward

```

Figure 84. PC/3270 LAN Via 802.2 Protocol

7. Enter Destination Address of the PC Server System/390 token-ring adapter.
We used 400005003901 as defined during LAPS customization.
8. Enter Physical Unit ID.
This must match the IDNUM value of the corresponding switched major node definition in VTAM. Our example is shown in Figure 47 on page 56.
9. Enter Block ID.
This must match the IDBLK value of the corresponding switched major node definition in VTAM. Our example is shown in Figure 47 on page 56.
10. Enter the PIU size.
We used the default value of 0265
11. Press F8, and you are taken to the Screen, Keyboard and Printer panel.
Here you can select the screen size matching your LOGMODE definition in the switched major node. Also, keyboard information and a possible local printer is defined here.
12. Press F8, and you are taken to the End of Configuration panel.
13. Press F6, to start copying files.

The program ends successfully, and suggests starting the PC/3270 program. However, if you did not do this before, you have to install the IEEE802.2 protocol from the Local Area Network Support Program diskettes.

After this installation, we had to change the CONFIG.SYS so the last three statements were:

```

DEVICE=\LSP\DXMAOMOD.SYS
DEVICE=\LSP\DXMCOMOD.SYS
DEVICE=\LSP\DXMTOMOD.SYS ES=1 EST=33

```

This was according to the description of considerations for using IEEE802.2 in Appendix C of *Personal Communications/3270 Version 4.0 User's Guide for DOS, S20H/1772*

After a reboot of the machine, PC/3270 was automatically started, and we were able to switch between sessions by pressing Alt+Esc, and could get back to DOS by pressing Ctrl+Esc.

Chapter 6. The PC Server System/390 in an APPN LAN Environment

This chapter describes the APPN LAN connectivity scenarios conducted with the PC Server System/390. ACF/VTAM 4.2 was used to create a interchange node, network node, and extended border node. Additional verification of these scenarios were done using the APPC environment described in Chapter 7, "The PC Server System/390 in an APPC Environment" on page 95.

6.1 APPN Parameters

Before we go into the APPN scenarios, it is important to understand how the VTAM start parameters can determine the type of node functions that are supported.

NODETYPE is required to specify APPN support. It specifies the node type that is presented to other APPN nodes. When NODETYPE is not specified, the node operates as a subarea node and all TYPE 2.1 connections are managed as LEN connections.

The use of HOSTSA and NODETYPE=NN will cause VTAM to act as an Interchange Network Node (ICN). An ICN is capable of transforming subarea protocols to APPN protocols and vice versa. It also provides both network node and subarea node functions.

The use of HOSTSA and NODETYPE=EN will cause VTAM to act as a Migration Data Host (MDH). Unlike the ICN, an MDH is not capable of transforming subarea protocols to APPN protocols. It is used as a migration step from a subarea node to an end node. It provides both end node and subarea node functions.

When the node is configured as a network node or end node, attempts to activate PU types 4 or 5 (FID 4) connections fail. However, if the node is configured as an ICN or an MDH, PU Type 4 or 5 connections are allowed.

If you want to configure a node as a pure APPN node, HOSTSA must not be specified.

The following table shows the configurations that you can create depending on which parameters are used for the VTAM start options.

Node Type	NODETYPE	HOSTSA	CP-CP Sessions	SSCP-SSCP Sessions	NCP Ownership	Interchange Function
Subarea Node	(not coded)	#	no	yes	yes	no
Interchange Node	NN	#	yes	yes	yes	yes
Migration Data Host	EN	#	yes	yes	no	no
Network Node	NN	(not coded)	yes	no	no	no
End Node	EN	(not coded)	yes	no	no	no

Notes:

1. This table lists all the possible combinations of coding NODETYPE and HOSTSA. It also lists some considerations that should be kept in mind when deciding what kind of node to define.
2. The # symbol represents a subarea host number.
3. Under NCP Ownership, no means that activation or loading of an NCP is not supported.

Using BN=YES and NODETYPE=NN in the VTAM start option, will cause VTAM to act as an Extended Border Node (EBN). An EBN allows the connection of network nodes with different network IDs, and session establishment between LUs in different subnetworks that are not adjacent. It also provides network node functions.

For additional information on these and other VTAM start options, see *VTAM Resource Definition Reference*, SC31-6498.

6.2 PC Server System/390 As an APPN Network Node

The following section provides information about the configuration of SLCD07 as a network node and SLCD01 configured as an interchange node.

In this environment we have used the same net ID for both systems. This means that the value of the NETID parameter in the VTAM start parameters is SYSLAB.

Figure 85 shows the environment we used.

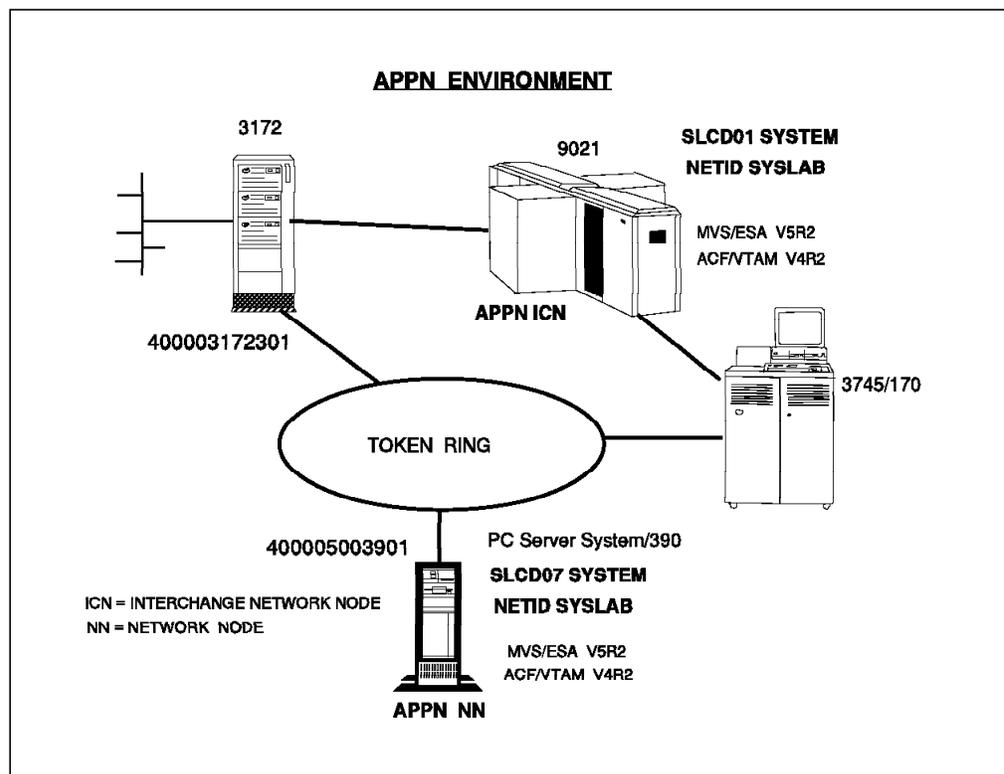


Figure 85. APPN Environment

6.2.1 ATCSTRxx Start Parameters for SLCD07

The start parameters for VTAM on SLCD07 are shown in Figure 86.

APPNCOS=COSAPPN, 1	COS TABLE FOR APPN CONNECTIONS	X
BN=NO,		X
CONFIG=00,		X
CDRSCTI=10S,	DELETE DYN DEFINITIONS AFTER	X
CPCP=YES, 2	GIVES APPN NODE SUPPORT FOR SW AND LEASED LINES	X
IOINT=3600,		X
NETID=SYSLAB, 3		X
NOPROMPT,		X
DYNLU=YES,		X
NODETYPE=NN, 4	APPN NETWORK NODE SUPPORT	X
SSCPNAME=SLCD07, 5	APPN CPNAME	X
SUPP=INFO,		X
TRACE,TYPE=VTAM,MODE=INT,OPTION=(API,MSG,PIU,SMS),SIZE=30,		X
APBUF=(68,,7,,68,14),		X
CRPLBUF=(102,,10,,34,20),		X
IOBUF=(200,508,19,,1,20),		X
LFBUF=(34,,4,,34,8),		X
LPBUF=(96,,10,,4,20),		X
SPBUF=(39,,4,,39,8),		X
DLRTCB=8		X

Figure 86. VTAM Start Parameters for SLCD07

The parameters used on SLCD07 to define it as a network node are described below:

- 1** Specifies the APPN class of service to be used if a requested class of service cannot be found in the topology. APPNCOS is useful to avoid COS mismatch situations.
- 2** Specifies that the network node supports CP-CP sessions with an adjacent node.
- 3** Indicates the network this host resides in.
- 4** Specifies the node type used for this configuration. This node will act as a network node.
- 5** Defines the CP_name this host is known as by adjacent nodes.

6.2.2 ATCCONxx List of Major Nodes on SLCD07

ATCCONxx contains the list of the major nodes defined for this environment.

SL07ATSO,	APPLICATIONS TSO,	X
SL07TERM,	LOCAL TERMINAL CONTROLLERS	X
SL3172AP,	PUT5 FOR APPN	X
SLSWN01	SWNET FOR SLCD01	

Figure 87. ATCCONxx List of Major Nodes on SLCD07

These major nodes are activated during startup.

6.2.3 XCA Major Node for SLCD07

A 3172 connection is used to connect a interchange network node, end node, or network node with any other type of APPN node. Our configuration shows how to connect a network node with an interchange network node. SLCD01 has a real 3172 Interconnect Controller, but SLCD07 is using the AWS3172 device manager (3172 emulation) as shown in Figure 88.

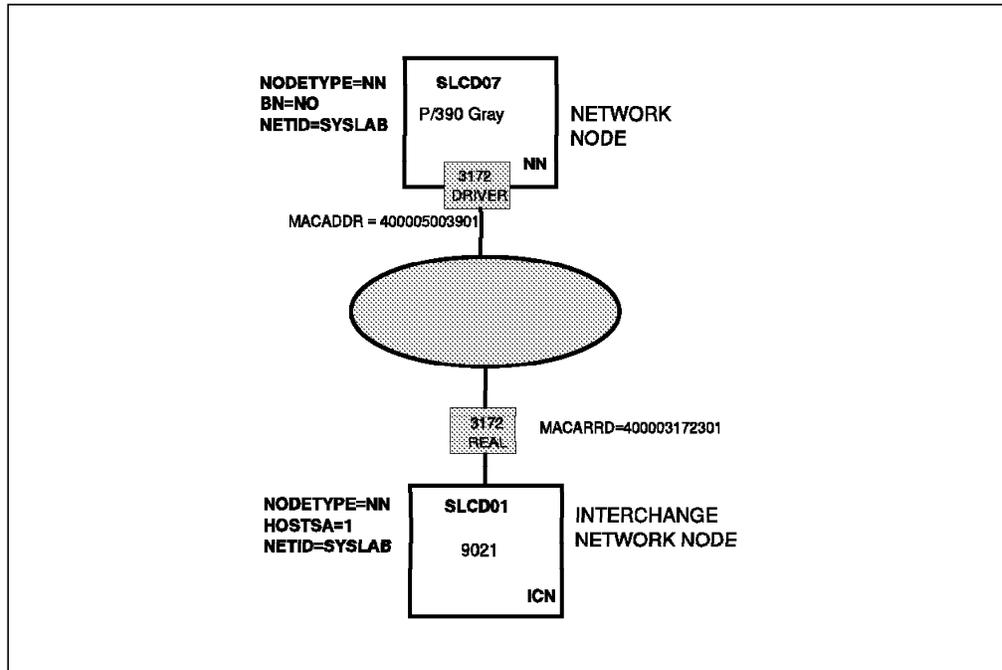


Figure 88. Two APPN Nodes Using XCA Connections

Figure 89 shows how we defined the XCA major node for the token-ring adapter on the PC Server System/390.

```

SL3172AP VBUILD TYPE=XCA
SLPORT  PORT  ADAPNO=0,      1          X
          CUADDR=E20,        X
          MEDIUM=RING,      2          X
          SAPADDR=04,        X
          TIMER=60
SLGRP1  GROUP DIAL=YES,DYNPU=YES,CALL=INOUT,ANSWER=ON,ISTATUS=ACTIVE
SLL1    LINE
SLP1    PU
SLL2    LINE
SLP2    PU
SLL3    LINE
SLP3    PU
    
```

Figure 89. XCA Major Node for SLCD07 Using Token-Ring

Notes:

- 1** Must match the number assigned in LAPS as shown in Figure 22 on page 29
- 2** Defines the type of LAN that is being used.

6.2.4 Switched Major Node for SLCD07

In order to establish an APPN connection with SLCD01, the dialing side requires a SWNET major node. Figure 90 shows the definitions needed to configure the SWNET major node.

SLSWN01	VBUILD	TYPE=SWNET,MAXNO=20,MAXGRP=5	
SLPU01	PU	ADDR=C3,	X
		CPNAME=SLCD01, 1 CPNAME	X
		MAXPATH=5,	X
		DWACT=YES, 2	X
		NETID=SYSLAB,	X
		CONNTYPE=APPN, 3	X
		CPCP=YES, 4 NN SUPPORT	X
		DYNLU=YES 5	
PATH01	PATH	DIALNO=0004400003172301, 6	X
		GRPNM=SLGRP1 7	

Figure 90. Switched Major Node for SLCD07

Notes:

1 VTAM was defined as a type 2.1 node. The value for the CPNAME parameter is the same as the SSCPNAME value of the adjacent node.

You must ensure that the PUNAME has a different name than the CPNAME of the adjacent node you are defining. If they are the same, the connection will fail.

2 Determines whether or not a dial should be made when the major node is activated. If DWACT=NO (default) you can establish the connection using the VTAM command:

```
V NET,DIAL,ID=PUNAME,CPCP=YES
```

Note: PUNAME is the name defined to the PU in the SWNET major node.

3 Specifies whether a type 2.1 PU connection is to be established as a LEN connection or attempted as an APPN connection. If we don't code the NODETYPE on the start option, the CONNTYPE is ignored and the connection will be a LEN connection.

In our case we have specified CONNTYPE=APPN, which means that this connection may support parallel TGs, CP-CP sessions, and CP_name exchange support. CONNTYPE=APPN must be coded for CPCP=YES to be valid.

4 Specifies whether CP-CP sessions are supported on this connection. If we don't code this value, it takes the value specified on the VTAM start option. We have coded CPCP=YES, the same value that was coded on the start option.

If the CPCP parameter is not specified on the VTAM start parameters, it takes the default, which is LEASED. It means that CP-CP sessions are supported over leased connections. In this case, we need to remember that all token-ring connections look like switched connections to VTAM.

5 Used to specify whether dynamic allocation on the CDRSC definition is supported. If we do not code this value, it takes the same value that was defined on the start option. With the value used we are able to define dynamic CDRSC.

6 Indicates the MAC address of the 3172 token-ring adapter, prefixed by a two digit place-holer and the SAP address.

7 Must match the group name defined on the XCA major node.

6.2.5 XCA Major Nodes for SLCD01

This major node creates the APPN connection to the token-ring from SLCD01. Figure 91 shows how we defined the XCA major node for use with the 3172 token-ring adapter.

```
SL3172AP VBUILD TYPE=XCA
SLPORT  PORT  ADAPNO=0, 1 X
          CUADDR=207, X
          MEDIUM=RING, 2 X
          SAPADDR=04, X
          TIMER=60
SLGRP1  GROUP DIAL=YES,DYNPU=YES,CALL=INOUT,ANSWER=ON,ISTATUS=ACTIVE
SLL1    LINE
SLP1    PU
SLL2    LINE
SLP2    PU
SLL3    LINE
SLP3    PU
```

Figure 91. XCA Major Node for SLCD01

Notes:

1 Must match the number assigned by 3172 Operator Facility for this port.

2 Defines the type of LAN that is being used.

SLCD01 was defined as a interchange network node as described in 5.1.1, “ATCSTRxx Start Parameters on SLCD01” on page 48.

With this configuration we support the following network functions:

- Establishes CP-CP sessions
- Establishes SSCP-SSCP sessions
- Can be the owner of NCPs
- Supports interchange node functions

The interchange node function in VTAM provides a seamless connection between the subarea part and the APPN part of the SNA network. In other words, an interchange node supports subarea and APPN protocols, and is capable of transforming subarea protocols to APPN protocols, and vice versa.

6.2.6 Verification Results

Figure 92 shows the messages we saw on the MVS console, indicating SLCD07 was started as a network node.

```
19.28:17          s vtam
19.28.17 STC00770 $HASP373 VTAM      STARTED
19.28.18 STC00770 IST093I ISTCDRDY ACTIVE
19.28.18 STC00768 IST315I VTAM INTERNAL TRACE ACTIVE - MODE = INT, SIZE
= 050
IST199I OPTIONS = API MSG PIU SMS
IST314I END
19.28.20 STC00768 IST984I USER EXIT ISTEEXCV IS ACTIVE
19.28.21 STC00768 IST984I USER EXIT ISTEEXCSD IS ACTIVE
19.28.21 STC00768 IST093I COSAPPN ACTIVE
19.28.21 STC00768 IST093I ISTDSWMN ACTIVE
19.28.22 STC00768 IST093I A0700 ACTIVE
19.28.22 STC00768 IST984I USER EXIT ISTEEXCGR IS ACTIVE
19.28.23 STC00768 IST093I LOCAL700 ACTIVE
19.28.24 STC00768 IST093I LOCAL900 ACTIVE
19.28.24 STC00768 IST093I SL3172AP ACTIVE
19.28.26 STC00768 IST093I SLPU01 ACTIVE
19.28.26 STC00768 IST093I SLSWN01 ACTIVE
19.28.29 STC00768 IST020I VTAM INITIALIZATION COMPLETE FOR V4R2
19.28.29 STC00768 IST1349I COMPONENT ID IS 5695-11701-201
19.28.29 STC00768 IST1348I VTAM STARTED AS NETWORK NODE
```

Figure 92. VTAM Start on SLCD07

The messages shown in Figure 93 indicate SLCD07 has established a connection with SLCD01.

```
IST590I CONNECTIN ESTABLISHED FOR PU SLPU01 ON LINE SLL1
IST1086I APPN CONNECTION FOR SYSLAB.SLCD01 IS ACTIVE - TGN = 21
IST1096I CP-CP SESSIONS WITH SYSLAB.SLCD01 ACTIVATED
```

Figure 93. SLCD07 APPN Connection to SLCD01

After CP-CP sessions were established, we were able to access applications running on the adjacent node.

The following display shows the topology information on SLCD07. Here you can see the status of SYSLAB.SLCD01 is in an operative state.

```

19.45.48          d net,topo,id=slcd07,list=all
19.45.48 STC00768  IST097I  DISPLAY ACCEPTED
19.45.48 STC00768  IST350I  DISPLAY TYPE = TOPOLOGY
IST1295I CP NAME          NODETYPE  ROUTERES  CONGESTION  CP-CP  WEIGHT
IST1296I SYSLAB.SLCD07    NN        128      NONE        *NA*   *NA*
IST1297I          ICN/MDH  CDSERVR  RSN
IST1298I          NO        NO        218
IST1223I          BN        NATIVE
IST1224I          NO        YES
IST1299I TRANSMISSION GROUPS ORIGINATING AT CP SYSLAB.SLCD07
IST1357I          CPCP
IST1300I DESTINATION CP   TGN      STATUS   TGTYPE    VALUE  WEIGHT
IST1301I SYSLAB.SLCD01   21      OPER    INTERM    YES    *NA*
IST314I  END

```

Figure 94. SLCD07 Topology Information

6.3 PC Server System/390 As an APPN Extended Border Node

This section describes the scenario which was created to connect nodes with different net IDs using the border node functions on SLCD07. We have three systems with different net IDs. The scenario includes the connection between an extended border node (SLCD07), a network node (SLCD06), and an interchange node (SLCD01). Figure 95 shows the environment created for this scenario.

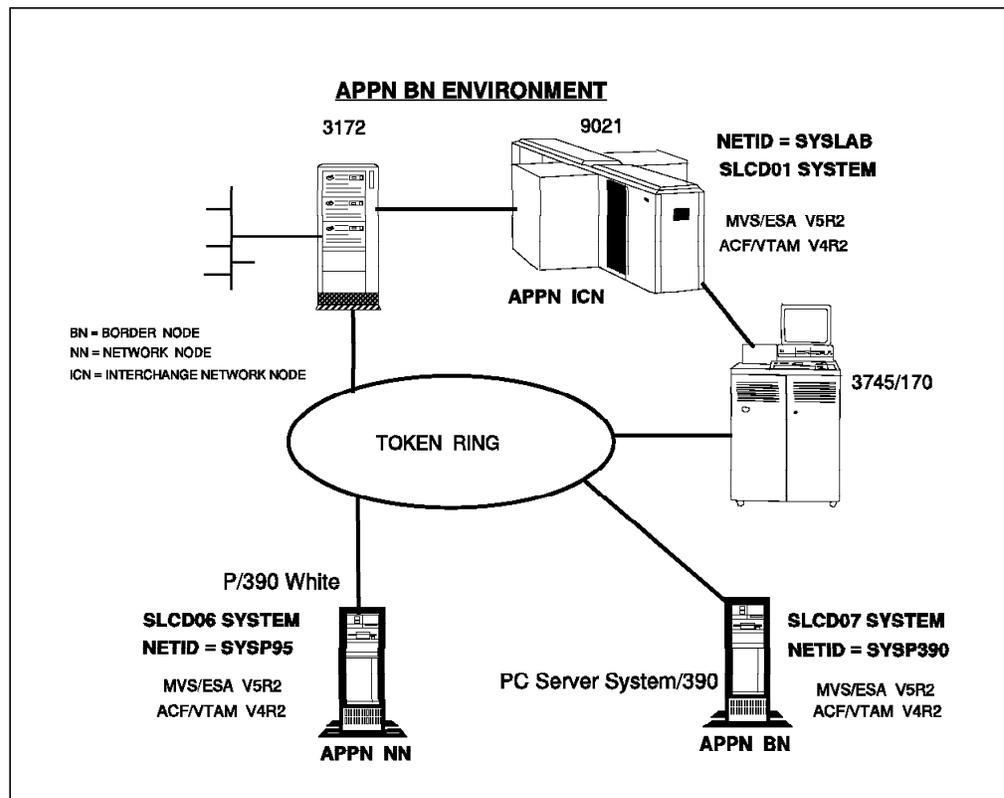


Figure 95. SLCD07 As a Border Node

6.3.1 APPN Border Node Definitions

The border node allows two network nodes with different net IDs to connect. Also it allows network nodes to isolate their topologies from each other, whether they have the same or different net IDs. This results in reduced network overhead.

Figure 96 shows the environment we used. We have only included the additional definitions that were needed on the network nodes (SLCD07) to create the EBN.

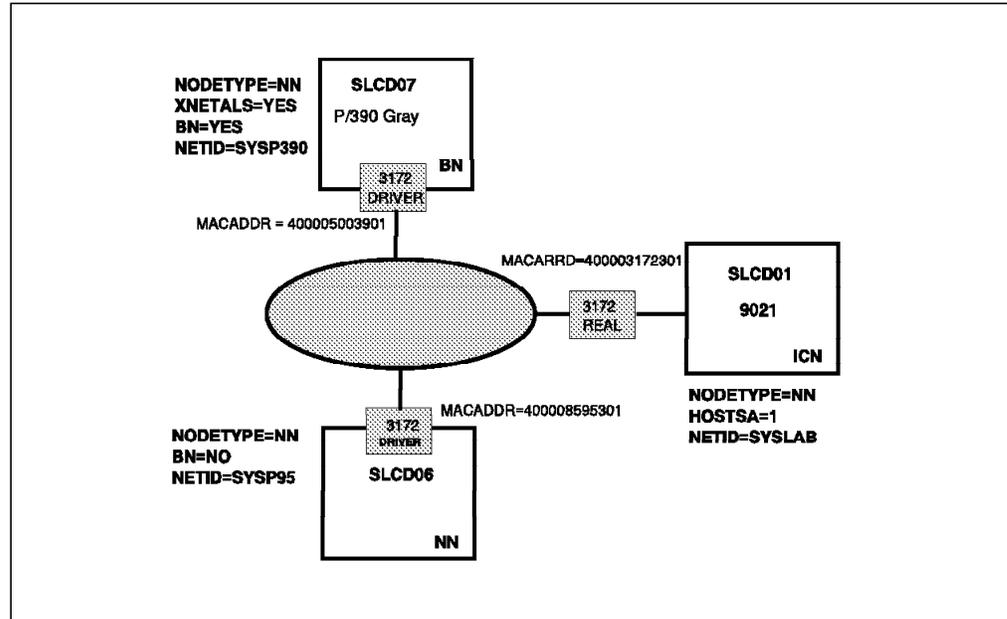


Figure 96. APPN Border Node Environment

6.3.2 ATCSTRxx Start Parameters for SLCD07

The VTAM start parameters on SLCD07 are shown in Figure 97 on page 92.

APPNCOS=COSAPPN, COS TABLE FOR APPN CONNECTIONS	X
BN=YES, 1 EXTENDED BN SUPPORT FOR CONN BETW DIFF NETIDS	X
BNDYN=FULL, 2 CROSS NETWORK DYNAMICALLY	X
XNETALS=YES, 3	X
CONFIG=AP,	X
CDRSCTI=10S, DELETE DYN DEFINITIONS AFTER	X
CPCP=YES, GIVES APPN NODE SUPPORT FOR SW AND LEASED LINES	X
IOINT=3600,	X
NETID=SYSP390, 4	X
PROMPT,	X
DYNLU=YES,	X
NODETYPE=NN, 5 APPN NETWORK NODE SUPPORT	X
SSCPNAME=SLCD07, APPN CPNAME	X
SUPP=INFO,	X
TRACE,TYPE=VTAM,MODE=INT,OPTION=(API,MSG,PIU,SMS),SIZE=30,	X
APBUF=(68,,7,,68,14),	X
CRPLBUF=(102,,10,,34,20),	X
IOBUF=(200,508,19,,1,20),	X
LFBUF=(34,,4,,34,8),	X
LPBUF=(96,,10,,4,20),	X
SPBUF=(39,,4,,39,8),	X
DLRTCB=8	X

Figure 97. ATCSTRxx Start Parameters for SLCD07

The following parameters are required to allow this VTAM to act as a border node.

- 1** Specifies that this node is to provide extended border node functions. The BN parameter is only valid if you code the NODETYPE=NN in the VTAM start options.
- 2** Defines that all active border nodes in the native subnetwork as well as active border nodes and peripheral network nodes in nonnative subnetworks attached to this node, are automatically added to the routing list. The BNDYN parameter is only valid if you code BN=YES on the VTAM start options.
- 3** This means that the network ID of the adjacent PU is used for connection and session establishment. XNETALS becomes the default when specifying BN=YES.
- 4** Defines the network ID that is used for this network node.
- 5** Specifies that this node is a network node.

The rest of the VTAM definitions used in this scenario for SLCD07 are described in 6.2, "PC Server System/390 As an APPN Network Node" on page 84.

6.3.3 Verification Results

When VTAM was started on SLCD07 the messages we saw on the MVS console are shown in Figure 98 on page 93.

```

19.28:17          s vtam
19.28.17 STC00770 $HASP373 VTAM      STARTED
20.05.20 STC00774 IST093I ISTDGRDY ACTIVE
20.05.31 STC00774 IST1288I TOPOLOGY DATASET RETRIEVAL WAS NOT SUCCESSFU
          CODE = 11
20.05.31 STC00774 IST315I VTAM INTERNAL TRACE ACTIVE - MODE = INT, SIZE
          = 050
IST199I OPTIONS = API MSG PIU SMS
IST314I END
20.05.32 STC00774 IST984I USER EXIT ISTEUCV IS ACTIVE
20.05.32 STC00774 IST984I USER EXIT ISTEUCSD IS ACTIVE
20.05.33 STC00774 IST093I COSAPPN ACTIVE
20.05.33 STC00774 IST093I ISTDWMMN ACTIVE
20.05.33 STC00774 IST984I USER EXIT ISTEUCGR IS ACTIVE
20.05.33 STC00774 IST093I S07ATSO ACTIVE
20.05.34 STC00774 IST093I S07LTERM ACTIVE
20.05.35 STC00774 IST093I SL3172AP ACTIVE
20.05.35 STC00774 IST093I SL3172A1 ACTIVE
20.05.36 STC00774 IST093I SLPU01 ACTIVE
20.05.36 STC00774 IST093I SLPE01 ACTIVE
20.05.36 STC00774 IST093I SLSWN01 ACTIVE
20.05.36 STC00774 IST093I SLSWE01 ACTIVE
20.05.38 STC00774 IST020I VTAM INITIALIZATION COMPLETE FOR V4R2
20.05.38 STC00774 IST1349I COMPONENT ID IS 5695-11701-201
20.05.38 STC00774 IST1348I VTAM STARTED AS NETWORK NODE

```

Figure 98. VTAM Start on SLCD07

After all APPN connections were made, we were able to establish sessions with the APPC applications on both systems, using the scenarios in Chapter 7, “The PC Server System/390 in an APPC Environment” on page 95.

The topology of SLCD07 is shown in Figure 99.

```

20.09.35          d net,topo,id=slcd07,list=all
20.09.35 STC00774 IST097I DISPLAY ACCEPTED
20.09.35 STC00774 IST350I DISPLAY TYPE = TOPOLOGY
IST1295I CP NAME          NODETYPE ROUTERES CONGESTION CP-CP WEIGHT
IST1296I SYSP390.SLCD07  NN          128          NONE          *NA*  *NA*
IST1297I                  ICN/MDH  CDSERVR  RSN
IST1298I                  NO          NO          4
IST1223I                  BN          NATIVE
IST1224I                  YES 1 YES
IST1299I TRANSMISSION GROUPS ORIGINATING AT CP SYSP390.SLCD07
IST1357I                  CPCP
IST1300I DESTINATION CP   TGN          STATUS  TGTYPE  VALUE WEIGHT
IST1301I SYSLAB.SLCD01   21          OPER   INTERCLUST YES  *NA*
IST314I END

```

Figure 99. SLCD07 Topology Information

Note:

- 1** SLCD07 is defined as a border node and is acting as one.

Chapter 7. The PC Server System/390 in an APPC Environment

This chapter identifies the tasks that are required to properly define the AIX, OS/2, and MVS environments to enable partner transaction programs to communicate using APPC.

Usually, the information provided by the APPC program you are going to use should provide some help on problem determination. In our case the APING program gave quite good information on what it was doing, and also what the reason was when something went wrong. APING could also be very useful to control the parameters before the actual APPC program is tested.

These steps proved to be very challenging to configure because of the number of parameters that had to be matched. We also found, that the terminology between the different platforms was very different and often confusing. We even saw one incident where the CM/2 help facility was talking about CPNAME on the host system, where it should have been the LUNAME on the host system.

7.1 The APPC Environment

The APPC configuration is described by using a standard terminology. These standard terms are used throughout this chapter to discuss the configuration. Each platform may use *platform-specific* terms in its configuration instead of the standard terms. Therefore, at the start of the APPC configuration sections, there is a terminology mapping table that cross-references the terms below with platform-specific terms. Then, at the end of the APPC configuration sections, there is a "How to find..." table that will help you to quickly find a parameter value in your configuration.

The following are the steps to create an APPC environment:

Define yourself to the network.

To define yourself to the network, you must define these parameters:

- Network name

A network is a set of interconnected nodes that are grouped by a common identifier called a *network name*. The network name is a 1 to 8 character field consisting of alphanumeric characters.

- LU name

A 1 to 8 character field consisting of alphanumeric characters which is the LU name of the node. Choose a name that is unique within the network name.

The fully qualified name is represented as two concatenated names, the network name and the LU name, separated by a period (NETNAME.LUNAME). This unique name identifies the node.

Define a link to your partner.

- You can define a direct link between the local node and the partner node if both nodes are in the same local network.
- If there is a Network Node (NN) in the local network, you can define a link to the NN, and the NN can locate the partner node.

- If the partner node is located in a subarea node, you can define a link to it, and the subarea node can locate the partner node for you.

To define a link, you must define these parameters:

- Network name

This is the network name of the partner machine. To determine this value, refer to the “How to find...” table of the partner machine’s configuration chapter.

- Partner LU name

This is the LU name of the partner machine. To find this value, refer to the “How to find...” table of the partner machine’s configuration chapter.

- Adjacent LAN address

This is the address of the adjacent node or the network node you are connecting to. In a token-ring, this is the address of the token-ring adapter at the adjacent node. To find this value, refer to the “How to find...” table of the partner machine’s configuration chapter.

Define a partner LU name.

If you are not using a network node in your network, you must define a partner LU name. This will allow the partner to be located.

- Partner LU name

This is the LU name defined on the partner machine. To find this value, refer to the “How to find...” table of the target machine’s configuration chapter.

If you are using a network node in your network, you do not need to define an explicit partner LU name. However, you will need to know the partner LU name when running transaction programs.

CPI-C side information may be used to associate a set of parameters, including the partner LU name, with a symbolic destination name. The symbolic destination name can then be used when running transaction programs to specify the partner.

Configure to run as a client-server.

If you are configuring your computer to run as a server, a transaction program (TP) must be configured on your computer. The transaction program is the target of a *conversation* started by a client.

- TP name

From 1 to 64 alphanumeric characters. This is the name specified by the partner APPC application when it wants to start a conversation with a TP on your computer.

If you are configuring your computer to run as a client, CPI-C side information may be required.

Figure 100 on page 97 shows the environment which was used to create the APPC scenarios.

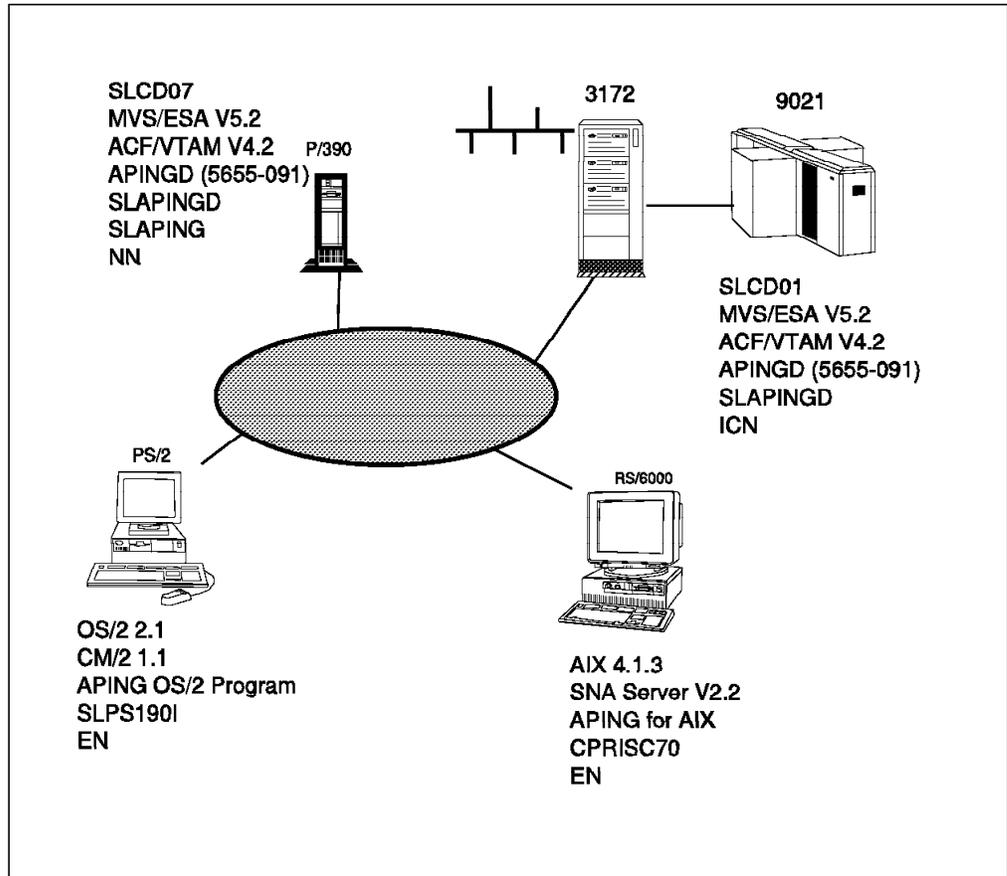


Figure 100. The APPC Environment

The network system definition examples provided in the remainder of this chapter are derived from this configuration.

7.2 APPC/MVS Configuration

This section describes the steps required to configure Advanced Program-to-Program Communication for MVS (APPC/MVS) as a server for the APINGD program.

7.2.1 APPC/MVS Operating Environment

APPC/MVS is a component of MVS/ESA SP Version 4 Release 2 and higher. The APPC/MVS operating environment consists of an APPC component address space, a transaction scheduler, and transaction programs. The APPC component address space, APPC, is a startable address space that establishes itself as a VTAM application using the APPCCMD macro interface. It uses a specified parmlib member to determine which VTAM LUs to activate. It establishes itself as a service type address space that processes CPI-C or LU 6.2 service requests from application programs.

The APPC/MVS provided transaction scheduler, ASCH, is a startable address space which manages a transaction queue. It balances the workload against the response time objectives defined by the installation using schedule policies specified in a PARMLIB member. The ASCH transaction scheduler adjusts the number of APPC initiators between the installation specified limits depending on the rate of work arriving. As the demand in the workload for a class increases, the number of initiators for the class is increased until the number reaches the maximum specified.

7.2.2 APPC/MVS Terminology

This terminology table maps the standard networking terms defined in 7.1, "The APPC Environment" on page 95 to the terms used by APPC/MVS.

<i>Table 5. APPC Terminology</i>	
Standard Term	APPC/MVS Term
Network name	NETID
LU name	Name supplied for APPL definition in APPL major node
Partner LU name	In our case the Local LU Name defined on the workstation
Adjacent LAN address	DIALNO (on PATH definition in switched major node, if a switched major node is going to be used)

7.2.3 APPC/MVS Configuration Worksheet

Table 6 on page 99 shows the completed configuration worksheet that we worked from. These are the values that must also match in other places.

In the APPC/MVS examples that follow, the values that we used have been highlighted. You should substitute these values with your own values.

<i>Table 6. APPC/MVS Configuration Worksheet</i>		
Symbol	How to determine this value	Our value
?LOCALLU?	The value specified for the ACBNAME on the LUADD statement in the parmlib member APPCPMxx defines an APPC/MVS LU. Look in this parmlib member to see if one has already been created. If not, you will create one during this configuration. See Figure 103 on page 101.	<i>SLAPINGD</i>
?LOCALCP?	VTAM, being a LEN node, does not have a CP (Control Point) name for APPN use. It does, however, have an SSCPNAME (System Services Control Point Name). Use the SSCPNAME in lieu of a CP name. It is the value specified for SSCPNAME in the VTAM start options (ATCSTRxx is the start options member of the VTAMLST data set). See Figure 86 on page 85.	<i>SLCD07</i>
?LOCALNET?	For systems with VTAM already configured, this value is found in the VTAMLST start options (ATCSTRxx) member. The option name is NETID. See Figure 86 on page 85.	<i>SYSLAB</i>
?PARTNERLU?	This is the partner's LU name. See DEFINE_LOCAL_CP command in A.4, "CM/2 NDF File for End Node (APPC) Scenario" on page 159.	<i>SLPS190I</i>
?PLUALIAS?	This is the symbol for the partner LU alias. 1 to 8 characters that designates a nickname for the partner LU. Alias names are case sensitive.	<i>slapingd</i>
Local values		
?3172MACADDR?	This is the local LAN address customized in Lan Adapter Protocol Support Program (LAPS) on the PC Server System/390 See Figure 24 on page 31.	<i>40000500390I</i>
?MODETAB?	Name of a logon mode table in VTAM. It is assembled and link-edited into a VTAM LOADLIB data set. The systems programmer should know the names of the logon mode tables defined on the system. This should be the name of the table where the APPC modes are included. We found that the necessary entries were already included in the default mode table. We found the source in SYS1.SAMPLIB.	<i>ISTINCLM</i>
?VOL?	This is the name of a volume on which VSAM data sets for APPC/MVS is created. It is a maximum of six characters.	<i>SCPMV5</i>
?JES?	The actual JES subsystem type (JES2 or JES3) should be substituted for this.	<i>JES2</i>
?CLIST.DATA SET?	The CLIST data set where you put the APINGD CLIST.	<i>SYS1.CLIST</i>

For a complete description of all the network definition parameters that have been used, review *VTAM Resource Definition Reference, SC31-6498*.

Figure 101 summarizes the definitions that have to be made for APPC/MVS.

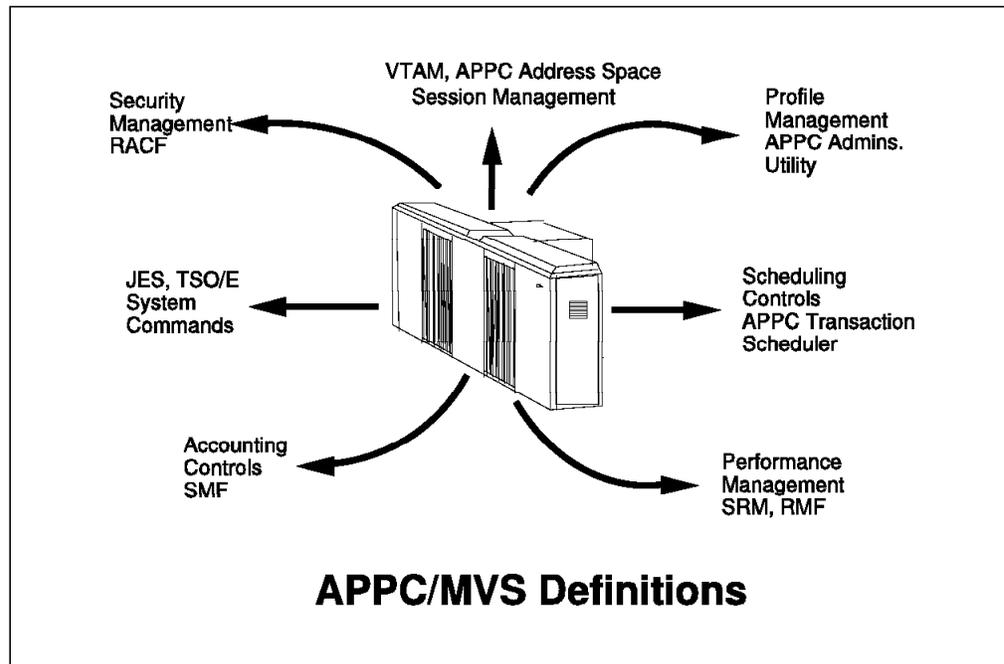


Figure 101. APPC/MVS Definition Requirements

7.2.4 Define Yourself to the Network

Each of the address spaces, APPC and ASCH, as previously described in 7.2.1, "APPC/MVS Operating Environment" on page 98, has its own SYS1.PARMLIB member that is used to obtain initialization and configuration information.

1. Create SYS1.PARMLIB members ASCHPM00 and APPCPM00.
 - Modify ASCHPM00 and APPCPM00 members located in the data set SYS1.PARMLIB.

The ASCH address space uses the member named ASCHPM00, as shown in Figure 102, to obtain scheduling policy information that designates how APPC/MVS manages TP workloads.

```

/*****/
CLASSADD CLASSNAME(FAST)
        MAX(10)
        MIN(2)
        RESPGOAL(.02)
        MSGLIMIT(500)
OPTIONS DEFAULT(FAST)
        SUBSYS(JES2)
TPDEFAULT REGION(4M)
        OUTCLASS(A)
/*****/

```

Figure 102. SYS1.PARMLIB(ASCHPM00)

The APPC address space uses the member named APPCPM00, as shown in Figure 103, to establish the environment where APPC/MVS services are to be provided and to define the names of the local APPC/MVS LUs.

```

/*****/
LUADD ACBNAME(SLAPINGD)
      SCHED(ASCH)
      BASE
      TPDATA(SYS1.APPCTP)
      TPLEVEL(USER)
SIDEINFO DATASET(SYS1.APPCSI)
/*****/

```

Figure 103. SYS1.PARMLIB(APPCPM00)

2. Create a VTAM application major node (SL07APPC) as shown in Figure 104.

```

*****
APPC      VBUILD TYPE=APPL
SLAPINGD APPL  ACBNAME=SLAPINGD,          ACBNAME FOR APPC      C
              APPC=YES,                  C
              AUTOSSES=1,                 C
              DDRAINL=NALLOW,            C
              DLOGMOD=#INTER,             INTERACTIVE W/O SECURITY C
              DMINWNL=1,                  C
              DMINWNR=1,                  C
              DRESPL=NALLOW,             C
              DSESLIM=2,                  C
              EAS=509,                     C
              MODETAB=ISTINCLM,           C
              SECACPT=CONV,                C
              SRBEXIT=YES,                 C
              VERIFY=NONE,                 C
              VPACING=0
*****

```

Figure 104. VTAM Definition of APPC LU

3. Add APPC modes to the logon mode table. In the example above, we used the VTAM default mode table.
 - If you need to assemble and link-edit a new mode table, you can use the sample job in A.9, "JCL Used to Assemble VTAM Tables" on page 177.
4. Update other SYS1.PARMLIB members.

There are other SYS1.PARMLIB members that need to be updated for APPC/MVS:

COMMNDxx/IEACMDxx

Start APPC services and scheduler address space, and add the following:

```

COM=' S APPC,SUB=MSTR          AUTOMATIC START OF APPCPM00'
COM=' S ASCH,SUB=MSTR         AUTOMATIC START OF ASCHPM00'

```

IEAICSxx

Assign performance groups and provide system information through the Resource Monitor Facility (RMF).

IEAIPSxx

Assign relative performance to the control performance groups referenced in IEAICSxx.

SMFPRMxx

Collect system management facilities (SMF) records.

For more information, see *APPC System Definitions in MVS/ESA and OS/2*, GG66-3224.

7.2.5 Define a Link to a Partner or Intermediate Node

The following definition is specifically for a LEN configuration. We have defined our PC Server System/390 as a NN and our Communications Manager/2 as an EN, so the VTAM definitions are created dynamically, therefore, it was not necessary for us to define the switched major node shown in Figure 105.

	VBUILD	TYPE=SWNET	
SLPS19	PU	ADDR=02,	X
		IDBLK=05D,	X
		IDNUM=20019,	X
		CONNTYPE=LEN,	X
		PUTYPE=2,	X
		DYNLU=YES,	X
		MAXPATH=1	
SLPS190I	LU	LOCADDR=0	

Figure 105. SYS1.VTAMLST(SLTRPS2S)

Once you have defined the workstation partner LU and the VTAM application major node, you should add these to your VTAM startup list (For example, SYS1.VTAMLST(ATCCON00)).

7.2.6 Configure to Run As a Server

To set up APPC/MVS for the APINGD program, we only have to concern ourselves with configuring the host as a server.

1. Define transaction program data set.

- Use the JCL shown in Figure 106 on page 103 to create a VSAM Data set for Transaction Program (TP) Profiles.

This job must be run for APPC/MVS to be able to associate TP names with particular job streams when an incoming request to start a TP is received.

```

//TPSAMPLE EXEC PGM=IDCAMS
//SYSPRINT DD  SYSOUT=*
//SYSABEND DD  SYSOUT=*
//AMSDUMP DD   SYSOUT=*
//SYSIN DD     *
        DEFINE CLUSTER (NAME(SYS1.APPCTP) -
                VOLUMES(SCPMV5) -
                INDEXED REUSE -
                SHAREOPTIONS(3 3) -
                RECORDSIZE(3824 7024) -
                KEYS(112 0) -
                RECORDS(300 150)) -
        DATA -
        (NAME(SYS1.APPCTP.DATA)) -
        INDEX -
        (NAME(SYS1.APPCTP.INDEX))
/*

```

Figure 106. JCL for TP Profile VSAM Data Set (SMAPPCTP)

2. Create the APINGD APPC Side Information profile.

- Use the JCL shown in Figure 107 to create the APPC/MVS Side Information file APING requires.

This task is needed for APPC/MVS to be able to initiate transaction programs that use side information. This is only used when APPC/MVS is acting as a client.

This job runs the APPC/MVS administrative utility (ATBSDFMU).

```

//P390A JOB (ACCT#),
//      ' P390',                               /*OPER*/
//      CLASS=A,REGION=6000K,                 /*JCLAS*/
//      MSGLEVEL=(1,1),
//      MSGCLASS=X,
//      NOTIFY=P390,
//      TIME=30,
//      USER=P390                               /*RACF*/
//*
//STEP01 EXEC PGM=ATBSDFMU
//SYSPRINT DD  SYSOUT=*
//SYSSDLIB DD  DSN=SYS1.APPCSI,DISP=SHR
//SYSSDOUT DD  SYSOUT=*
//SYSIN DD     *
        SIADD
        DESTNAME(SLPS19)
        TPNAME(APINGD)
        MODENAME(#INTER)
        PARTNER_LU(SLPS190I)
/*

```

Figure 107. JCL to Add Information to Side Information File

Note: The DESTNAME in this job is a symbolic name. TPNAME is the server application, the PARTNER_LU is allowed to execute. MODENAME is the logon mode name going to be used for this conversation. PARTNER_LU is the LUNAME of the client (adjacent node).

3. Add APINGD to a CLIST library.

The APINGD REXX CLIST must be copied to a public CLIST data set and renamed to APINGD. The TP profile example, Figure 108 on page 105, assumes it has been added to data set SYS1.CLIST. We will run this after we have configured APPC on CM/2.

4. Create TP profile for APINGD.

- Use the JCL shown in Figure 108 on page 105 to create a transaction program profile for APINGD.

The job runs the APPC/MVS administrative utility (ATBSDFMU) to add a TP profile for APINGD. It starts the TSO terminal monitor program, IKJEFT01, which in turn calls the REXX CLIST APINGD, which it assumes is located in the SYS1.CLIST data set.

```

//P390A JOB (ACCT#),
//          ' P390',                               /*OPER*/
//          CLASS=A,REGION=6000K,                 /*JCLAS*/
//          MSGLEVEL=(1,1),
//          MSGCLASS=X,
//          NOTIFY=P390,
//          TIME=30,
//          USER=P390                               /*RACF*/
//*
//STEP01 EXEC PGM=ATBSDFMU
//SYSPRINT DD SYSOUT=*
//SYSSDLIB DD DSN=SYS1.APPCSI,DISP=SHR
//SYSSDOUT DD SYSOUT=*
//SYSIN DD DATA,DLM=XX
        TPADD
            TPNAME(APINGD)
            ACTIVE(YES)
            TPSCHED_DELIMITER(##)
            TAILOR_SYSOUT(NO)
            TAILOR_ACCOUNT(NO)
            CLASS(FAST)
            TPSCHED_TYPE(STANDARD)
            JCL_DELIMITER(END_OF_JCL)
//P390APPC JOB (ACCT#),
//          ' P390',                               /*OPER*/
//          CLASS=A,REGION=6000K,                 /*JCLAS*/
//          MSGLEVEL=(1,1),
//          MSGCLASS=X,
//          NOTIFY=P390,
//          TIME=30,
//          USER=P390                               /*RACF*/
//*
//IKJACCNT EXEC PGM=IKJEFT01,
            PARM=' EXEC '' SYS1.CLIST(APINGD)'''
//STEPLIB DD DSN=SYS1.SISPLoad,DISP=SHR
//SYSUADS DD DSN=SYS1.UADS,DISP=SHR
//SYSLBC DD DSN=SYS1.BRODCAST,DISP=SHR
//SYSTSPRT DD SYSOUT=*,FREE=CLOSE
//SYSTSIN DD DUMMY
//SYSPRINT DD SYSOUT=*,FREE=CLOSE
END_OF_JCL
        KEEP_MESSAGE_LOG(NEVER)
##
XX
/*

```

Figure 108. JCL to Add a TP Profile to the VSAM Data Set (TPADD)

7.2.7 How to Find APPC/MVS Terms

<i>Table 7. How to Find APPC/MVS Terms</i>	
APPC/MVS Term	Where Found
LU name	For APPC/MVS, this is configured in SYS1.PARMLIB(APPCPMxx). The LUADD parameter includes an ACBNAME. The ACBNAME defines an APPC/MVS LU Name. This name is also included on an APPL definition statement in an APPL major node of VTAM.
Control Point (CP) name	VTAM, being a LEN, does not have a CP (Control Point) name for APPN use. It does, however, have an SSCPNAME (System Services Control Point Name). If in configuring a partner platform a CP name is needed, use the SSCPNAME instead. It is set in the ATCSTRxx member of the VTAMLST data set.
Network name	It is defined in a member named ATCSTRxx of a data set with the DDNAME of VTAMLST in the VTAM start procedure. The "xx" is two digits, and the default is 00. ATCSTRxx is the VTAM start options. The NETID parameter defines the network name.
LAN address	The LAN address is address coded when LAPS was customized.

This completes the configuration of APPC/MVS.

7.3 Base Definitions of Communications Manager/2 As an End Node

This section describes the steps to configure APPC for a Communications Manager/2 (CM/2) workstation that is connected to a token-ring local area network that is used to access APINGD on the host. It assumes that CM/2 has already been installed on the workstation.

This scenario is based on an APPN end node definition, but for your convenience we have added the changes to be made if you are configuring a LEN node.

With reference to Figure 100 on page 97, these steps must be carried out for the workstations that are going to access APINGD.

7.3.1 Communications Manager/2

Communications Manager provides communication services and connections that allow an OS/2 workstation to communicate with a wide range of systems, including IBM and non-IBM mainframes, mid-range computers, and personal computers. Communications Manager allows you to communicate in networks that implement IBM's Systems Network Architecture (SNA) and in non-SNA networks, as well.

For Communications Manager/2, a *configuration file* is used to describe the hardware and software environment for the OS/2 workstation. The information in the configuration file is used by Communications Manager/2 to determine the

appropriate functions to invoke and to use in controlling communications for the workstation.

The information in a configuration file is organized by *profiles* that provide specific characteristics of a communications feature (software and hardware).

Communications Manager/2 provides an APPC API for programs that perform distributed transaction processing. An OS/2 transaction program (TP), using APPC, can communicate with TPs on other systems (such as APPC/MVS) that supports APPC.

7.3.2 CM/2 Terminology

This terminology table maps the standard networking terms defined in 7.1, "The APPC Environment" on page 95 to the terms used by CM/2.

Standard Term	CM/2 Window Term
Network name	Network name
LU name	Local node name
Partner LU name	Partner node name
Adjacent LAN address	LAN destination address

7.3.3 Communications Manager/2 APPC Configuration Worksheet

Table 9 shows a configuration worksheet with the values that must also match in other places.

<i>Table 9 (Page 1 of 2). Communications Manager/2 Configuration Worksheet</i>		
Symbol	How to determine the value for this symbol	Our value
?LUNAME?	This is the symbol that refers to the LU name of the machine you are defining to the network. An LU name is defined by defining a CPNAME in CM/2. With reference to Figure 105 on page 102, this equates to the name of the independent LU (LOCADDR=0), not the PU name specified. Refer to 7.1, "The APPC Environment" on page 95 for more information about LU names.	<i>SLPS190I</i>
?NETWORK?	This is the symbol that refers to the network name to which this control point (CM/2) is associated. This name is specified on the NETID keyword in the VTAM start list (ATCSTRxx) of the owning VTAM. Refer to 7.1, "The APPC Environment" on page 95 for more information about network names. Refer to 7.2.7, "How to Find APPC/MVS Terms" on page 106 for more about this value.	<i>SYSLAB</i>
?PARTNERLU?	This is the symbol for the partner's LU name. Refer to 7.2.7, "How to Find APPC/MVS Terms" on page 106 for this value. Refer to 7.1, "The APPC Environment" on page 95 for more information about the partner LU name.	<i>SLAPINGD</i>
?PARTNERCP?	This is the symbol for the Control Point (CP) name of your partner. Refer to 7.2.7, "How to Find APPC/MVS Terms" on page 106 for this value.	<i>SLCD07</i>
?PARTNERNET?	This is the symbol for the network name of the partner computer. Refer to 7.2.7, "How to Find APPC/MVS Terms" on page 106 for this value.	<i>SYSLAB</i>
?LOCALPU?	This is the symbol for VTAM's PU name.	<i>SLPS19</i>
?LANADDRESS?	This is the symbol for the LAN address of the partner computer or the LAN address of a network node if the link is being made to a network node. In our example configuration, the workstation being configured is attached to a LAN that is connected directly to the PC Server System/390. This address is used here. Refer to 7.2.7, "How to Find APPC/MVS Terms" on page 106 for this value.	<i>400005003901</i>

<i>Table 9 (Page 2 of 2). Communications Manager/2 Configuration Worksheet</i>		
Symbol	How to determine the value for this symbol	Our value
?TPPATH?	This is the fully-specified path and filename of the transaction program's executable code. For example, if OS/2 is installed on the C: drive, this value could be: D:OS2UTIL APING.EXE	<i>D:OS2UTIL APING.EXE</i>
?MODE?	This is the symbol for the mode name. See 1.2.7, "What Is a Mode?" on page 7 for a discussion of modes. It is recommended that you use one of the architected modes discussed in this section. Often, a client/server product's documentation specifies what mode must be used by that product. APING uses any mode (this is specified on the APING command line), but the default is #INTER.	<i>#INTER</i>
Local values		
?LUALIAS?	This is the symbol for the local LU alias. It is 1 to 8 characters that designates a nickname for the Local LU. Alias names are case sensitive.	<i>s/ps190i</i>
?LINKNAME?	This is the symbol for the link name of a logical link. It is 1 to 8 letters or numbers that are used as a local name on the OS/2 machine to refer to the link to a partner computer. You can choose any name you such as, but since you will use this name later to refer to this link, choose a meaningful name. (suggestion:LINK001)	<i>LINK001</i>

7.3.4 Start Communications Manager/2 Customization

This section describes the necessary customization of Communications Manager/2 to be able to establish LUTYPE6.2 sessions between Communications Manager/2 and an APPC server program. In our case the APPC server program is running APPC/MVS on PC Server System/390.

To start the customization, select Communication Manager Setup from the Communication Manager/2 folder, or execute CMSETUP from an OS/2 window.

The values we have used are shown in brackets, in each of the relevant steps.

During the described steps you can always refer to the worksheet shown in Table 9 on page 108 for an explanation of the terms.

1. Click on **OK** on the IBM Welcome panel.
2. On the Communication Manager Setup panel, click on **Setup...**, which will take you to the Open Configuration panel. There you enter a Configuration Name (P30EN) and a Description, and click on **OK**. You will then be taken to the Communications Manager Configuration Definition panel, shown in Figure 109 on page 110.

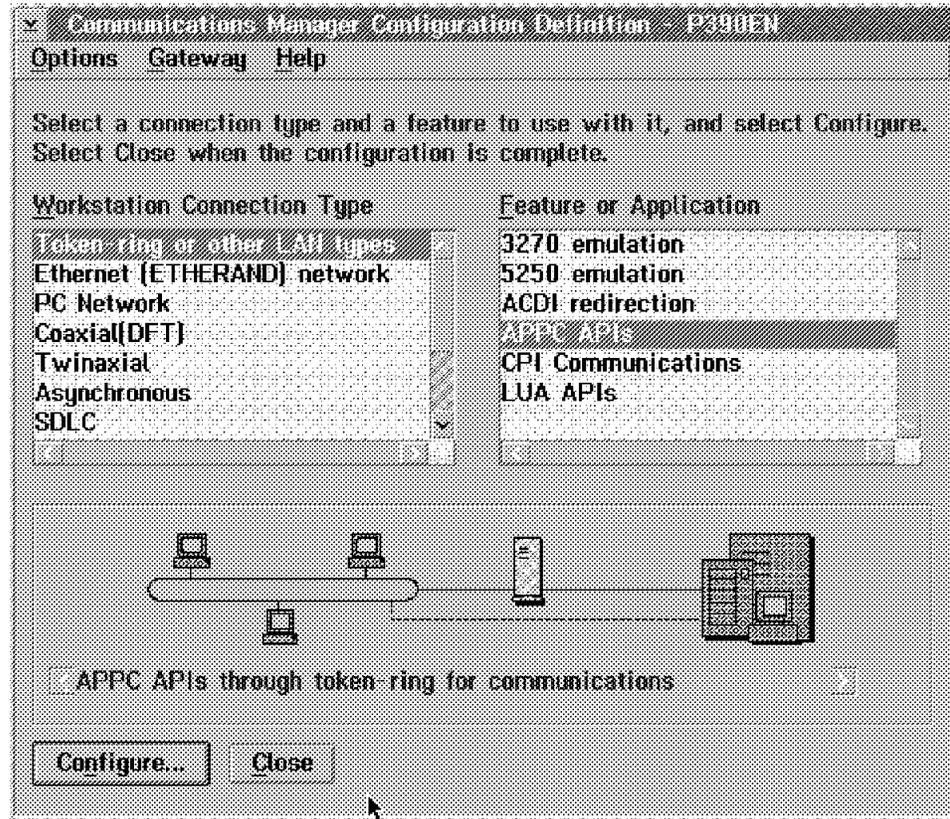


Figure 109. Communications Manager Configuration Definition

3. In Workstation Connection Type, select **Token-ring or other LAN types**.
4. In Feature or Application, select **APPC APIs**.
5. Click on **Configure...** and you will see the Communication Manager Profile List shown in Figure 110 on page 111.

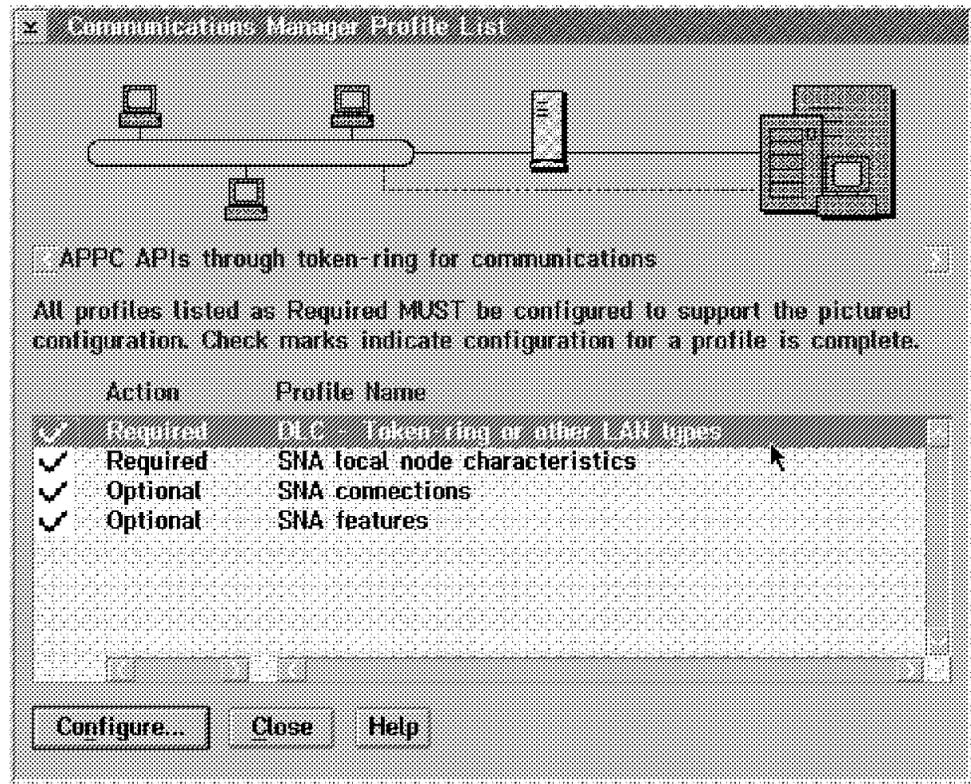


Figure 110. Communication Manager Profile List

This panel displays the profiles that need to be configured for APPC.

This is the starting point for the following CM/2 sections, 7.3.5, "Define Yourself to the Network."

7.3.5 Define Yourself to the Network

Before CM/2 can communicate in a network, it must define itself to the network. This is usually done during installation of CM/2.

You can define (or find if it is already configured) your local node name in the SNA Local Node Characteristics window.

To define or view your local node name, follow this sequence of steps:

1. Click on **SNA local node characteristics**.
2. Click on **Configure...** to view the Local Node Characteristics panel, as shown in Figure 111 on page 112.

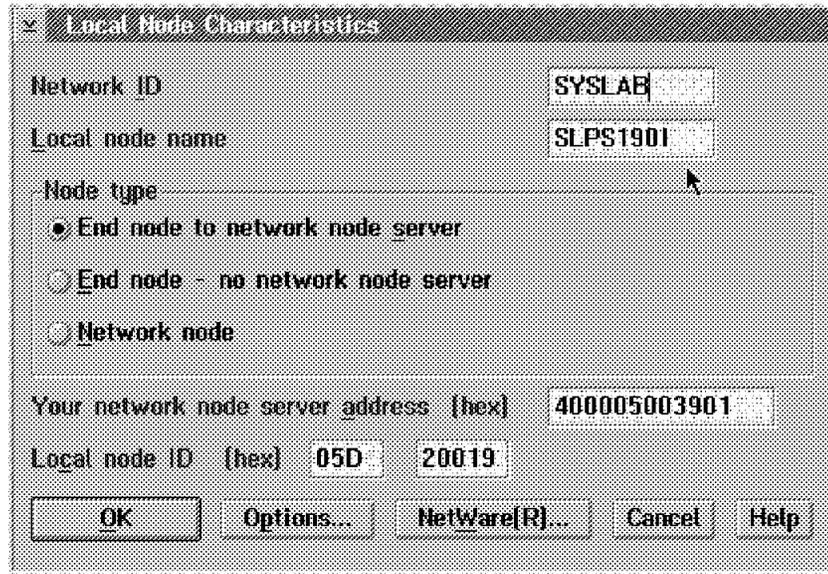


Figure 111. Local Node Characteristics

The control point is responsible for managing the mode and its resources. A CM/2 control point is also a logical unit and may be the only logical unit required. The control point being defined is for the OS/2 workstation shown in Figure 100 on page 97.

3. Enter your Network ID (SYSLAB).
4. Enter your Local Node Name (SLPS190I).

For a LEN node definition the Local node name must match the LU name of the LU with LOCADDR=0 defined in the switched major node. This is shown in Figure 47 on page 56.

5. Click on **End node to network node server**.

For a LEN node definition you should click on **End node - no network node server**.

6. Click on **Options...** to proceed to the Local Node Options panel, as shown in Figure 112.

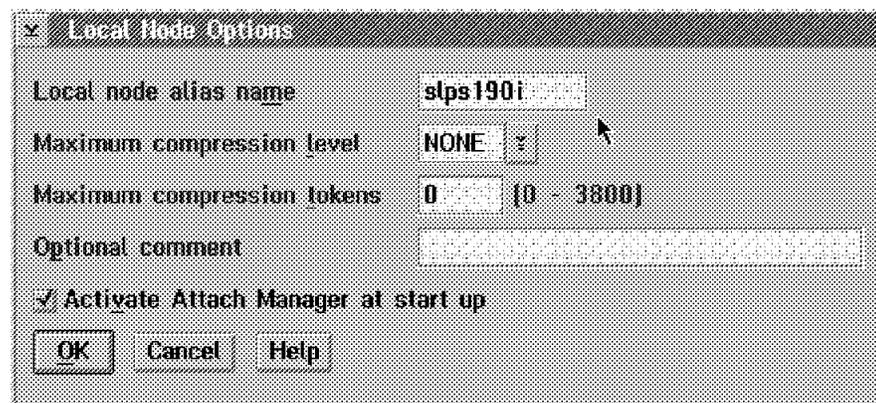


Figure 112. Local Node Options

7. Enter a Local node alias name (slps190i).

An indication is made to have the CM/2 attach manager started when CM/2 is started. The attach manager must be active in order to accept incoming allocation requests. Otherwise, all incoming requests are rejected.

8. Click on **OK** to go back to the Local Node Characteristics panel, as shown in Figure 111 on page 112.
9. Click on **OK** to go to the Communications Manager Profile List, as shown in Figure 110 on page 111.

7.3.6 Define a Link to a Partner or Intermediate Node

To define a link to a partner or to an intermediate node, follow this sequence of steps:

1. Click on **SNA Connections**.
2. Click on **Configure...** to view the Connections List panel, as shown in Figure 113.

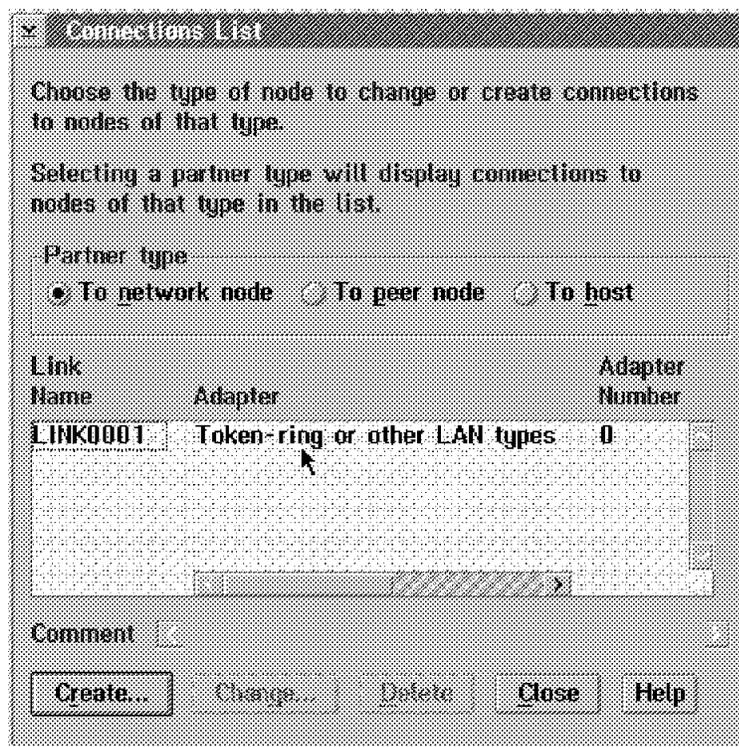


Figure 113. Connections List

3. Select the partner type of node you are connecting to:

Partner type	Node type
To network node	Network node
To peer node	End node
To host	Subarea node

In our example, the type of connection that provided connectivity to the APPC/MVS LU on the host was defined as To network node, because our PC Server System/390 was defined as a network node.

4. Enter your Link Name (LINK0001).

- Click on **Create...** to view the Adapter List panel, as shown in Figure 114 on page 114.

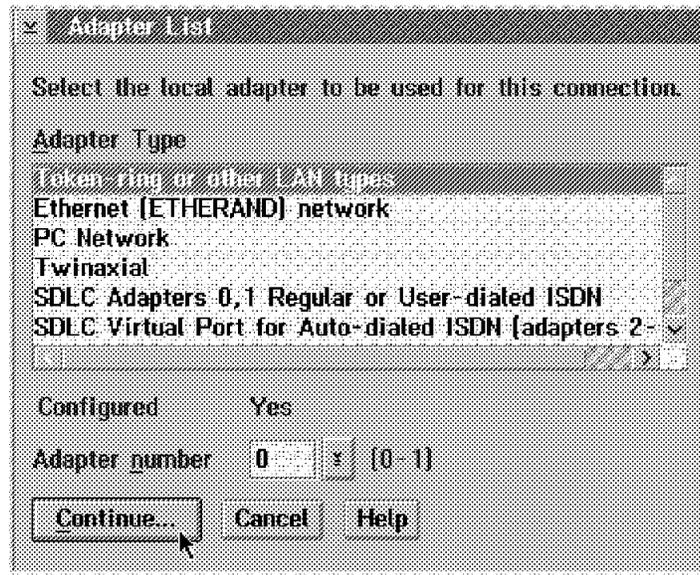


Figure 114. Adapter List

- Select the type of data link connection you desire. In our example, Token-ring or other LAN types.
For Ethernet you would have chosen Ethernet (ETHERAND) network.
- Click on **Continue...** to view the Connection to a Network Node panel, as shown in Figure 115.

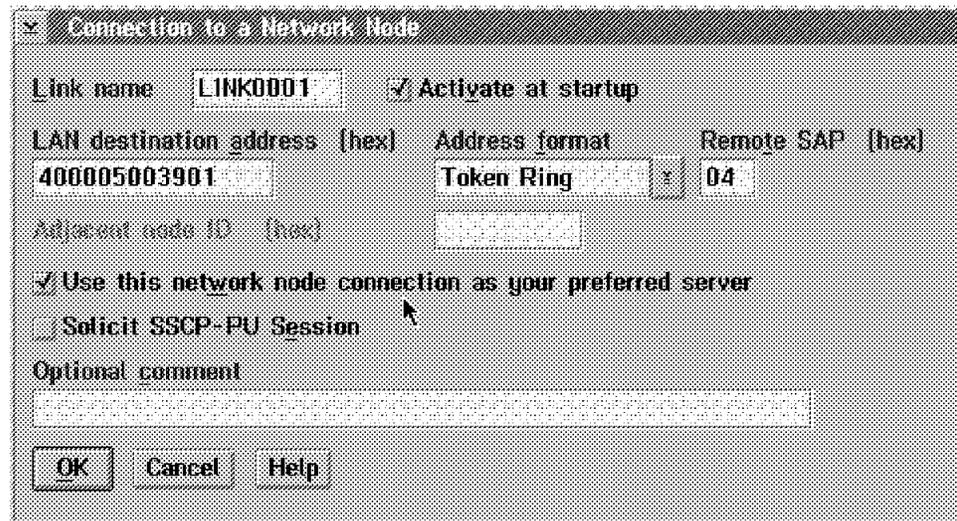


Figure 115. Connection to Network Node

- Select **Use this network node connection as your preferred server**.
- Click on **OK**, and you will return to the Connection List, shown in Figure 113 on page 113.
- Click on **Close**, and you will return to the Communications Manager Profile List, shown in Figure 110 on page 111.

You are now ready to configure SNA features.

7.3.7 Define a Partner LU Name

1. Select **SNA Features**.
2. Click on **Configure...** to view the SNA Features List panel, as shown in Figure 116.

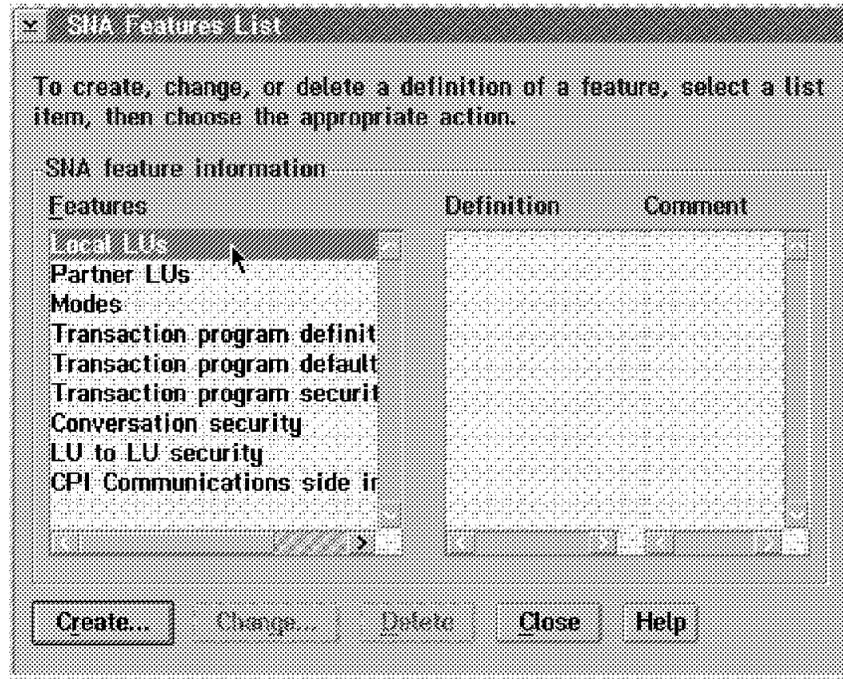


Figure 116. Connection to Network Node

For a LEN node you will have to do the following:

- a. Select **Partner LUs**.
- b. Click on **Create...** to view the Partner LU panel, as shown in Figure 117 on page 116.



Figure 117. Partner LU

- c. Enter the fully qualified LU name. The first field is the Network ID and the second is the Partner LU name, which is the same as the APPC program on the server (SYSLAB SLAPINGD).
 - d. Enter Alias (slapingd).
 - e. Click on **OK** to view the SNA Features List panel again, as shown in Figure 116 on page 115.
3. Select **Modes**, and you will see the available modes as shown in Figure 118.

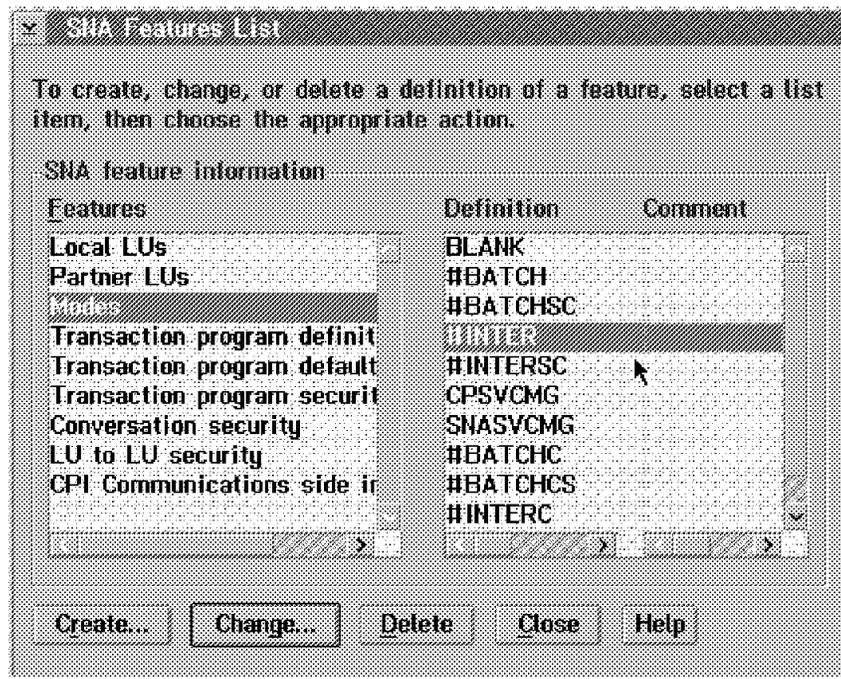


Figure 118. SNA Feature List

4. Click on **#INTER** to select this mode

5. Click on **Close** to return to the Communications Manager Profile List, shown in Figure 110 on page 111.
6. Click on **Close** to return to the Communications Manager Configuration Definition, shown in Figure 109 on page 110.

7.3.8 Verifying the Configuration

To verify the changes made to the configuration, click on **Close**.

Communications Manager will automatically check your updated values, and if they are correct, you are ready to start Communication Manager to activate your definitions.

7.3.9 Testing the Configuration with APING

To validate the configuration we used APING from the client workstation. This is described in 9.3, "APING" on page 145.

7.3.10 How to Find OS/2 CM/2 Terms

<i>Table 10. How to Find APPC/OS2 Terms</i>	
OS/2 CM/2 Term	Where Found
LU name	You can find your local LU name in the Local Node Characteristics panel, as shown in Figure 111 on page 112. The LU name is the Local Node Name in the window.
CP name	The CP name is the same as the LU name found above (Local Node Name).
Network name	The Network name is the Network ID in the Local Node Characteristics panel, as shown in Figure 111 on page 112.
Local LAN address	The local LAN address cannot be found by the CM/2 windows. This is the LAN address coded when LAPS was customized. See 7.2.7, "How to Find APPC/MVS Terms" on page 106.

7.4 Base Definitions of SNA Server/6000 As an APPN End Node

This section provides an overview of the steps required to configure APPC for AIX. The configuration is described by using standard terminology. These standard terms are used throughout the section to describe the configuration. Each platform may use *platform-specific* terms in its configuration instead of the standard terms. Therefore, at the start of the APPC/AIX configuration sections, there is a terminology mapping table that cross-references the terms below with platform-specific terms. Then, at the end of the APPC/AIX configuration sections, there is a "How to find..." table that will help you to quickly find a parameter value in your configuration.

This scenario is based on an APPN end node definition, but for your convenience we have added the changes to be made if you are configuring a LEN node.

7.4.1 APPC/AIX Terminology

This terminology table maps the standard networking terms defined in 7.1, “The APPC Environment” on page 95 to the terms used by APPC/AIX.

Standard Term	APPC/AIX Term
Link name	Link Station profile name
Network name	network name
LU name	Local LU name
Partner LU name	partner LU name
LAN address	Link address
Adjacent LAN address	Remote link address

7.4.2 APPC/AIX Operating Environment

APPC/AIX is a component of SNA/Server/6000 V2.2 and higher. All the APPC/AIX definitions were made using the System Management Interface Tool (SMIT).

7.4.3 APPC/AIX Configuration Worksheet

Table 6 on page 99 shows the completed configuration worksheet that we worked from. These are the values that must also match in other places.

In the APPC/AIX examples that follow, the values that we used have been highlighted. You should substitute these values with your own values.

Symbol	How to determine this value	Our value
?LOCALLU?	This is the symbol that refers to a LU name in the machine you are defining to the network. It is a 1 to 8 character field consisting of upper-case alphanumeric characters which represent a LU name in the node. Choose a name that is unique within the same network. A local LU name is not necessary for communicating with other nodes in the network. The local CP name may function as the default LU name, in which case you do not need a local LU name defined.	<i>SLRISC70</i>
?PARTNERLU?	This is the partner’s LU name. Refer to 7.2.7, “How to Find APPC/MVS Terms” on page 106 for information of the partner computer, in our case the APPC/MVS.	<i>SLAPINGD</i>
?PARTNERNET?	This is the symbol for the network name of the partner computer Refer to 7.2.7, “How to Find APPC/MVS Terms” on page 106 for information of the partner computer. In this case the APPC/MVS.	<i>SYSLAB</i>

<i>Table 12 (Page 2 of 2). APPC/AIX Configuration Worksheet</i>		
Symbol	How to determine this value	Our value
?TPNAME?	This is the symbol for Transaction Program name. This is the name of the transaction program at the partner computer. It is 1-64 bytes long, and it is case sensitive. For APING, the TP Name on server ID APINGD.	<i>APINGD</i>
?MODE?	This is the symbol for hte mode name. APING can use any mode (this can be specified on the APING command line, see 9.3, "APING" on page 145), but the default is #INTER.	<i>#INTER</i>
?SYMDEST?	This is the symbol for the CPI-C side information symbolic destination name. It is any 1-8 character name you choose. It will be used locally on the AIX machine to refer to a Side Information profile.	<i>P390PING</i>
?LUPRO?	The symbol for the name of the Local Logical Unit 6.2 profile.	<i>RISCP390</i>

7.4.4 Start SNA Server/6000 Customization

This section describes the steps required to customize SNA Server/6000 to be able to establish LUTYPE6.2 sessions with an APPC server program. The APPC server program is running on the PC Server System/390.

To customization SNA Server/6000 we used System Management Interface Tools (SMIT).

1. In a AIXTERM or dtterm window enter the command smit.
This will take you to System Management Interface Tools (SMIT).
2. Click on **Communications Applications and Services**.
3. Click on **SNA Server/6000**.
4. Click on **Configure SNA Profiles**, and you will get the following options :
 - Initial Node Setup
 - Quick Configuration
 - Advanced Configuration

Now, you can define yourself to the network by completing the following steps. During the described steps, you can refer to the worksheet shown in Table 12 on page 118.

From the panel **Configure SNA Profiles**:

1. Click on **Initial Node Setup**, and you will be requested to choose a DLC type (token_ring).
2. Click on **OK**, and you will get the panel shown in Figure 119 on page 120.

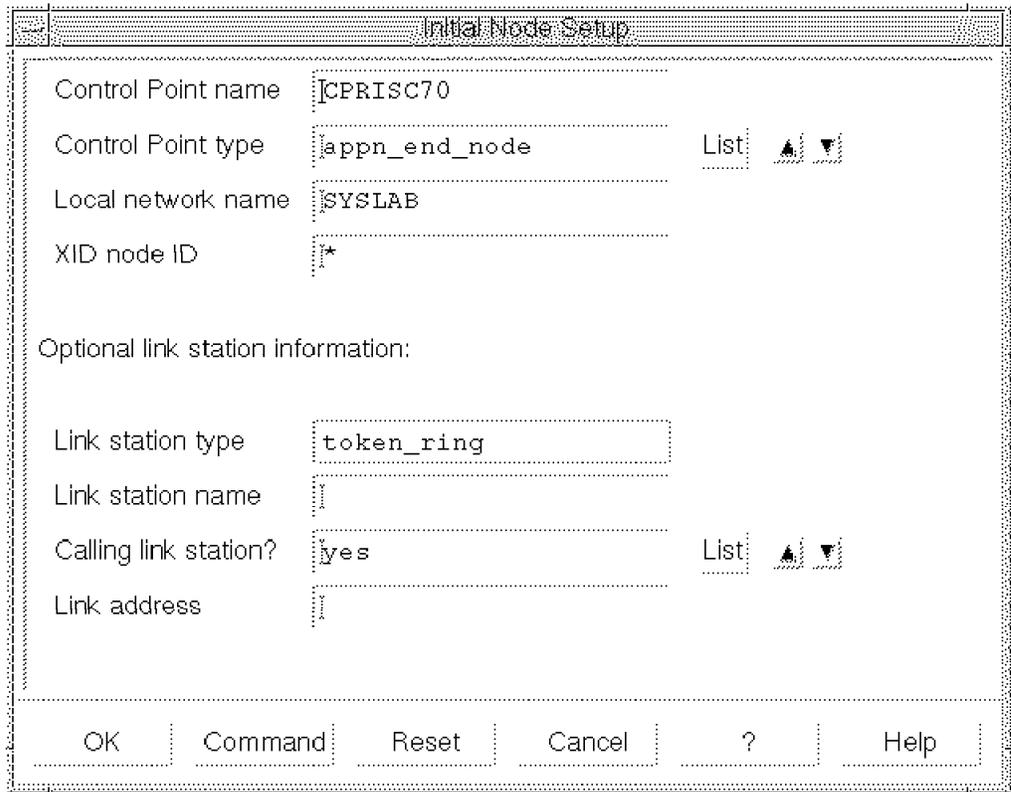


Figure 119. Initial Node Setup

3. Enter the Control Point name, it defines the name of the CPNAME for the SNA Server/6000. (CPRISC70). This value is used to establish the CP-CP session between the SNA Server/6000 and the PC Server System/390.
4. Enter Control Point type (app_end_node).
5. Enter Local network name (SYSLAB).
6. Select Calling link station (yes).

Note:

To configure the SNA Server/6000 as a LEN node, the value required for the Control Point name must match the CPNAME, or the value of XID node ID must match the combination of IDBLK and IDNUM. Both are specified in the SWNET major node (See Figure 80 on page 76).

7. Click on **OK**.
8. Click on **DONE**.

Return to the panel **Configure SNA Profiles:**, to define a link to your partner.

1. Click on **Advanced Configuration**.
2. Click on **Links**.
3. Click on **Token Ring**.
4. Click on **Add a Profile**, and you will get the panel shown in Figure 120 on page 121.

Add Token Ring Link Station Profile

* Profile name: List ▲ ▼

Use Control Point's XID node ID? List ▲ ▼

If no, XID node ID:

* SNA DLC Profile name: List

Stop link station on inactivity? List ▲ ▼

If yes, Inactivity time-out (0-10 minutes):

LU address registration? List ▲ ▼

If yes, LU Address Registration Profile name: List

Trace link? List ▲ ▼

If yes, Trace size: List ▲ ▼

Adjacent Node Address Parameters

Access routing: List ▲ ▼

If link_name, Remote link name:

If link_address, Remote link address:

Remote SAP address (02-fa):

Adjacent Node Identification Parameters

Verify adjacent node? List ▲ ▼

Network ID of adjacent node:

Buttons: OK, Command, Reset, Cancel, ?, Help

Figure 120. Token-Ring Link Station Profile

5. Enter SNA DLC Profile Name. For token-ring we used the default profile (tok0.00001) and for Ethernet we used the default profile (ent0.00001).
6. Enter Remote link address. This is the MAC address defined in LAPS for the token-ring adapter installed in the PC Server System/390 (see 2.6, "PC Server System/390 LAPS Customization" on page 29).
7. Click on **OK**.
8. Click on **DONE**.

Return to the panel **Advanced Configuration**, to define a partner LU name.

1. Click on **Sessions**
2. Click on **LU 6.2**.
3. Click on **Local 6.2 Local LU**.

4. Click on **Add a Profile**, and you will get the panel shown in Figure 121 on page 122.

Figure 121. LU 6.2 Local LU Profile

5. Enter Current profile name (RISCP390).
6. Enter Local LU name (SLRISC70).
This specifies the name of the LU 6.2, as known to the adjacent node.
7. Enter Local LU alias, takes the same value as defined in the previous field.

Note:

To configure SNA Server/6000 as a LEN node, the value required for Local LU name must match the definition for the independent LU with LOCADDR=0 in the SWNET major node (see Figure 80 on page 76).

8. Click on **OK**.

Return to the panel **LU 6.2**, and do the following:

1. Click on **LU 6.2 Side Information**.
2. Click on **Add a Profile**, and you will get the panel shown in Figure 122 on page 123.

Current profile name	p390ping	
New profile name		
Local LU or Control Point alias		List
Provide only one of the following:		
Partner LU alias		List
Fully qualified partner LU name	SYSLAB.SLAPINGD	
Mode name	INTER	List
Remote transaction program name (RTPN)	apingd	
RTPN in hexadecimal?	no	List ▲ ▼
Comments		
<input type="button" value="OK"/> <input type="button" value="Command"/> <input type="button" value="Reset"/> <input type="button" value="Cancel"/> <input type="button" value="?"/> <input type="button" value="Help"/>		

Figure 122. LU 6.2 Side Information Profile

3. Enter Current profile name (p390ping).

4. Enter Fully qualified partner LU name (SYSLAB.SLAPINGD).

This was defined in the APPL major node for APPC/MVS (see Figure 104 on page 101).

5. Enter Remote transaction program name (APINGD).

This specifies the name of the program to execute on the server.

6. Click on **OK**.

Return to the panel LU 6.2, and do the following:

1. Click on **LU 6.2 Transaction Program Name**.

2. Click on **Add a Profile**, and you will get the panel shown in Figure 123 on page 124.

Change/Show LU 6.2 TPN Profile			
Current profile name	aping		
New profile name			
Transaction program name (TPN)	apingd		
Transaction program name (TPN) is in hexadecimal?	no	List	▲ ▼
PIP data?	no	List	▲ ▼
If yes, Subfields (0-99)	0		
Use Command Line Parameters?	no	List	▲ ▼
Command Line Parameters			
Conversation type	either	List	▲ ▼
Sync level	none/confirm	List	▲ ▼
Resource security level	none	List	▲ ▼
If access, Resource Security Access List Prof.			
Full path to TP executable	/usr/lpp/sna/samples/		
Multiple instances supported?	no	List	▲ ▼
User ID	100		
Server synonym name			
Restart action	once	List	▲ ▼
Communication type	signals	List	▲ ▼
If IPC, Communication IPC queue key	0		
Standard input file/device	/dev/console		
Standard output file/device	/dev/console		
Standard error file/device	/dev/console		
Comments			
<input type="button" value="OK"/> <input type="button" value="Command"/> <input type="button" value="Reset"/> <input type="button" value="Cancel"/> <input type="button" value="?"/> <input type="button" value="Help"/>			

Figure 123. LU 6.2 TPN Profile

3. Enter Transaction program name (APINGD).

This specifies the name of the program to execute on the server environment.

4. Enter Full path to TP executable.

This specifies the complete path to the transaction program to be executed on this machine.

At this point SNA Server/6000 is ready to run as an end node. There is however, one additional step to perform if SNA Server/6000 will run as a LEN node.

Return to the panel LU 6.2, and do the following:

1. Click on **LU 6.2 Partner LU**.
2. Click on **Add a Profile**, and you will get the panel shown in Figure 124 on page 125.

Current profile name	p390partner	
New profile name		
Fully qualified partner LU name	SYSLAB.SLAPINGD	
Partner LU alias		
Parallel sessions supported?	yes	List ▲ ▼
Session security supported?	no	List ▲ ▼
Conversation security level	none	List ▲ ▼
Comments		

OK Command Reset Cancel ? Help

Figure 124. LU 6.2 Partner LU Profile

3. Enter Current profile name (P390PARTNER).
4. Enter Fully qualified partner LU name (SYSLAB.SLAPINGD).

This is the name of the partner LU 6.2. It was defined in the APPL major node for the APPC/MVS (see Figure 104 on page 101).

5. Click on **OK**.

At this point SNA Server/6000 is ready to run as a LEN node.

7.4.5 Verification Results

To verify the SNA Server/6000 environment we completed the following steps:

1. To verify the definitions that we created and to make the profiles active, we issued the VERIFYSNA -U command.
2. To start SNA, we used the command SNA -S.
3. To start the link station profile, we used the command SNA -S L -P SLRISC70. In this command SLRISC70 is the name of the token-ring link station profile (see Figure 120 on page 121).
4. To test the LU-LU session between the SNA Server/6000 and the PC Server System/390, we used the APING program. The results are shown in Figure 125 on page 126.

```

# aping p390ping
IBM APING version 2.43.1c APPC echo test with timings.
Licensed Materials - Property of IBM
(C) Copyright 1994 by IBM Corp. All rights reserved.

Allocate duration:      37 ms
Program startup and Confirm duration:  2683 ms

Connected to a partner running on: UNKNOWN
Duration Data Sent Data Rate Data Rate
(msec)      (bytes)      (KB/s)      (Mb/s)
-----
          41             200           4.8         0.038
          37             200           5.3         0.042
Totals:      78             400           5.0         0.040
Duration statistics: Min = 37 Ave = 39 Max = 41
#

```

Figure 125. Running APING

In Figure 125, P390PING is the name of the profile defined in LU 6.2 side information.

For more information on APING, please see 9.3, "APING" on page 145.

7.4.6 How to Find APPC/AIX Terms

<i>Table 13. How to Find APPC/AIX Terms</i>	
APPC/AIX Term	Where Found
LU name	The LU name is specified in a Local LU6.2 profile as the Local LU name parameter.
Network name	The network name is specified in the Control Point profile, as the Network name parameter.
Control Point (CP) name	The CP name is specified in the Control Point profile, as the Control Point (CP) name parameter.

This completes the configuration of APPC/AIX.

Chapter 8. The PC Server System/390 in a TCP/IP LAN Environment

This chapter shows the various scenarios based on our TCP/IP LAN environment. We have only customized the necessary functions in TCP/IP to be able to verify the connectivity with the PC Server System/390, using the PING and Telnet applications.

Figure 126 depicts the environment we used, with the corresponding IP addresses.

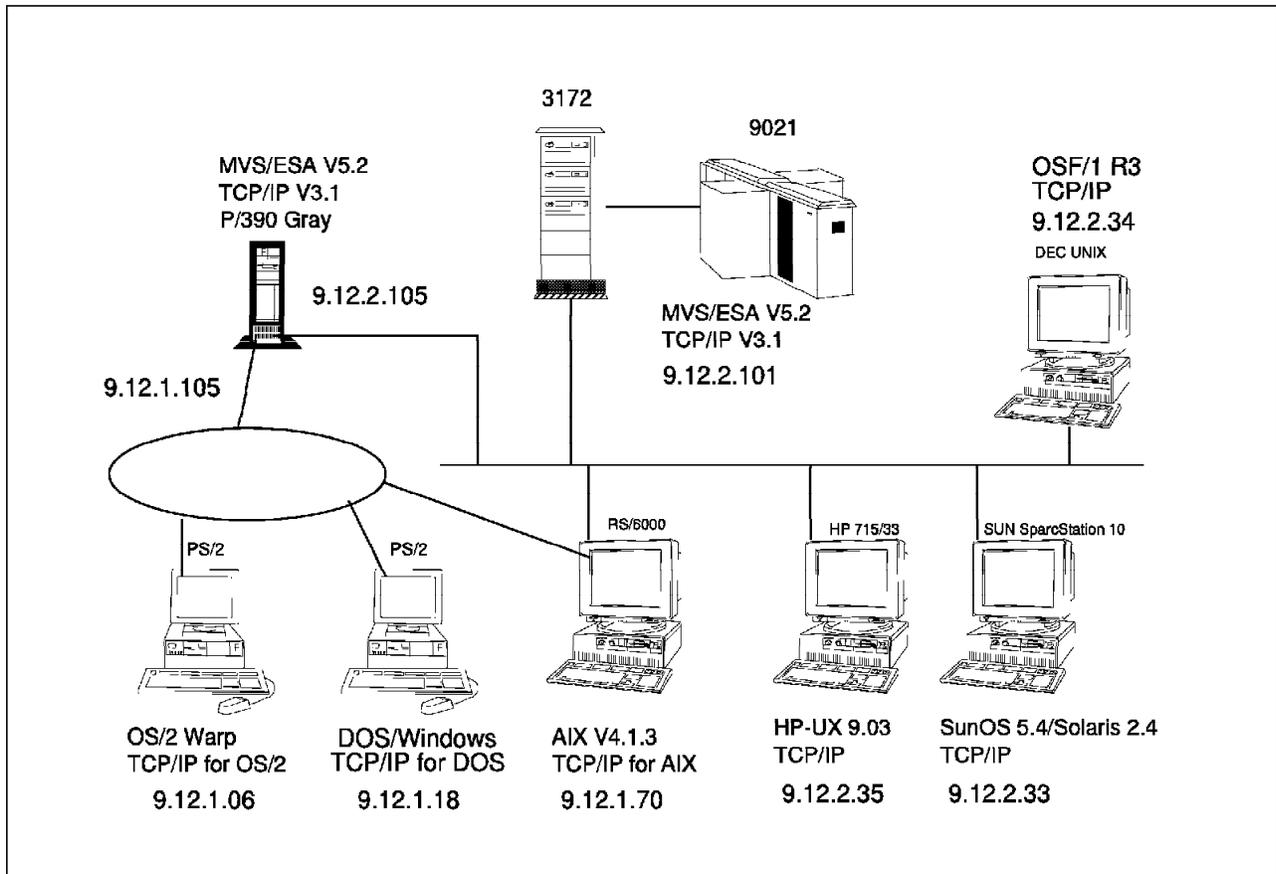


Figure 126. TCP/IP Environment

8.1 Configuring TCP/IP

Basically, when configuring TCP/IP there are only six required elements for a host. These elements, that are described below, can be found in each of the scenarios discussed in this chapter.

1. The IP address of each adapter
2. The network mask for each adapter
3. The IP address of a default gateway (router)
4. The host name

And if you are using a Domain Name Server(DNS) also the following:

5. The domain name
6. The IP address of the DNS

8.2 TCP/IP on PC Server System/390

TCP/IP V3.1 was already installed on our machine, so we only had to customize it. This was done by changing the TCPPROF and TCPDATA member in the TCP/IP installation library.

1. TCPPROF member

A full listing of this member is found in A.1, "Listing of TCPPROF Member" on page 149. In Figure 127 only the parameters that are pertinent to our configuration are explained.

```

.
DEVICE LCS1  LCS          E22          1
LINK TR1    IBMTR        0 LCS1      2
DEVICE LCS2  LCS          E24          3
LINK ETH1   ETHEROR802.3 1 LCS2      4
.
.
HOME
  9.12.1.105 TR1          5
  9.12.2.105 ETH1        5
.
.
GATEWAY
  9          =          TR1      2000    0.255.255.0  0.12.1.0  6
  9          =          ETH1     1500    0.255.255.0  0.12.2.0  6
  DEFAULTNET 9.12.2.32 ETH1     1500    0.255.255.0  0          7
.
BEGINVTAM
; Define the LUs to be used for general users.
DEFAULTLUS 8
  TCP00001 TCP00002 TCP00003 TCP00004 TCP00005
  TCP00006 TCP00007 TCP00008 TCP00009 TCP00010
  TCP00011 TCP00012 TCP00013 TCP00014 TCP00015
  TCP00016 TCP00017 TCP00018 TCP00019 TCP00020
  TCP00021 TCP00022 TCP00023 TCP00024 TCP00025
  TCP00026 TCP00027 TCP00028 TCP00029 TCP00030
ENDDEFAULTLUS
.
.
.
START LCS1 9
START LCS2 9

```

Figure 127. Subset of TCPPROF Member

Notes:

1 LCS1 is the name of the device. You can chose any name you want, but it must be the same on the LINK statement and on the START statement.

The value LCS specifies that the device is a LAN Channel Station.

E22 is the hexadecimal address of the LCS. This is the first address in a required even/odd address pair. The addresses E22 and E23 are defined to the MVS/ESA by using HCD (see 2.4, "PC Server System/390 MVS/ESA Configuration" on page 21). It must also be defined to the PC Server System/390 by using its configurator (see 2.3, "PC Server System/390 Configurator" on page 16).

2 TR1 is a unique assigned link name. This *must* match the name on the HOME statement and the GATEWAY statement.

The next value (0 in our example) is normally 0 for the first protocol network installed in the 3172, 1 for the second protocol network installed, and so on. On the PC Server System/390 where LAPS together with the LCS3172 device manager provides this support, this number *must* correspond to the adapter number give by LAPS for this adapter. See 2.6, "PC Server System/390 LAPS Customization" on page 29. The values 0 and 1, which are assigned to our adapters, would have been reversed if we installed the Ethernet adapter before the token-ring adapter.

3 Here we define our next adapter. The given name is LCS2 and the address pair required to be defined in HCD and PC Server System/390 Configurator is E24 and E25.

4 This is the Ethernet adapter, and it is given the adapter number 1 by LAPS.

ETHERor802.3 is the protocol supported. This value is:

ETHERNET Standard Ethernet protocol only.

802.3 IEEE 802.3 protocol only.

ETHERor802.3 Both standard Ethernet and IEEE 802.3 protocols.

When ETHERor802.3 is specified, ARP packets for both protocols are generated. All devices on the network must be able to process or discard these packets.

The Dual EtherStreamer MC 32 Adapter was defined to support the IEEE802.3 Standard, so we could have specified 802.3. However, we used ETHERor802.3.

5 In the HOME statement the IP address is specified for this host. We have both a token-ring adapter and an Ethernet adapter, therefore we need two different IP addresses.

The TR1 and ETH1 specified after the IP address *must* correspond to the name given to this adapter on the LINK statement.

6 For each adapter the network mask is defined (0.255.255.0) The names TR1 and ETH1 makes the reference to the LINK statement.

7 The default gateway to use, if there is no direct route to the destination address.

8 These statements define the application LU names to use, when a workstation is accessing the PC Server System/390 using Telnet. These names have to match the VTAM definitions shown in Figure 130 on page 131.

9 These adapters are going to be activated during startup. LCS1 and LCS2 correspond to the name on the DEVICE statement.

2. TCPDATA member

A full listing of this member is found in A.2, “Listing of TCPDATA Member” on page 156. In Figure 128 only the parameters that are relevant to our configuration are explained.

```
.
TCPIPJOBNAME TCPIP           1
.
.
DOMAINORIGIN  ITSC.POK.IBM.COM 2
.
.
NSINTERADDR  9.12.1.32       3
.
.
```

Figure 128. Subset of TCPDATA Member

Notes:

1 Specifies the member name of the procedure used to start the TCPIP address space.

2 Specifies the domain origin that is appended to the host name to form the fully qualified domain name for this host. See more about this structure in 1.3.2, “Network and Host Names” on page 11.

3 This statement defines the IP address of a domain name server. You could have more IP addresses to define alternate domain name servers.

Now we have defined all the required elements according to 8.1, “Configuring TCP/IP” on page 127, except the host name. The host name can be specified in the OURMVSNMAME statement in the TCPDATA member or let TCP/IP default to the value specified in the IEFSSNxx member in SYS1.PARMLIB. Here we have the definitions shown in Figure 129.

```
JES2,,PRIMARY          JOB ENTRY SUBSYSTEM
RACF,IRRSSI00,#        RESOURCE ACCESS CONTROL FACILITY
SMS,IGDSSIIN,ID=00     SYSTEM-MANAGED STORAGE
CICS                   CUSTOMER INFORMATION CONTROL SYSTEM
DGOV,DGOVSINI,DGOVENQN DB2 PM SUBSYSTEM
DSN,DSN3INI,'DSN3EP,-' DB2 SUBSYSTEM
IRLM                   IRLM SUBSYSTEM
JRLM                   IRLM SUBSYSTEM
TNF,MVPTSSI           TCP/IP SUBSYSTEM
VMCF,MVPXSSI,P390     TCP/IP SUBSYSTEM
```

Figure 129. IEFSSNxx Member in SYS1.PARMLIB

The last two statements are defining TCP/IP as a subsystem. The last parameter (P390) of the VMCF statement defines the host name if it is not specified in TCPDATA.

3. VTAM application major node

The definitions shown in Figure 130 on page 131 are needed to access the PC Server System/390 through Telnet.

```
SLTCP    VBUILD TYPE=APPL
TCP00001 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00002 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00003 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00004 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00005 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00006 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00007 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00008 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00009 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00010 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00011 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00012 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00013 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00014 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00015 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00016 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00017 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00018 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00019 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00020 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00021 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00022 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00023 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00024 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00025 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00026 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00027 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00028 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00029 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCP00030 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
TCPIMS01 APPL  AUTH=NVPACE,EAS=1,PARSESS=NO,MODETAB=ISTINCLM
```

Figure 130. TCP/IP VTAM Definition

:

8.2.1 TCP/IP on OS/2

This customization was done on PS06 with IP address 9.12.1.06, which was installed with OS/2 Warp Connect. The machine was already prepared for LAN Distance use.

To use a LAN adapter or to move from remote attached to LAN attached, you must change the configuration using the LAN Distance Shuttle Option. This option is available when you close LAN Distance or when you shut down OS/2. You will then receive the panel shown in Figure 131 on page 132.

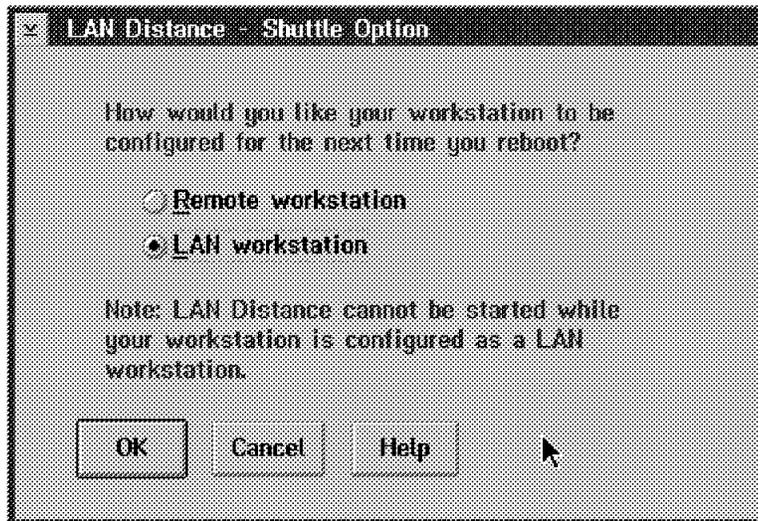


Figure 131. LAN Distance Shuttle Option

Click on **LAN Workstation**, then click on **OK**.

At this point you must reboot the machine so the LAN adapter can be used.

8.2.1.1 Configuring TCP/IP for OS/2

We define the elements described in 8.1, "Configuring TCP/IP" on page 127 by doing the following steps.

1. Double-click on the **TCP/IP** icon.
If it is not on your desktop, it might be in the OS/2 System folder.
2. Double-click on the **TCP/IP Configuration** icon.

This will take you to Figure 132 on page 133 where you have to enter both the IP address and the network mask.

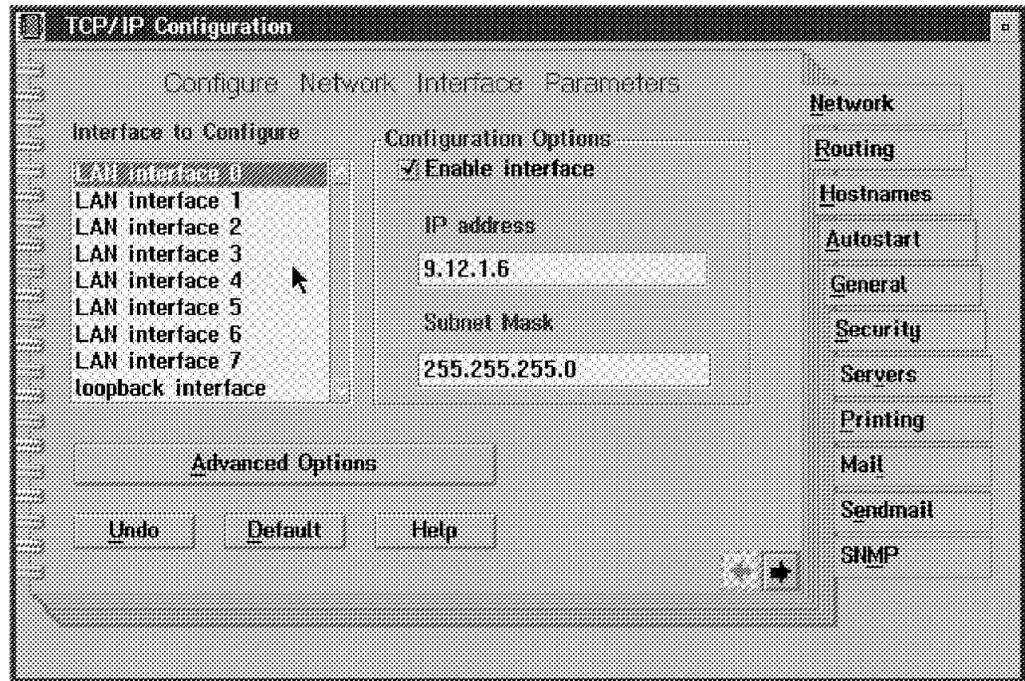


Figure 132. TCP/IP Configuration

3. Select **LAN interface 0**.
4. Enter your IP address.
Our address was 9.12.1.6.
5. Enter your subnet mask.
We used 255.255.255.0.
6. Click on **Routing** to get to the next page, as shown in Figure 133 on page 134. Here you can specify the IP address of the gateway. This is the gateway to ask if a requested destination address is not within this network.

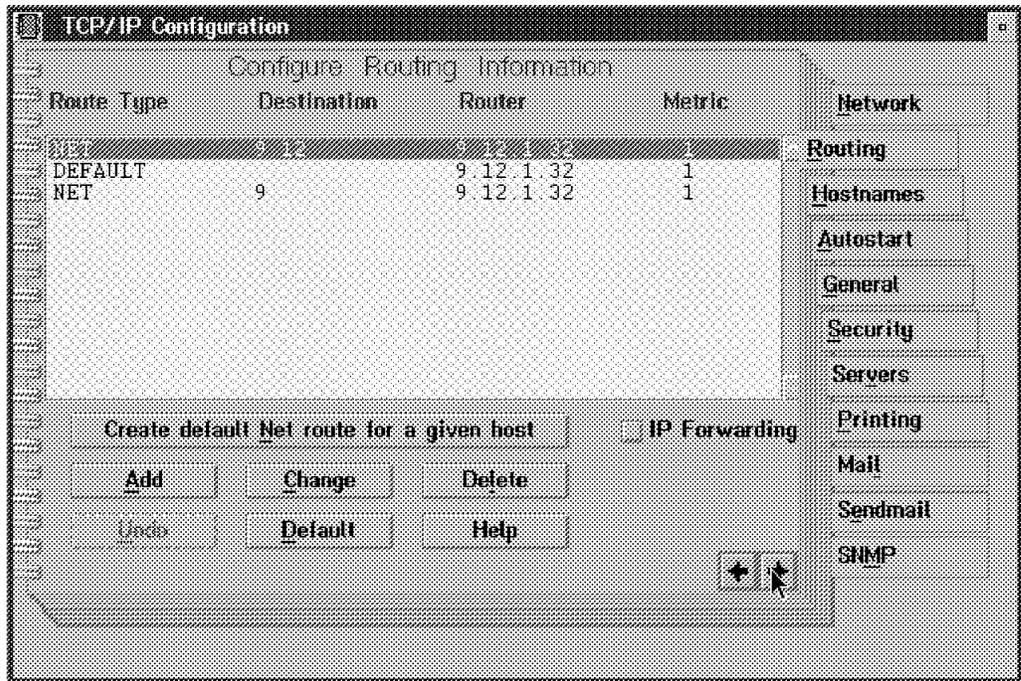


Figure 133. Configure Routing Information

7. Click on **Add** to add the default gateway. This will take you to Figure 134.



Figure 134. TCP/IP Add Route

8. Enter IP address.
Our router (gateway) had IP address 9.12.1.32.
9. Click on **Add**.
This will bring you back to Figure 133, which allows you to add more routing information if required.
10. Click on **Hostnames** to get to the next page, as shown in Figure 135 on page 135.

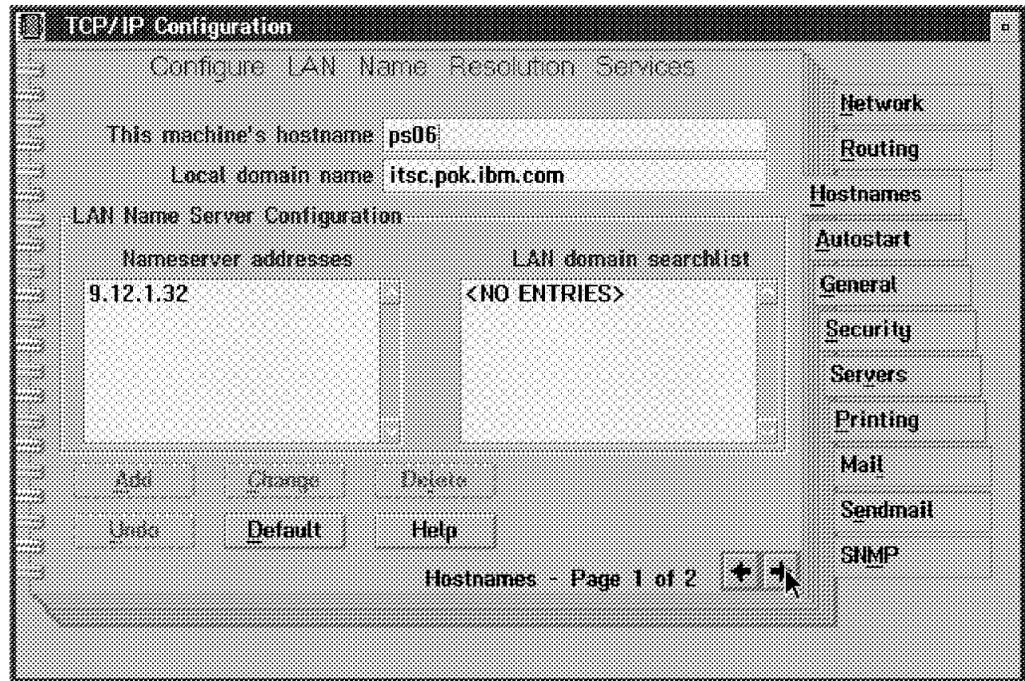


Figure 135. Configure LAN Name Resolution Services

11. Enter host name of this machine.

We used PS06.

12. Enter Local domain name.

We used itsc.pok.ibm.com. This address together with the host name defines a unique name within the network.

13. Enter IP address of the Domain Name Server.

Our Domain Name Server has IP address 9.12.1.32.

14. Press **Add**.

After this we were ready to start TCP/IP.

At this point, we able to PING the PC Server System/390 by issuing the command PING 9.12.1.105.

We also established a telnet connection to the PC Server System/390 by issuing the command telnet 9.12.1.105.

8.2.2 TCP/IP on DOS

This customization was done on PS18 with IP address 9.12.1.18. Here we installed DOS 6.3, Windows 3.11 and TCP/IP for DOS. Then we were ready to do the configuration.

8.2.2.1 Configuring TCP/IP for DOS

Define the elements described in 8.1, "Configuring TCP/IP" on page 127 by doing the following steps.

1. From the command prompt, type the command custom.

This will take you to the welcome panel.

- Click on **Configure** in the top left-hand corner and you will see the panel shown in Figure 136 on page 136. Here you can select different configuration options.

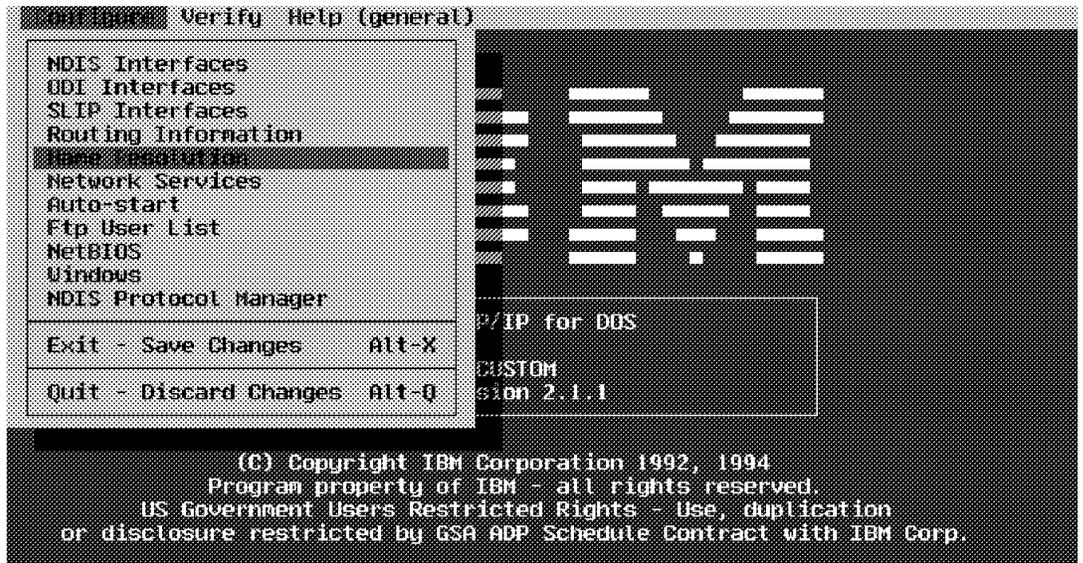


Figure 136. TCP/IP Configuration

- Click on **NDIS Interfaces** and you will see the panel shown in Figure 137, where you have to enter the IP address, the network mask, and the appropriate adapter type.

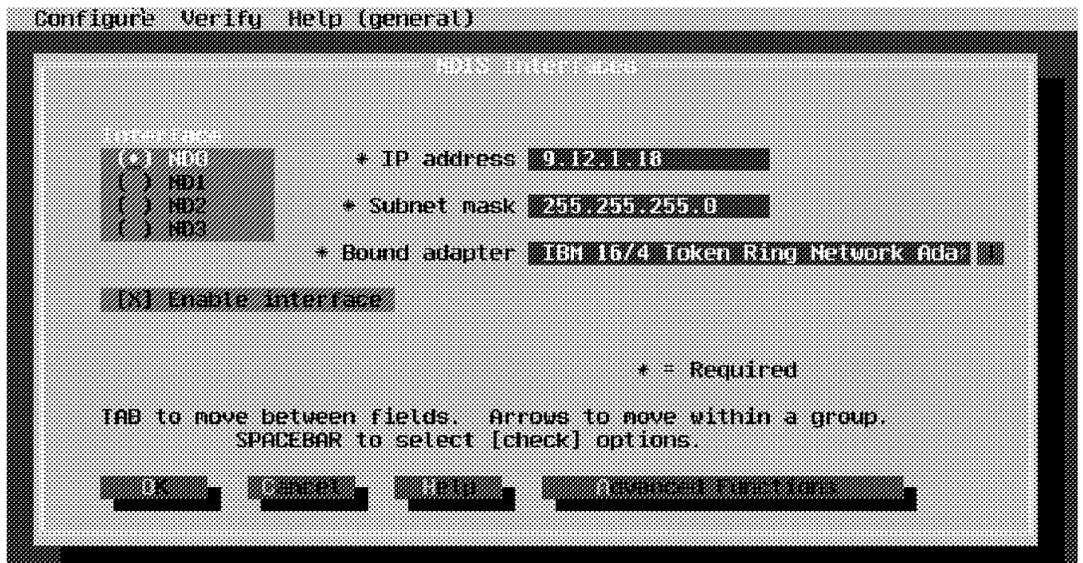


Figure 137. TCP/IP NDIS Interface Configuration

- Select **ND0**.
- Enter your IP address.
Our address was 9.12.1.18.
- Enter your subnet mask.
We used 255.255.255.0.

7. Select your adapter type.

We used IBM 16/4 Token-Ring Network Adapter.

8. Click on **OK**, to get back to Figure 136 on page 136.

9. Click on **Routing Information**, where you enter the default gateway. This is shown in Figure 138. Here you can specify the IP address of the gateway. This is the gateway to ask if a requested destination address is not within this network.

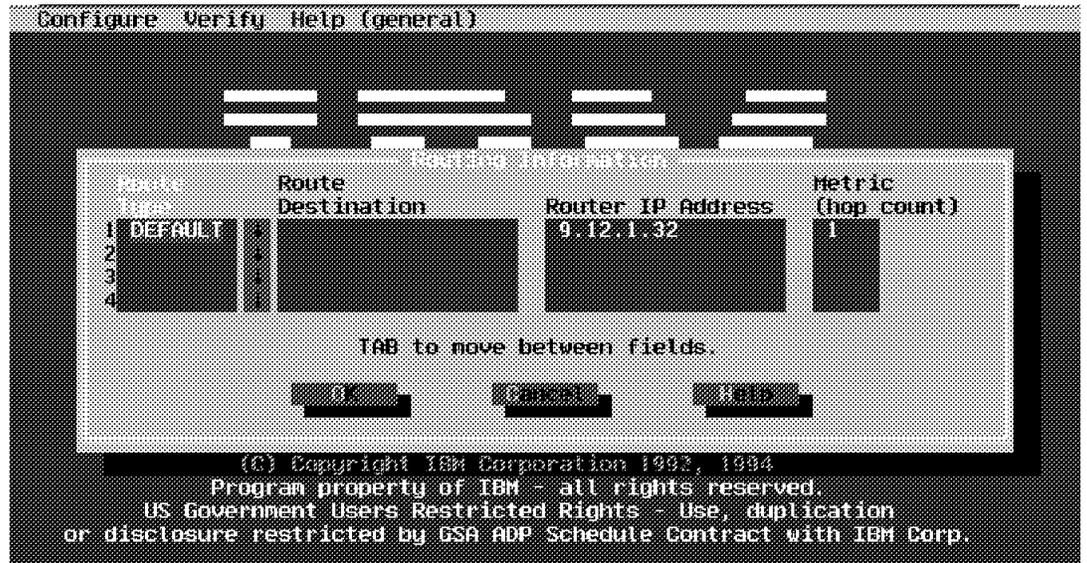


Figure 138. Configure Routing Information

10. Enter DEFAULT in Route Type.

11. Enter IP address in Router IP Address.

Our Router (gateway) has IP address 9.12.1.32.

12. Enter 1 in Metric.

13. Click on **OK**, to get back to Figure 136 on page 136.

14. Click on **Name Resolution**, to get to Figure 139 on page 138.

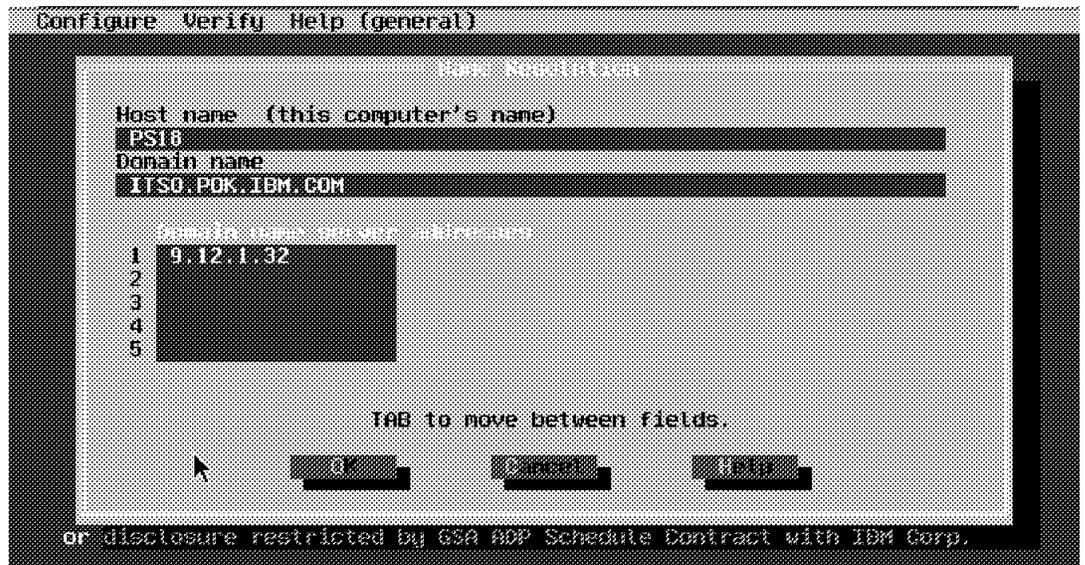


Figure 139. TCP/IP Name Resolution

15. Enter host name of this machine.
We used PS18.
16. Enter Local Domain Name.
We used itsc.pok.ibm.com. This address, together with the host name, defines a unique name within the network.
17. Enter IP address of the Domain Name Server.
Our Domain Name Server has IP address 9.12.1.32.
18. Click on **OK**, to get back to Figure 136 on page 136.
19. Select **Exit - Save Changes** and TCP/IP will do the necessary changes to CONFIG.SYS and AUTOEXEC.BAT. Allow TCP/IP to make these changes.
20. Reboot the machine, and you are ready to start TCP/IP.

We were able to PING PC Server System/390 by issuing the command PING 9.12.1.105.

We also established a Telnet connection with the PC Server System/390 by issuing the command telnet 9.12.1.105.

8.2.3 TCP/IP on AIX

This customization was done on RISC70 with IP address 9.12.1.70 for token-ring and 9.12.2.70 for Ethernet. Here AIX V4.1.3 and TCP/IP were already installed, so we only had to do the configuration.

8.2.3.1 Configuring TCP/IP for AIX

Define the elements described in 8.1, "Configuring TCP/IP" on page 127 by doing the following steps.

1. In a AIXTERM or dterm window enter the command smit.
This will take you to System Management Interface Tool (SMIT).
2. Click on **Communications Applications and Services**.

3. Click on **TCP/IP**.
4. Click on **Minimum Configuration and Setup**.
5. Click on **tr0 Token-Ring Network Interface**, and you will see the panel shown in Figure 140, where you can enter all the values we need for the configuration.

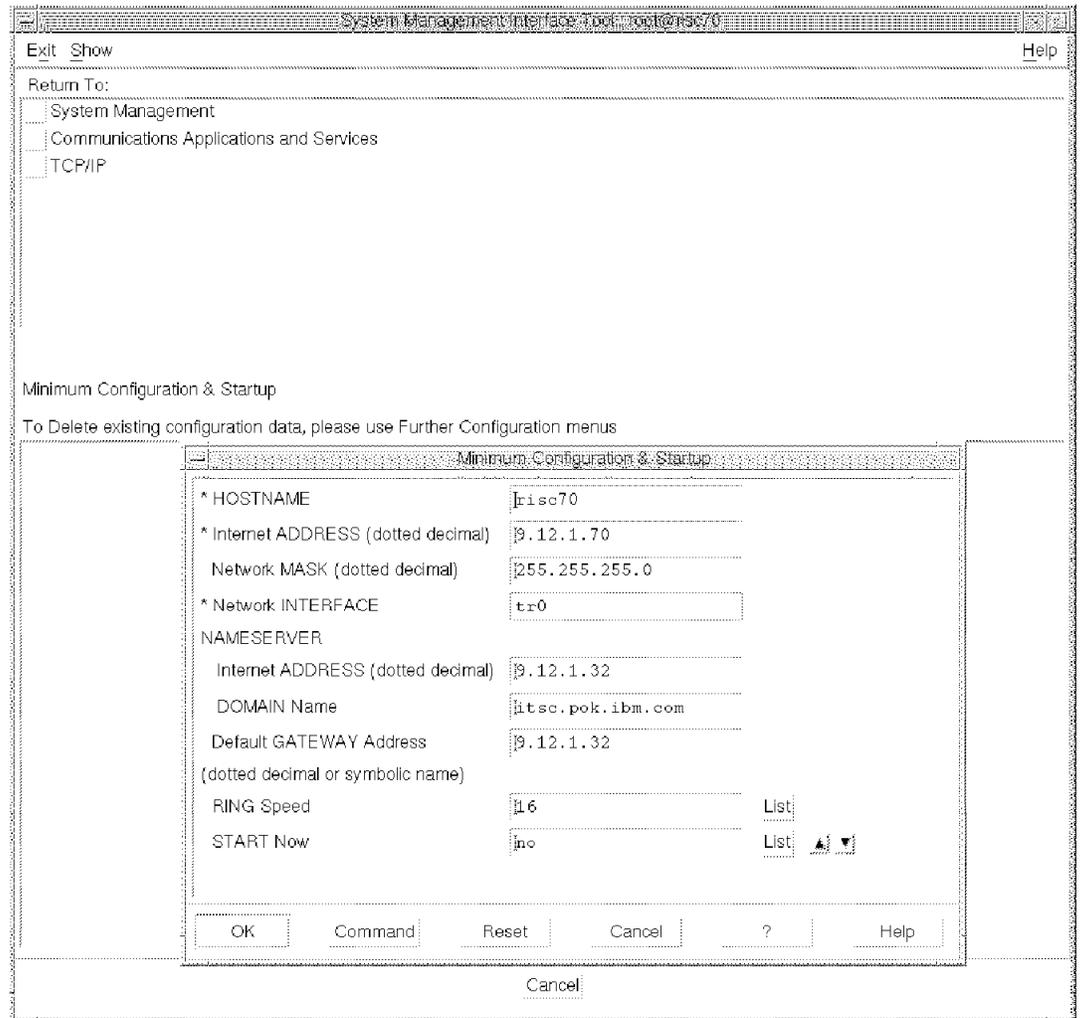


Figure 140. TCP/IP Configuration for Token-Ring

For Ethernet you have to select **en0 Ethernet Network Interface**, and enter a valid Ethernet IP address. For example 9.12.2.70 as shown in Figure 141 on page 140.

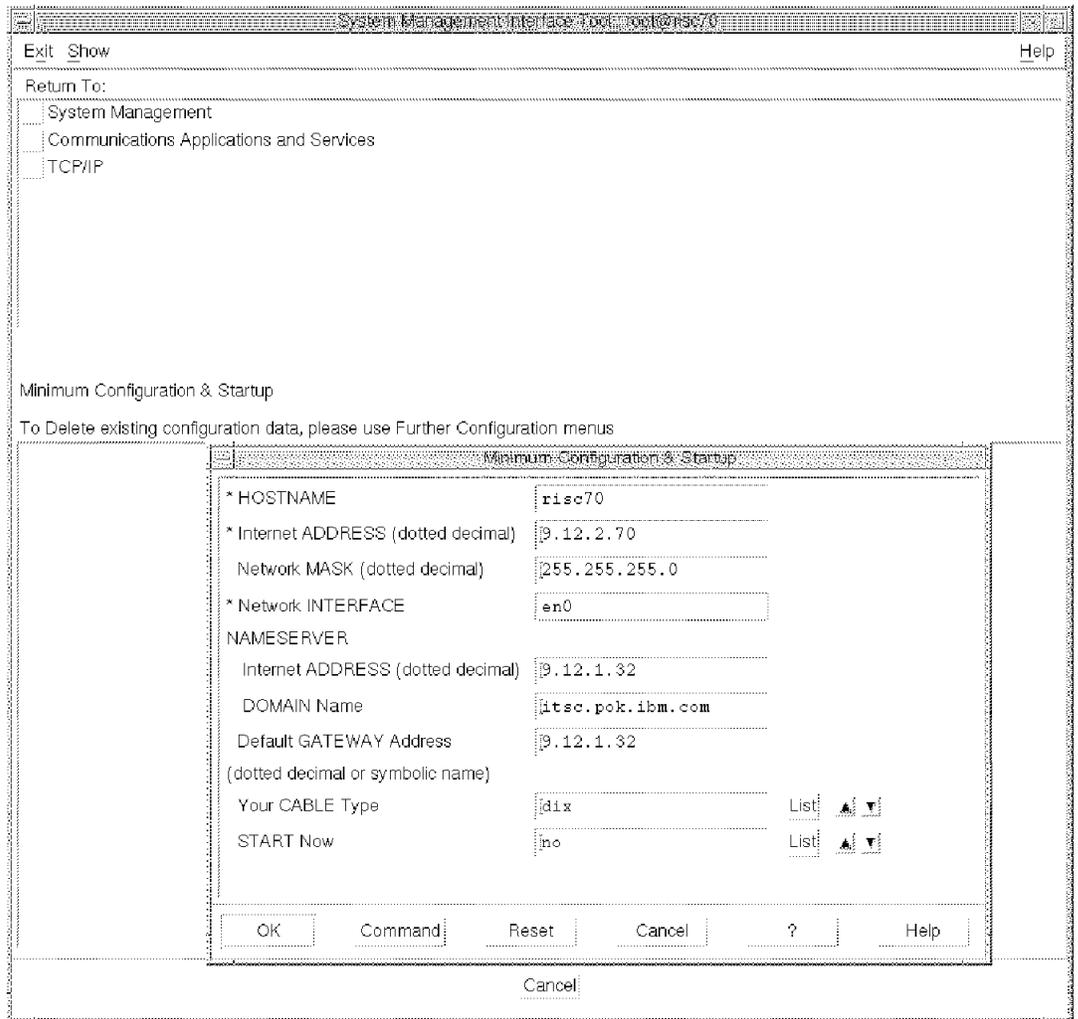


Figure 141. TCP/IP Configuration for Ethernet

For both scenarios:

6. Enter your HOSTNAME.
We used RISC70.
7. Enter your IP address.
Our address was 9.12.1.70.
8. Enter your subnet mask.
We used 255.255.255.0.
9. Enter your Internet ADDRESS for the NameServer.
Our Domain Name Server has IP address 9.12.1.32.
10. Enter your DOMAIN Name.
We used itsc.pok.ibm.com. This address together with the host name gives a unique name within the entire internet.
11. Enter Default GATEWAY Address.
Our router (gateway) has IP address 9.12.1.32.
12. Enter 1 in Metric.

13. Click on **OK**, to save your changes,
 Make sure the changes are executed and accepted.
14. Click on **Done**, to exit.

Chapter 9. Useful Tools

In this chapter we describe some of the tools we have used throughout the scenarios. These tools are easy to use, and could save you a considerable amount of time when debugging or verifying connections. We have used the following tools:

- LANPING
- OS2PING
- APING
- Debugging aids for the device managers

9.1 LANPING

The lanping program is used to identify the path(s) in a LAN to a specific adapter address. It displays the source routing information and times the responses to the replies to a TEST frame. It can be used as a network debugging tool and as an aid to network performance analysis and tuning.

This tool runs under DOS V3.1 or higher only.

9.1.1 Short Description of LANPING

In maintaining a LAN, it occasionally becomes necessary to determine whether or not a specific adapter is inserted into the ring. This was the original purpose of LANPING. The program opens a SAP, sends a TEST frame to the target, and waits a specific amount of time for responses. In the minimal case, which is without any options, the program reports the number of responses it received. If there is no reply during the period, that too is reported. The waiting may be interrupted by hitting any key.

9.1.2 How to use LANPING

The options may be preceded by either a dash or a slash. The options and their defaults are:

```
LANPING          a(dapter)=123456789ABC
                  ( l(ana)={0 1} )           ( 0 )
                  ( d(ata)=n   )           ( 64 )
                  ( sa(p)=nn   )           ( 42 )
                  ( w(ait)=n   )           ( 10 )
```

The different options are described below:

Option	Description
adapter	12-hex digit target address
lana	Denotes which local adapter to use
data	Length of TEST data to send
sap	Specifies the local SAP to use
wait	Number of seconds to wait for responses

9.2 OS2PING

This tool is a fast way to check if there is a physical connection to a token-ring adapter.

9.2.1 Short Description of OS2PING

The OS2PING program is used to identify the path(s) in a LAN to a specific adapter address. It displays the source routing information and times the responses to the replies to a TEST frame. It can be used as a network debugging tool and as a limited aid to network performance analysis and tuning.

It is basically the same as LANPING described in 9.1, "LANPING" on page 143, but OS2PING is running in OS/2 environment.

9.2.2 How to use OS2PING

The options may be preceded by either a dash or a slash. The options and their defaults are:

```
OS2PING          a(dapter)=123456789ABC
                  ( l(ana)={0 1})          ( 0 )
                  ( d(ata)=n )             ( 64 )
                  ( sa(p)=nn )             ( 42 )
                  ( sr(oute) )             ( off )
                  ( p(lainprint))          ( off )
                  ( r(oute) )             ( off )
                  ( t(ime) )              ( off )
                  ( w(ait)=n )            ( 10 )
                  ( m(ac) )               ( off )
```

The different options are described below:

Option	Description
adapter	12-hex digit target address
lana	Denotes which local adapter to use
data	Length of TEST data to send
sap	Specifies the local SAP to use
sroute	Has TEST sent through Single-Route Broadcast
plainprint	Causes display of return RI(unformatted)
route	Causes display of return RI(formatted)
time	Enables an elapsed time measurement
wait	Number of seconds to wait for responses
mac	Now allows PINGing adapters through the RequestRing Station MAC frame. This option is required to ping adapters in the IBM RT/PC and the IBM RS/6000. It requires the adapter's direct station interface.

9.3 APING

APING is a widely available APPC program, that sends data across a network and receives it back. APING can be used to test connectivity between two machines, and give diagnostic information back.

APING is available as a sample program with Networking Services/DOS, SNA Server/6000 and Communications Manager/2

For the mainframe systems APPC suites is also available for many platforms.

For testing the APPN scenarios we used the APINGD program from APPC application suites and available as Program Product 5655-091 for ACF/VTAM V4R2. This suite is included in the ACF/VTAM V4R3 product.

We used the APING for OS/2 program from OS2TOOLS, which is an IBM internal bulletin board. IBM marketing representatives and systems engineers can get access to these bulletin boards.

For our test we used the APING for OS/2 as a client and APINGD running APPC/MVS on the PC Server System/390 as the server.

9.3.1 How to Use APING

The options may be preceded by either a dash or a slash. The options are:

```
APING -flags destination
```

The different options are described below:

Flags	Description
Destination	May be either a symbolic destination name or a NetID.Partner_LU_name or a Partner_LU_Alias.
-m mode_name	Mode_name (default: #INTER).
-t tp_name	Tp_name the TP to start on the server (default: APINGD).
-s N	N is the size of the packet transmitted (default: 100 bytes).
-i N	N is the number of iterations (default: 2).
-c N	N is the number of consecutive packets sent by each side (default: 1).
-1	Only send data from client to server (no echo).
-u user ID	User ID.
-p password	Password.
-n	Do not use any security (SECURITY=NONE).
-q	Do not produce any output.

The minimum time, maximum time, and average time will always be shown.

9.3.2 APING Test Results

After having established the different APPC environments described in this document, we tested APPC using APING on the different workstations and APINGD on the PC Server System/390.

In the first example we executed APING with a fully qualified name (NetID.Partner_LU_name). The first time we executed APING command we received the following output:

```
C:aping syslab.slapingd
APING version 2.44 APPC echo test with timings.
  by Peter J. Schwaller (pjs@ralvm6.vnet.ibm.com)
```

Allocate duration: 4280 ms

Program startup and Confirm duration: 11660 ms

	Duration (msec)	Data Sent (bytes)	Data Rate (KB/s)	Data Rate (Mb/s)
	30	200	6.5	0.052
	30	200	6.5	0.052
Totals:	60	400	6.5	0.052

Duration statistics: Min = 30 Ave = 30 Max = 30

In the example below we executed APING with a Partner_LU_Alias. The second and following times we received:

```
C:aping slapingd
APING version 2.44 APPC echo test with timings.
  by Peter J. Schwaller (pjs@ralvm6.vnet.ibm.com)
```

Allocate duration: 0 ms

Program startup and Confirm duration: 3400 ms

	Duration (msec)	Data Sent (bytes)	Data Rate (KB/s)	Data Rate (Mb/s)
	70	200	2.8	0.022
	70	200	2.8	0.022
Totals:	140	400	2.8	0.022

Duration statistics: Min = 70 Ave = 70 Max = 70

The second time, the allocation was already done, therefore the time in this case is 0 ms for allocation duration.

9.4 Device Manager Tracing

The PC Server System/390 provides some tracing tools to assist if you encounter problems with a device manager. To use any of these tools you must modify the IPL.CMD (OS/2 file), which will activate the trace when you IPL the system.

The following example shows the trace options that are available with the LCS3172 device manager.

```
'AWSSTART LCS3172.EXE w DEBUG(#)'
      |
      |----- AWSTRACE LEVEL CONTROL
      |
      | DEBUG(0) - NO TRACING
      | DEBUG(1) - CHANNEL PARTIAL / LANA PARTIAL (DEF
      | DEBUG(2) - CHANNEL FULL / LANA PARTIAL
      | DEBUG(3) - CHANNEL PARTIAL / LANA FULL
      | DEBUG(4) - CHANNEL FULL / LANA FULL
      |
      | PARTIAL TRACE captures all MAJOR Events
      | FULL/PARTIAL governs MINOR Event detail
      |
      |----- WINDOW OPTION
      |
      | N = NO WINDOW
      | T = WATCH TEXT WINDOW
```

Below is the output you could expect to see from the LCS3172 trace.

```
R/W 0600/0601 BLK 006633A0/00009558 FR 0112768F/0000AA8A XC 49645726/0
- LTLN LANA ADDRESS RECV FRAME 0112769B LOST/LOW 0000001A LOST/OUT 00
- 0200 4000747000C2 XMIT FRAME 0000AA8A LOST/ERR 00000000 -----
```

```
2EF352CE 560601 (XSIDE COMMAND)(07/STARTUP) CCUU=0601
2EF352CE 3F0200 (XSIDE COMMAND)(01/STARTLAN) CMD LTLN=0200
2EF352CE 6B0040 (XSIDE RESPONSE)(04|OD/LANSTAT|LANSTAT2) LAPSTYPE=0040
2EF353AD D7003D (YSIDE SHORT) RECEIVE BUFFER SHORTAGE LEFT=003D
2EF353AD D4007A (YSIDE EVENT)(RECEIVE BUFFERS RECOVERED) BUFFERS=007A
2EF59528 1D0600 (XSIDE HALT)(READY->NOTREADY) CCUU=0600
2EF59528 200200 (XSIDE RESET)(YSIDE DIR.RECEIVE CANCELED) LTLN=0200
2EF59528 1D0601 (XSIDE HALT)(READY->NOTREADY) CCUU=0601
2EF59628 CT|ET 0002435A BLOCK/S 002D FRAME/S 0079 BYTE/S 0000208C W
```

The readme file for the device drivers will give you some information on how to read from the fields. We found it useful to determine whether something was sent or received from the adapter.

Appendix A. Listings

This appendix provides some examples of the members and listing used throughout this document:

- TCPPROF Member
- TCPDATA Member
- NDF File for Subarea Scenario
- NDF File for End Node Scenario for APPC
- NDF File for LEN Node Scenario for APPC
- JES2 Definitions on SLCD07
- JES2 Definitions on SLCD01
- AWSICA and BSC NJE
- JCL used to assemble VTAM tables

A.1 Listing of TCPPROF Member

This is the complete listing of the TCPPROF member used on the PC Server System/390.

```
;
; PROFILE.TCPIP
; =====
;
; COPYRIGHT = NONE.
;
; This is a sample configuration file for the TCPIP address space.
; The POOL sizes listed are the default values and need not be
; specified.
;
; NOTES:
;
;   The device configuration statements MUST be changed to match your
;   hardware and software configuration.
;
;   The BEGINVTAM section must be changed to match your VTAM
;   configuration.
;
;   It is recommended that you establish a TCP maintenance user ID and
;   all occurrences of TCPMAINT be changed to that user ID.
;
; For more information about this file, see "Configuring the TCPIP
; Address Space" and "Configuring the Telnet Server" in the Customization
; and Administration Guide.
;
; -----
;
; The various pool sizes can be customized for your environment.
; Please see the Customization and Administration Guide for details on
; improving your system's overall performance by changing these
; values.
;
; NOTES:
```

```
;
;   If you are running Offload, use a data buffer size of 28672. For
;   example, the statement would be: DATABUFFERPOOLSIZE 160 28672.
;
```

```
ACBPOOLSIZE           1000
ADDRSTRANSLOCATIONPOOLSIZE 1500
CCBPOOLSIZE           150
DATABUFFERPOOLSIZE   160 16384
ENVELOPEPOOLSIZE     750
IPROUTEPOOLSIZE      300
LARGEENVELOPEPOOLSIZE 50 8192
RCBPOOLSIZE          50
SCBPOOLSIZE          256
SKCBPOOLSIZE         256
SMALLDATABUFFERPOOLSIZE 1200
TCBPOOLSIZE          256
TINYDATABUFFERPOOLSIZE 500
UCBPOOLSIZE          100
```

```
;
; -----
;
; Inform the following users of serious errors.
;
```

```
INFORM
  P390
ENDINFORM
```

```
;
; Obey the following users for restricted commands.
;
```

```
OBEY
  P390
ENDOBEY
```

```
;
; -----
;
; Flush the ARP tables every 5 minutes.
;
```

```
ARPAGE 5
```

```
;
; -----
;
; The SYSCONTACT and SYSLOCATION statements are used for SNMP.
;
; SYSCONTACT is the contact person for this managed node and how to
; contact this person. Used for MVS agent MIB variable "sysContact".
;
```

```
SYSCONTACT
  MAIN OPERATOR (555-1234)
ENDSYSCONTACT
```

```

;
; SYSLOCATION is the physical location of this node. Used for MVS
; agent MIB variable "sysLocation".
;
SYSLOCATION
    FIRST FLOOR COMPUTER ROOM
ENDSYSLOCATION

;
; You can specify DATASETPREFIX in the PROFILE.TCPIP and
; TCPIP.DATA data sets. The character string specified as a
; parameter on DATASETPREFIX takes precedence over both the distributed
; or modified data set prefix name as changed by the EZAPPRFX
; installation job. If this statement is used in a profile or
; configuration data set that is allocated to a client or a server, then
; that client or server dynamically allocates additional required data
; sets using the value specified for DATASETPREFIX as the data set name
; prefix. The DATASETPREFIX parameter can be up to 26 characters long,
; and the parameter must NOT end with a period.
;
; For more information please see "Understanding TCP/IP Data Set
; Names" in the Customization and Administration Guide.
;
DATASETPREFIX SYS1
;
; -----
;
; Set Telnet time-out to 10 minutes.
;
INTERNALCLIENTPARMS TIMEMARK 600 ENDINTERNALCLIENTPARMS

;
; -----
;
; AUTOLOG the following servers.
;
;
;AUTOLOG
;  FTPSERVE      ; FTP Server
;  LPSERVE       ; LPD Server
;  NAMESRV       ; Domain Name Server
;  NCPROUT       ; NCPROUTE Server
;  PORTMAP       ; Portmap Server
;  ROUTED        ; RouteD Server
;  RXSERVE       ; Remote Execution Server
;  SMTP          ; SMTP Server
;  SNMPD         ; SNMP Agent Server
;  SNMPQE        ; SNMP Client
;  TCPIPX25      ; X25 Server
;  MVSNFS        ; Network File System Server
;ENDAUTOLOG
;
;
; -----
;
; Reserve ports for the following servers.
;

```

```

; NOTES:
;
;   A port that is not reserved in this list can be used by any user.
;   If you have TCP/IP hosts in your network that reserve ports
;   in the range 1-1023 for privileged applications, you should
;   reserve them here to prevent users from using them.
;
;   The port values below are from RFC 1060, "Assigned Numbers."
;

```

```

PORT
  7 UDP MISC SERV          ; Miscellaneous Server
  7 TCP MISC SERV
  9 UDP MISC SERV
  9 TCP MISC SERV
 19 UDP MISC SERV
 19 TCP MISC SERV
 20 TCP FTPSERV NOAUTOLOG ; FTP Server
 21 TCP FTPSERV          ; FTP Server
 23 TCP INTCLIEN        ; Telnet Server
 25 TCP SMTP            ; SMTP Server
 53 TCP NAMESRV         ; Domain Name Server
 53 UDP NAMESRV         ; Domain Name Server
111 TCP PORTMAP         ; Portmap Server
111 UDP PORTMAP         ; Portmap Server
135 UDP LLBD           ; NCS Location Broker
161 UDP SNMPD          ; SNMP Agent
162 UDP SNMPQE         ; SNMP Query Engine
512 TCP RXSERVE        ; Remote Execution Server
514 TCP RXSERVE        ; Remote Execution Server
515 TCP LPSERVE        ; LPD Server
520 UDP ROUTED         ; Routed Server
580 UDP NCPROUT        ; NCPROUTE Server
750 TCP MVS KERB       ; Kerberos
750 UDP MVS KERB       ; Kerberos
751 TCP ADM@SRV        ; Kerberos Admin Server
751 UDP ADM@SRV        ; Kerberos Admin Server
2049 UDP MVS NFS       ; NFS Server
3000 TCP CICS TCP      ; CICS Socket

```

```

;
; -----
;

```

```

; Hardware definitions:
;
;
;
; LCS1 is a 3172 Model 3 Token-Ring adapter.
; LCS2 is a 3172 Model 3 Ethernet adapter.
;

```

```

DEVICE LCS2  LCS      E22
LINK ETH1  ETHEROR802.3 1 LCS2
DEVICE LCS1  LCS      E24
LINK TR1   IBMTR      0 LCS1

```

```

;
; LCS3 is a 3172 Model 3 FDDI adapter.
;

```

```

;
;DEVICE LCS3  LCS          BEO
;LINK FDDI1 FDDI      0 LCS3
;
;
; OFF1 is a 3172 Model 3 with one LAN adapter, running Offload.
;
;
;DEVICE OFF1 CLAW 5A0 TCPIP OS2TCP NONE
;LINK IPLINK1 OFFLOADLINK1 1 OFF1
;LINK OFFLAN1 OFFLOADAPIBROAD 9.67.43.200 OFF1 IPLINK1
;
;
; SNALUO is an SNA Link.
;
;
;DEVICE SNALUO SNAIUCV SNALINK LU000000 SNALINK
;LINK SNA1 IUCV      1 SNALUO
;
;
; -----
;
; HOME internet (IP) addresses of each link in the host.
;
; NOTE:
;
;   The IP addresses for the links of an Offload box are specified in
;   the LINK statements themselves, and should not be in the HOME list.
;
HOME
  9.12.1.105    TR1
  9.12.2.105    ETH1
;  9.12.3.xxx    FDDI1
;  9.12.7.xxx    SNA1
;
;
; -----
;
; The new PRIMARYINTERFACE statement is used to specify which interface
; is the primary interface. This is required for specifying an Offload
; box as being the primary interface, since the Offload box's links
; cannot appear in the HOME statement.
;
; A link of any type, not just an Offload box, can be specified in the
; PRIMARYINTERFACE statement. If PRIMARYINTERFACE is not specified,
; then the first link in the HOME statement is the primary interface,
; as usual.
;
;
;PRIMARYINTERFACE OFFLAN1
;
;
; -----
;
; IP routing information for the host. All static IP routes should
; be added here.
;

```

```

GATEWAY
;
; Direct Routes - Routes that are directly connected to my interfaces.
;
; Network First Hop Link Name Packet Size Subnet Mask Subnet Value
;
; 9 = TR1 2000 0.255.255.0 0.12.1.0
; 9 = ETH1 1500 0.255.255.0 0.12.2.0
; DEFAULTNET 9.12.2.32 ETH1 1500 0.255.255.0 0
; 128.240 = OFFLAN1 1500 0.0.255.0 0.0.5.0
; 9 = FDDI1 4000 0.255.255.0 0.67.43.0
; 193.7.2.2 = SNA1 2000 HOST
;
; Indirect Routes - Routes that are reachable through routers on my
; network.
;
; Network First Hop Link Name Packet Size Subnet Mask Subnet Value
;
; 193.12.2 130.50.10.1 TR1 2000 0
; 10.5.6.4 193.5.2.10 ETH1 1500 HOST
;
;
; Default Route - All packets to an unknown destination are routed
; through this route.
;
; Network First Hop Link Name Packet Size Subnet Mask Subnet Value
;
; DEFAULTNET 9.67.43.1 FDDI1 DEFAULTSIZE 0
;
; -----
;
; Routed Routing Information
; If you are using Routed, uncomment all the lines below for
; 'BSDROUTINGPARMS', and in the GATEWAY statement, comment out
; the static routes to be dynamically added by Routed.
;
; ; Link Maxmtu Metric Subnet Mask Dest Addr
; ; BSDROUTINGPARMS false
; ; TR1 2000 0 255.255.255.0 0
; ; ETH1 1500 0 255.255.255.0 0
; ; OFFLAN1 1500 0 255.255.255.0 0
; ; FDDI1 DEFAULTSIZE 0 255.255.255.0 0
; ; SNALUO 2000 0 255.255.255.0 193.7.2.2
; ; ENDBSDROUTINGPARMS
;
;
; -----
;
; Use TRANSLATE to specify the hardware address of a specific IP
; address. See the Customization and Administration Guide for more
; information.
;
; TRANSLATE
;
; -----

```

```

;
; Turn off all tracing.  If tracing is to be used, comment out the
; NOTRACE command and insert the TRACE statements here.

NOTRACE
; TRACE      <trace_parameter>
; MORETRACE <trace_parameter>
SCREEN
;
; -----
; Use ASSORTEDPARMS NOFWD to prevent the forwarding of IP packets
; between different networks.  If NOFWD is not specified IP packets
; will be forwarded between networks.
;
;ASSORTEDPARMS
; NOFWD
;ENDASSORTEDPARMS
;
;
; -----
; Define the VTAM parameters required for the Telnet server.
;

BEGINVTAM
; Define logon mode tables to be the defaults shipped with the latest
; level of VTAM
3278-3-E NSX32703 ; 32 line screen - default of NSX32702 is 24 line screen
3279-3-E NSX32703 ; 32 line screen - default of NSX32702 is 24 line screen
3278-4-E NSX32704 ; 48 line screen - default of NSX32702 is 24 line screen
3279-4-E NSX32704 ; 48 line screen - default of NSX32702 is 24 line screen
3278-5-E NSX32705 ; 132 column screen - default of NSX32702 is 80 columns
3279-5-E NSX32705 ; 132 column screen - default of NSX32702 is 80 columns
; Define the LUs to be used for general users.
DEFAULTLUS
TCP00001 TCP00002 TCP00003 TCP00004 TCP00005
TCP00006 TCP00007 TCP00008 TCP00009 TCP00010
TCP00011 TCP00012 TCP00013 TCP00014 TCP00015
TCP00016 TCP00017 TCP00018 TCP00019 TCP00020
TCP00021 TCP00022 TCP00023 TCP00024 TCP00025
TCP00026 TCP00027 TCP00028 TCP00029 TCP00030
ENDDEFAULTLUS
; LUSESSIONPEND ; On termination of a Telnet server connection,
; the user will revert to the DEFAULTAPPL
DEFAULTAPPL TSO ; Set the default application for all Telnet sessions.
LINEMODEAPPL TSO ; Send all line-mode terminals directly to TSO.
ALLOWAPPL TSO* DISCONNECTABLE ; Allow all users access to TSO applications
; TSO is multiple applications all beginning with TSO, so use
; the * to get them all.  If a session is closed, disconnect
; the user rather than log off the user.
RESTRICTAPPL IMS ; Only 3 users can use IMS.
USER USER1 ; Allow user1 access.
LU TCPIMS01 ; Assign USER1 LU TCPIMS01.
USER USER2 ; Allow user2 access from the default LU pool.
USER USER3 ; Allow user3 access from 3 Telnet sessions,
; each with a different reserved LU.
; LU TCPIMS31 LU TCPIMS32 LU TCPIMS33
ALLOWAPPL * ; Allow all applications that have not been
; previously specified to be accessed.

```



```

;*****
; TCPIPJOBNAME specifies the name of the started procedure that was
; used to start the TCPIP address space.   TCPIP is the default.
;
TCPIPJOBNAME TCPIP
;
; HOSTNAME specifies the TCP host name of this system.  If not
; specified, the default HOSTNAME will be the node name specified
; in the IEFSSNxx PARMLIB member.
;
; For example, if this TCPIP.DATA data set is shared between 2
; systems, OURMVSNAME and YOURMVSNAME, then the following 2 lines
; will define the HOSTNAME correctly on each system.
;
;OURMVSNAME:   HOSTNAME P390
;YOURMVSNAME:  HOSTNAME YOURTCPNAME
;
; DOMAINORIGIN specifies the domain origin that will be appended
; to host names passed to the resolver.  If a host name contains
; any dots, then the DOMAINORIGIN will not be appended to the
; host name.
;
DOMAINORIGIN  ITSC.POK.IBM.COM
;
; NSINTERADDR specifies the IP address of the name server.
; LOOPBACK (14.0.0.0) specifies your local name server.  If a name
; server will not be used, then do not code an NSINTERADDR statement.
; (Comment out the NSINTERADDR line below).  This will cause all names
; to be resolved via site table lookup.
;
NSINTERADDR  9.12.1.32
;
; NSPORTADDR specifies the foreign port of the name server.
; 53 is the default value.
;
NSPORTADDR  53
;
; RESOLVEVIA specifies how the resolver is to communicate with the
; name server.  TCP indicates use of TCP virtual circuits.  UDP
; indicates use of UDP datagrams.  The default is UDP.
;
RESOLVEVIA  UDP
;
; RESOLVERTIMEOUT specifies the time in seconds that the resolver
; will wait to complete an open to the name server (either UDP or TCP).
; The default is 30 seconds.
;
RESOLVERTIMEOUT 30
;
; RESOLVERUDPRETRIES specifies the number of times the resolver
; should try to connect to the name server when using UDP datagrams.
; The default is 1.
;
RESOLVERUDPRETRIES 1
;
; TRACE RESOLVER will cause a complete trace of all queries to and
; responses from the name server or site tables to be written to
; the user's console.  This command is for debugging purposes only.
;

```

```

; TRACE RESOLVER
;
;
; You can specify DATASETPREFIX in the PROFILE.TCPIP and TCPIP.DATA
; data sets. The character string specified as a parameter on
; DATASETPREFIX takes precedence over both the distributed or modified
; data set prefix name as changed by the EZAPPRFX installation job.
; If this statement is used in a profile or configuration
; data set that is allocated to a client or a server, then
; that client or server dynamically allocates additional required data
; sets using the value specified for DATASETPREFIX as the data set name
; prefix. The DATASETPREFIX parameter can be up to 26 characters long
; and the parameter must NOT end with a period.
;
; For more information please see "Understanding TCP/IP Data Set
; Names" in the Customization and Administration Guide.
;
DATASETPREFIX SYS1
;
;
; MESSAGECASE MIXED indicates to the FTP server, FTP client, TELNET
; client, and PING client that all messages should be displayed in
; mixed case. MESSAGECASE UPPER indicates to the FTP server, FTP
; client, TELNET client, and PING client that all messages should
; be displayed in uppercase. Mixed case inserts in messages will
; will not be uppercased.
; If MESSAGECASE is not specified, mixed case messages will be used.
;
; MESSAGECASE MIXED
; MESSAGECASE UPPER
;
; LOADDBCSTABLES indicates to the FTP server and FTP client which DBCS
; translation tables should be loaded at initialization time. Remove
; from the list any tables that are not required. If LOADDBCSTABLES is
; not specified, no DBCS tables will be loaded.
;
; LOADDBCSTABLES JIS78KJ JIS83KJ SJISKANJI EUCKANJI HANGEUL KSC5601
; TCHINESE
; *****
;
; End of file.
;

```

A.3 CM/2 NDF File for the Subarea Scenario

```

DEFINE_LOCAL_CP FQ_CP_NAME(SYSLAB.SLPS19 )
                CP_ALIAS(SLPS19 )
                NAU_ADDRESS(INDEPENDENT_LU)
                NODE_TYPE(EN)
                NODE_ID(X'05D20019')
                NW_FP_SUPPORT(NONE)
                HOST_FP_SUPPORT(YES)
                HOST_FP_LINK_NAME(HOST0001)
                MAX_COMP_LEVEL(NONE)
                MAX_COMP_TOKENS(0);

DEFINE_LOGICAL_LINK LINK_NAME(HOST0001)
                   ADJACENT_NODE_TYPE(LEARN)

```

```

DLC_NAME(IBMTRNET)
ADAPTER_NUMBER(0)
DESTINATION_ADDRESS(X'400005003901')
ETHERNET_FORMAT(NO)
CP_CP_SESSION_SUPPORT(YES)
ACTIVATE_AT_STARTUP(NO)
LIMITED_RESOURCE(USE_ADAPTER_DEFINITION)
LINK_STATION_ROLE(USE_ADAPTER_DEFINITION)
SOLICIT_SSCP_SESSION(YES)
NODE_ID(X'05D20019')
MAX_ACTIVATION_ATTEMPTS(USE_ADAPTER_DEFINITION)
USE_PUNAME_AS_CPNAME(NO)
EFFECTIVE_CAPACITY(USE_ADAPTER_DEFINITION)
COST_PER_CONNECT_TIME(USE_ADAPTER_DEFINITION)
COST_PER_BYTE(USE_ADAPTER_DEFINITION)
SECURITY(USE_ADAPTER_DEFINITION)
PROPAGATION_DELAY(USE_ADAPTER_DEFINITION)
USER_DEFINED_1(USE_ADAPTER_DEFINITION)
USER_DEFINED_2(USE_ADAPTER_DEFINITION)
USER_DEFINED_3(USE_ADAPTER_DEFINITION);

DEFINE_DEFAULTS IMPLICIT_INBOUND_PLU_SUPPORT(YES)
DEFAULT_MODE_NAME(BLANK)
MAX_MC_LL_SEND_SIZE(32767)
DIRECTORY_FOR_INBOUND_ATTACHES(*)
DEFAULT_TP_OPERATION(NONQUEUED_AM_STARTED)
DEFAULT_TP_PROGRAM_TYPE(BACKGROUND)
DEFAULT_TP_CONV_SECURITY_RQD(NO)
MAX_HELD_ALERTS(10);

START_ATTACH_MANAGER;

```

A.4 CM/2 NDF File for End Node (APPC) Scenario

```

DEFINE_LOCAL_CP FQ_CP_NAME(SYSLAB.SLPS190I )
CP_ALIAS(slps190i)
NAU_ADDRESS(INDEPENDENT_LU)
NODE_TYPE(EN)
NODE_ID(X'05D20019')
NW_FP_SUPPORT(NONE)
HOST_FP_SUPPORT(YES)
MAX_COMP_LEVEL(NONE)
MAX_COMP_TOKENS(0);

DEFINE_CONNECTION_NETWORK FQ_CN_NAME(SYSLAB.P390LAN )
ADAPTER_INFO( DLC_NAME(IBMTRNET)
ADAPTER_NUMBER(0));

DEFINE_LOGICAL_LINK LINK_NAME(LINK0001)
ADJACENT_NODE_TYPE(NN)
PREFERRED_NN_SERVER(YES)
DLC_NAME(IBMTRNET)
ADAPTER_NUMBER(0)
DESTINATION_ADDRESS(X'40000500390104')
ETHERNET_FORMAT(NO)
CP_CP_SESSION_SUPPORT(YES)
ACTIVATE_AT_STARTUP(YES)
LIMITED_RESOURCE(NO)

```

```

LINK_STATION_ROLE(USE_ADAPTER_DEFINITION)
SOLICIT_SSCP_SESSION(NO)
MAX_ACTIVATION_ATTEMPTS(USE_ADAPTER_DEFINITION)
USE_PUNAME_AS_CPNAME(NO)
EFFECTIVE_CAPACITY(USE_ADAPTER_DEFINITION)
COST_PER_CONNECT_TIME(USE_ADAPTER_DEFINITION)
COST_PER_BYTE(USE_ADAPTER_DEFINITION)
SECURITY(USE_ADAPTER_DEFINITION)
PROPAGATION_DELAY(USE_ADAPTER_DEFINITION)
USER_DEFINED_1(USE_ADAPTER_DEFINITION)
USER_DEFINED_2(USE_ADAPTER_DEFINITION)
USER_DEFINED_3(USE_ADAPTER_DEFINITION);

DEFINE_PARTNER_LU FQ_PARTNER_LU_NAME(SYSLAB.SLAPINGD )
PARTNER_LU_ALIAS(slapingd)
PARTNER_LU_UNINTERPRETED_NAME(SLAPINGD)
MAX_MC_LL_SEND_SIZE(32767)
CONV_SECURITY_VERIFICATION(NO)
PARALLEL_SESSION_SUPPORT(YES);

DEFINE_DEFAULTS IMPLICIT_INBOUND_PLU_SUPPORT(YES)
DEFAULT_MODE_NAME(BLANK)
MAX_MC_LL_SEND_SIZE(32767)
DIRECTORY_FOR_INBOUND_ATTACHES(*)
DEFAULT_TP_OPERATION(NONQUEUED_AM_STARTED)
DEFAULT_TP_PROGRAM_TYPE(BACKGROUND)
DEFAULT_TP_CONV_SECURITY_RQD(NO)
MAX_HELD_ALERTS(10);

START_ATTACH_MANAGER;

```

A.5 CM/2 NDF File for LEN Node (APPC) Scenario

```

DEFINE_LOCAL_CP FQ_CP_NAME(SYSLAB.SLPS190I )
CP_ALIAS(slps190i)
NAU_ADDRESS(INDEPENDENT_LU)
NODE_TYPE(EN)
NODE_ID(X'05D20019')
NW_FP_SUPPORT(NONE)
HOST_FP_SUPPORT(YES)
HOST_FP_LINK_NAME(HOST0001)
MAX_COMP_LEVEL(NONE)
MAX_COMP_TOKENS(0);

DEFINE_CONNECTION_NETWORK FQ_CN_NAME(SYSLAB.P390LAN )
ADAPTER_INFO( DLC_NAME(IBMTRNET)
ADAPTER_NUMBER(0));

DEFINE_LOGICAL_LINK LINK_NAME(HOST0001)
FQ_ADJACENT_CP_NAME(SYSLAB.SLAPINGD )
ADJACENT_NODE_TYPE(LEN)
DLC_NAME(IBMTRNET)
ADAPTER_NUMBER(0)
DESTINATION_ADDRESS(X'40000500390104')
ETHERNET_FORMAT(NO)
CP_CP_SESSION_SUPPORT(NO)
ACTIVATE_AT_STARTUP(YES)
LIMITED_RESOURCE(USE_ADAPTER_DEFINITION)

```

```

LINK_STATION_ROLE(USE_ADAPTER_DEFINITION)
SOLICIT_SSCP_SESSION(YES)
NODE_ID(X'05D20019')
MAX_ACTIVATION_ATTEMPTS(USE_ADAPTER_DEFINITION)
USE_PUNAME_AS_CPNAME(NO)
EFFECTIVE_CAPACITY(USE_ADAPTER_DEFINITION)
COST_PER_CONNECT_TIME(USE_ADAPTER_DEFINITION)
COST_PER_BYTE(USE_ADAPTER_DEFINITION)
SECURITY(USE_ADAPTER_DEFINITION)
PROPAGATION_DELAY(USE_ADAPTER_DEFINITION)
USER_DEFINED_1(USE_ADAPTER_DEFINITION)
USER_DEFINED_2(USE_ADAPTER_DEFINITION)
USER_DEFINED_3(USE_ADAPTER_DEFINITION);

DEFINE_PARTNER_LU FQ_PARTNER_LU_NAME(SYSLAB.SLAPINGD )
PARTNER_LU_ALIAS(slapingd)
PARTNER_LU_UNINTERPRETED_NAME(SLAPINGD)
MAX_MC_LL_SEND_SIZE(32767)
CONV_SECURITY_VERIFICATION(NO)
PARALLEL_SESSION_SUPPORT(YES);

DEFINE_PARTNER_LU_LOCATION FQ_PARTNER_LU_NAME(SYSLAB.SLAPINGD )
WILDCARD_ENTRY(NO)
FQ_OWNING_CP_NAME(SYSLAB.SLAPINGD )
LOCAL_NODE_NN_SERVER(NO);

DEFINE_DEFAULTS IMPLICIT_INBOUND_PLU_SUPPORT(YES)
DEFAULT_MODE_NAME(BLANK)
MAX_MC_LL_SEND_SIZE(32767)
DIRECTORY_FOR_INBOUND_ATTACHES(*)
DEFAULT_TP_OPERATION(NONQUEUED_AM_STARTED)
DEFAULT_TP_PROGRAM_TYPE(BACKGROUND)
DEFAULT_TP_CONV_SECURITY_RQD(NO)
MAX_HELD_ALERTS(10);

START_ATTACH_MANAGER;

```

A.6 JES2 Definitions on the PC Server System/390

```

/* LIB: IP01.PARMLIB(JES2PARM) */ 00010000
/* GDE: CBIPO JES2 */ 00020000
/* DOC: THIS MEMBER CONTAINS A MINIMUM JES2 INITIALIZATION */ 00030000
/* STREAM FOR THE MVS/SP JES2 VERSION 5 RELEASE 2.0 (HJE5520). */ 00040000
/* PARAMETERS IN THIS MEMBER HAVE CHANGED FOR THIS LEVEL */ 00050000
/* OF JES2 AND WILL NOT WORK WITH OLDER LEVELS OF JES2. */ 00060000
/* */ 00070000
/* FULL DESCRIPTIONS OF JES2 INITIALIZATION */ 00080000
/* PARAMETERS AND DEFAULTS ARE CONTAINED IN: */ 00090000
/* MVS/SP VERSION 5 JES2 INITIALIZATION AND */ 00100000
/* TUNING REFERENCE, SC28-1454 */ 00110000
/* */ 00120000
/*****/ 00130000
/*****/ 00140000
/* */ 00150000
/* NOTE: CHANGING ANY OF THE FOLLOWING PARAMETERS WILL PREVENT A */ 00160000
/* JES2 WARMSTART; THEY CAN ONLY BE CHANGED ON A COLDSTART */ 00170000
/* */ 00180000
/* */ 00190000

```

```

/* JOBDEF      JOBNUM=                */ 00200000
/* NJEDEF      OWNNODE=                */ 00210000
/* OUTDEF      JOENUM=                 */ 00220000
/* SPOOLDEF    BUFSIZE=, DSNAME=, SPOOLNUM=, TGNUM=,    */ 00230000
/*            TRKCELL=, VOLUME=        */ 00240000
/*****/ 00250000
                /***** MULTI -ACCESS SPOOL *****/ 00260000
                /*                          */ 00270000
MASDEF  DORMANCY=(100,600), /* Min/Max Dormancy Time */ 00280000
        HOLD=800,          /* Minimum Hold Time     */ 00290000
        LOCKOUT=1200,      /* Lock-out Warning Time  */ 00300000
        OWNMEMB=IPO1,      /* This systems SID       */ 00310000
                /* Removing OWNMEMB causes a default */ 00320000
                /* to the SID value in SMFPRMxx.  */ 00330000
        SHARED=NOCHECK,    /* Don't check for shared DASD */ 00340000
        SYNCTOL=120,      /* Synch.Tolerance (Sec.)  */ 00350000
        XCFGRPNM=IPOGRP   /* MAS unique XCF group name */ 00360000
                /* ----- */ 00370000
                /* MEMBER- Used to define all members */ 00380000
MEMBER(1) NAME=IPO1      /* Member number (1-32) and 1-4 */ 00390000
                /* character member name */ 00400000
                /* This replaces SID parm from MASDEF */ 00410000
                /* as of SP510 */ 00420000
                /* */ 00430000
/*****/ 00440000
NJEDEF  JRNUM=1,JTNUM=1, /* */ 00440100
        LINENUM=10,     /* */ 00440200
        NODENUM=10,     /* */ 00440300
        OWNNODE=1,      /* */ 00440400
        SRNUM=1,        /* */ 00440500
        STNUM=1         /* */ 00440600
                00440700
LOGON1  APPLID=SLP39001 /* */ 00440800
                00440900
APPL(SLP39001) NODE=1   00441000
APPL(WTSCSL2) NODE=2   00441100
                00441200
NODE(1)  NAME=P390NJE, SUB=MVS 00441301
NODE(2)  NAME=WTSCSL2, SUB=MVS 00441401
                00441500
CONNECT NODEA=2,MEMBERA=1,NODEB=1,MEMBERB=1 00441600
                00441700
LINE(1)  UNIT=SNA 00441800
LINE(2)  UNIT=SNA 00441900
LINE(3)  UNIT=SNA 00442000
LINE(4)  UNIT=SNA 00442100
                00442200
                00442300
/*****/ 00442400
                /***** CONSOLE PARAMETERS *****/ 00442500
CONDEF  AUTOCMD=50, /* NUMBER OF AUTOMATIC COMMANDS */ 00442600
        BUFNUM=400, /* NUMBER OF CMB'S */ 00442700
        BUFWARN=80, /* WARNING THRESHOLD % */ 00442800
        CONCHAR=$, /* CONSOLE COMMAND CHARACTER */ 00442900
        DISPLEN=65, /* SCAN CMD/INIT DISPLAY LINE (NEW) */ 00443000
        DISPMAX=100, /* SCAN CMD/INIT MAX LINE (NEW) */ 00444000
        MASMSG=200, /* NUMBER OF QUEUED MESSAGES */ 00445000
        RDRCHAR=$ /* READER COMMAND CHARACTER */ 00446000
                /* */ 00447000

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                                /***** SPOOL DEFINITIONS *****/ 00448000
SPOOLDEF BUFSIZE=3992,          /* MAXIMUM BUFFER SIZE */ 00449000
        DSN=SYS1.HASPACE,      00450000
                                /* SPOOL DATA SETS' NAME */ 00460000
        FENCE=NO,              /* DON'T FORCE TO MINIMUM VOL. */ 00470000
        SPOOLNUM=32,          /* MAXIMUM NUMBER OF SPOOL VOLUMES */ 00480000
        TGBPERVL=10,         /* TRACK GROUPS/BLOB */ 00490000
                                /* NEW FOR JES2 5.1 */ 00500000
        TGSIZE=30,           /* BUFFERS/TRACK GROUP */ 00510000
                                /* NEW FOR JES2 5.1 */ 00520000
        TGSPACE=(MAX=16288,   /* MAX TRACK GROUPS BEFORE COLD START */ 00530000
                WARN=85),    /* WARNING THRESHOLD */ 00540000
        TRKCELL=3,          /* BUFFERS/TRACK-CELL */ 00550000
        VOLUME=MVSV5        /* SPOOL VOLUME SERIAL */ 00560000
                                /***** CHECKPOINT PARAMETERS *****/ 00570000
CKPTDEF CKPT1=(DSN=SYS1.HASPKPT, 00580000
        /*DATA SET NAME FOR CHECKPOINT*/ 00590000
        VOLSER=MVSV5R,      /* CHECKPOINT VOLSER */ 00600000
        INUSE=YES),        /* USE THIS DATA SET FOR CHECKPOINT */ 00610000
        MODE=DUAL,         /* NO DUPLEXING */ 00620000
        LOGSIZE=1,        /* NUMBER 4K PAGES FOR CHANGE LOG */ 00630000
        APPLCOPY=NONE,     /* NO COPY FOR APPLICATION PGMS */ 00640000
        VERSIONS=(NUMBER=00, /* MAX NUMBER OF CKPTDEF */ 00650000
                WARN=80)   /* WARN=80% */ 00660000
                                /* */ 00670000
OUTDEF COPIES=30,          /* MAX NUMBER OF COPIES ALLOWED */ 00680000
        DMNDSET=YES,       /* DEMAND SETUP */ 00690000
        JOENUM=1500,       /* MAX NUMBER OF JOES */ 00700000
        JOEWARN=80,        /* WARNING THRESHOLD % */ 00710000
        PRTHIGH=10,        /* CEILING FOR PRTY AGING */ 00720000
        PRTYLOW=1,         /* FLOOR FOR PRTY AGING */ 00730000
        PRTYOUT=NO,        /* NO PRTY= ON // OUTPUT */ 00740000
        STDFORM=STD,       /* DEFAULT FORMS ID */ 00750000
        USERSET=NO        /* NO USER DEMAND-SETUP */ 00760000
                                /* */ 00770000
                                /** DEFAULT ESTIMATED SYSOUT LINES/JOB*/ 00780000
ESTLNCT NUM=12,           /* # OF LINES FOR FIRST MESSAGE */ 00790000
        INT=6000,          /* THEN AT 6000 LINE INTERVALS */ 00800000
        OPT=0              /* ALLOW JOBS TO CONTINUE */ 00810000
                                /* */ 00820000
                                /** DEFAULT ESTIMATED SYSOUT CARDS/JOB*/ 00830000
ESTPUN NUM=500,           /* 500 CARDS FOR FIRST MESSAGE */ 00840000
        INT=500,           /* THEN AT 500 CARD INTERVALS */ 00850000
        OPT=0              /* ALLOW JOBS TO CONTINUE */ 00860000
                                /* */ 00870000
                                /***** JOB CHARACTERISTICS *****/ 00880000
JOBDEF ACCTFLD=OPTIONAL,   /* ACCOUNTING FIELD OPTIONAL */ 00890000
        JCLERR=YES,        /* TERMINATE JOB W/JCL ERROR */ 00900000
        JOBNUM=2000,       /* JOB QUEUE SIZE */ 00910000
        JOBWARN=80,        /* WARNING THRESHOLD % */ 00920000
        JNUMWARN=80,       /* WARNING THRESHOLD % */ 00930000
        PRTHIGH=10,        /* UPPER LIMIT FOR AGING */ 00940000
        PRTYJECL=YES,      /* PRIORITY JECL SUPPORTED */ 00950000
        PRTYJOB=NO,        /* PRTY= ON JOB NOT SUPPORTED */ 00960000
        PRTYLOW=1,         /* LOWER LIMIT FOR AGING */ 00970000
        PRTYRATE=1,        /* PRTY AGING RATE X/DAY */ 00980000
        RANGE=(1-9999)     /* LOCAL JOB NUMBER RANGE */ 00990000
                                /* */ 01000000

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/***** INITIATORS *****/ 01010000
INITDEF PARTNUM=10      /* NUMBER OF INITIATORS */ 01020000
/*                      */ 01030000
/***** DEFAULT OUTPUT PRIORITY *****/ 01040000
OUTPRTY1 PRIORITY=9,   /* OUTPUT PRTY IS 9 IF */ 01050000
RECORD=600            /* < 600 RECORDS      */ 01060000
OUTPRTY2 PRIORITY=8,   /* OUTPUT PRTY IS 8 IF */ 01070000
RECORD=1200           /* < 1200 RECORDS     */ 01080000
OUTPRTY3 PRIORITY=7,   /* OUTPUT PRTY IS 7 IF */ 01090000
RECORD=2400           /* < 2400 RECORDS     */ 01100000
OUTPRTY4 PRIORITY=6,   /* OUTPUT PRTY IS 6 IF */ 01110000
RECORD=4800           /* < 4800 RECORDS     */ 01120000
OUTPRTY5 PRIORITY=5,   /* OUTPUT PRTY IS 5 IF */ 01130000
RECORD=9600           /* < 9600 RECORDS     */ 01140000
OUTPRTY6 PRIORITY=4,   /* OUTPUT PRTY IS 4 IF */ 01150000
RECORD=20000          /* < 20000 RECORDS    */ 01160000
OUTPRTY7 PRIORITY=3,   /* OUTPUT PRTY IS 3 IF */ 01170000
RECORD=40000          /* < 40000 RECORDS    */ 01180000
OUTPRTY8 PRIORITY=2,   /* OUTPUT PRTY IF 2 IF */ 01190000
RECORD=80000          /* < 80000 RECORDS    */ 01200000
OUTPRTY9 PRIORITY=1,   /* OUTPUT PRTY IS 1 IF */ 01210000
RECORD=16777215      /* < 16777215 RECORDS */ 01220000
/*                      */ 01230000
/***** INTERNAL READER *****/ 01240000
INTRDR RDINUM=15      /* NUMBER OF INTERNAL READERS */ 01250000
/*                      */ 01260000
/***** PRINTING CHARACTERISTICS *****/ 01270000
PRINTDEF CCWNUM=50,   /* # OF CCWS / PRINT BUFFER */ 01280000
DBLBUFR=YES,         /* DOUBLE BUFFER LOCAL PRINTERS */ 01290000
FCB=6,               /* INITIAL FCB LOADED      */ 01300000
LINECT=61            /* 61 LINES PER PAGE       */ 01310000
/*                      */ 01320000
/***** PRINTER PARAMETERS *****/ 01330000
PRT(1)                /* USE TRACK CELLING ON THIS PRINTER */ 01340000
/***** 01350000
/* EXAMPLE OF SPECIFICATIONS FOR A 3800 PRINTER */ 01360000
/* PRT(2) UNIT=C18,CLASS=AD0Y46, */ 01370000
/* CKPTPAGE=100,DRAIN, */ 01380000
/* UCS=GF10,FCB=STD3,MARK, */ 01390000
/* WS=(W,Q,R,PRM,LIM/F,T,C) */ 01400000
/***** 01410000
/*                      */ 01420000
/***** LOGICAL INITIATORS *****/ 01430000
I1 NAME=A,            /* INITIATOR NAME */ 01440000
CLASS=A,              /* INITIAL JOB CLASSES */ 01450000
START=YES             /* START AUTOMATICALLY */ 01460000
I2 NAME=B,            /* INITIATOR NAME */ 01470000
CLASS=BA,             /* INITIAL JOB CLASSES */ 01480000
START=YES             /* START AUTOMATICALLY */ 01490000
I3 NAME=C,            /* INITIATOR NAME */ 01500000
CLASS=CBA,            /* INITIAL JOB CLASSES */ 01510000
START=YES             /* START AUTOMATICALLY */ 01520000
I4 NAME=D,            /* INITIATOR NAME */ 01530000
CLASS=DCBA,           /* INITIAL JOB CLASSES */ 01540000
START=YES             /* START AUTOMATICALLY */ 01550000
I5 NAME=E,            /* INITIATOR NAME */ 01560000
CLASS=EDCBA,          /* INITIAL JOB CLASSES */ 01570000
START=NO              /* OPERATOR START      */ 01580000
I6 NAME=F,            /* INITIATOR NAME */ 01590000

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CLASS=F, /* INITIAL JOB CLASSES */ 01600000
START=NO /* OPERATOR START */ 01610000
I7 NAME=G, /* INITIATOR NAME */ 01620000
CLASS=G, /* INITIAL JOB CLASSES */ 01630000
START=NO /* OPERATOR START */ 01640000
I8 NAME=H, /* INITIATOR NAME */ 01650000
CLASS=H, /* INITIAL JOB CLASSES */ 01660000
START=NO /* OPERATOR START */ 01670000
I9 NAME=I, /* INITIATOR NAME */ 01680000
CLASS=I, /* INITIAL JOB CLASSES */ 01690000
START=YES /* AUTOMATIC START */ 01700000
I10 NAME=W, /* INITIATOR NAME */ 01710000
CLASS=W, /* INITIAL JOB CLASSES */ 01720000
START=YES /* AUTOMATIC START */ 01730000
/***** JOB CLASS DEFINITIONS *****/ 01740000
JOBCLASS(A) ACCT=NO, /* ACCT # NOT REQUIRED */ 01750000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 01760000
TIME=(60,0), /* JOB STEP TIME */ 01770000
REGION=1M, /* REGION SIZE */ 01780000
XBM=, /* XBATC KEYWORD */ 01790000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 01800000
BLP=YES, /* PROCESS BLP */ 01810000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 01820000
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */ 01830000
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */ 01840000
JOBCLASS(B) ACCT=NO, /* ACCT # NOT REQUIRED */ 01850000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 01860000
TIME=(60,0), /* JOB STEP TIME */ 01870000
REGION=1M, /* REGION SIZE */ 01880000
XBM=, /* XBATC KEYWORD */ 01890000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 01900000
BLP=YES, /* PROCESS BLP */ 01910000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 01920000
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */ 01930000
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */ 01940000
JOBCLASS(C) ACCT=NO, /* ACCT # NOT REQUIRED */ 01950000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 01960000
TIME=(60,0), /* JOB STEP TIME */ 01970000
REGION=1M, /* REGION SIZE */ 01980000
XBM=, /* XBATC KEYWORD */ 01990000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 02000000
BLP=YES, /* PROCESS BLP */ 02010000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 02020000
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */ 02030000
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */ 02040000
JOBCLASS(D) ACCT=NO, /* ACCT # NOT REQUIRED */ 02050000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 02060000
TIME=(60,0), /* JOB STEP TIME */ 02070000
REGION=1M, /* REGION SIZE */ 02080000
XBM=, /* XBATC KEYWORD */ 02090000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 02100000
BLP=YES, /* PROCESS BLP */ 02110000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 02120000
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */ 02130000
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */ 02140000
JOBCLASS(E) ACCT=NO, /* ACCT # NOT REQUIRED */ 02150000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 02160000
TIME=(60,0), /* JOB STEP TIME */ 02170000
REGION=1M, /* REGION SIZE */ 02180000

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XBM=, /* XBATCH KEYWORD */ 02190000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 02200000
BLP=YES, /* PROCESS BLP */ 02210000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 02220000
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */ 02230000
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */ 02240000
JOBCLASS(F) ACCT=NO, /* ACCT # NOT REQUIRED */ 02250000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 02260000
TIME=(60,0), /* JOB STEP TIME */ 02270000
REGION=1M, /* REGION SIZE */ 02280000
XBM=, /* XBATCH KEYWORD */ 02290000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 02300000
BLP=YES, /* PROCESS BLP */ 02310000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 02320000
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */ 02330000
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */ 02340000
JOBCLASS(G) ACCT=NO, /* ACCT # NOT REQUIRED */ 02350000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 02360000
TIME=(60,0), /* JOB STEP TIME */ 02370000
REGION=1M, /* REGION SIZE */ 02380000
XBM=, /* XBATCH KEYWORD */ 02390000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 02400000
BLP=YES, /* PROCESS BLP */ 02410000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 02420000
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */ 02430000
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */ 02440000
JOBCLASS(H) ACCT=NO, /* ACCT # NOT REQUIRED */ 02450000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 02460000
TIME=(60,0), /* JOB STEP TIME */ 02470000
REGION=1M, /* REGION SIZE */ 02480000
XBM=, /* XBATCH KEYWORD */ 02490000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 02500000
BLP=YES, /* PROCESS BLP */ 02510000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 02520000
MSGLEVEL=(1,1), /* DON'T JOURNAL THIS JOB CLASS */ 02530000
JOURNAL=YES /* JOURNAL THIS JOB CLASS */ 02540000
JOBCLASS(I) ACCT=NO, /* ACCT # NOT REQUIRED */ 02550000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 02560000
TIME=(60,0), /* JOB STEP TIME */ 02570000
REGION=1M, /* REGION SIZE */ 02580000
XBM=, /* XBATCH KEYWORD */ 02590000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 02600000
BLP=YES, /* PROCESS BLP */ 02610000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 02620000
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */ 02630000
JOURNAL=YES /* JOURNAL THIS JOB CLASS */ 02640000
JOBCLASS(W) ACCT=NO, /* ACCT # NOT REQUIRED */ 02650000
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */ 02660000
TIME=(60,0), /* JOB STEP TIME */ 02670000
REGION=1M, /* REGION SIZE */ 02680000
XBM=, /* XBATCH KEYWORD */ 02690000
COMMAND=DISPLAY, /* DISPLAY COMMANDS */ 02700000
BLP=YES, /* PROCESS BLP */ 02710000
AUTH=ALL, /* ALLOW ALL COMMANDS */ 02720000
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */ 02730000
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */ 02740000
/* */ 02750000
/***** OUTPUT CLASS ATTRIBUTES *****/ 02760000
OUTCLASS(A) OUTDISP=WRITE, /* NOT A HELD CLASS */ 02770000

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        OUTPUT=PRINT,      /* PRINT CLASS                */ 02780000
        TRKCELL=YES       /* TRACK-CELL THIS CLASS     */ 02790000
OUTCLASS(B) OUTDISP=WRITE, /* NOT A HELD CLASS          */ 02800000
        OUTPUT=PUNCH,    /* PUNCH CLASS                */ 02810000
        TRKCELL=NO       /* NO TRACK CELL              */ 02820000
OUTCLASS(D) OUTDISP=HOLD, /* IS A HELD CLASS           */ 02830000
        OUTPUT=PRINT,    /* PRINT CLASS                */ 02840000
        TRKCELL=NO       /* NO TRACK CELL              */ 02850000
OUTCLASS(J) OUTDISP=WRITE, /* NOT A HELD CLASS          */ 02860000
        OUTPUT=PRINT,    /* PRINT CLASS                */ 02870000
        TRKCELL=YES       /* TRACK-CELL THIS CLASS     */ 02880000
OUTCLASS(K) OUTDISP=WRITE, /* NOT A HELD CLASS          */ 02890000
        OUTPUT=PUNCH,    /* PUNCH CLASS                */ 02900000
        TRKCELL=NO       /* NO TRACK CELL              */ 02910000
OUTCLASS(L) OUTDISP=WRITE, /* NOT A HELD CLASS          */ 02920000
        OUTPUT=PRINT,    /* PRINT CLASS                */ 02930000
        TRKCELL=NO       /* NO TRACK CELL              */ 02940000
OUTCLASS(O) OUTDISP=HOLD, /* IS A HELD CLASS           */ 02950000
        OUTPUT=PRINT,    /* PRINT CLASS                */ 02960000
        TRKCELL=YES       /* TRACK-CELL THIS CLASS     */ 02970000
OUTCLASS(6) OUTDISP=WRITE, /* NOT A HELD CLASS          */ 02980000
        OUTPUT=PRINT,    /* PRINT CLASS                */ 02990000
        TRKCELL=NO       /* NO TRACK CELL              */ 03000000
OUTCLASS(X) OUTDISP=HOLD, /* IS A HELD CLASS           */ 03010000
        OUTPUT=PRINT,    /* PRINT CLASS                */ 03020000
        TRKCELL=YES       /* TRACK-CELL THIS CLASS     */ 03030000
OUTCLASS(Z) OUTDISP=WRITE, /* NOT A HELD CLASS          */ 03040000
        OUTPUT=PRINT,    /* PRINT CLASS                */ 03050000
        TRKCELL=NO       /* NO TRACK CELL              */ 03060000
        /*                */ 03070000
        /****** STC DEFAULTS *****/ 03080000
STCCCLASS TIME=(60,00), /* JOB STEP TIME              */ 03090000
        REGION=1M,      /* REGION SIZE                 */ 03100000
        COMMAND=DISPLAY, /* EXECUTE COMMANDS           */ 03110000
        BLP=YES,        /* USE BLP PARM                */ 03120000
        AUTH=ALL,       /* ALLOW ALL COMMANDS         */ 03130000
        MSGLEVEL=(1,1), /* JOB, ALL MSGS              */ 03140000
        IEFUJP=YES,     /* DO TAKE SMF JOB PURGE EXIT */ 03150000
        IEFUSO=YES,     /* DO TAKE SYSOUT EXCESS EXIT */ 03160000
        LOG=NO,         /* DON'T PRINT JES2 JOB LOG   */ 03170000
        OUTPUT=YES,     /* PRODUCE OUTPUT FOR JOBS    */ 03180000
        PERFORM=0,      /* SRM PERFORMANCE GROUP     */ 03190000
        PROCLIB=00,     /* USE //PROCOO DD            */ 03200000
        TYPE6=YES,      /* PRODUCE SMF 6 RECORDS     */ 03210000
        TYPE26=YES,     /* PRODUCE SMF 26 RECORDS    */ 03220000
        OUTDISP=WRITE, /* NOT A HELD CLASS           */ 03230000
        MSGCLASS=Z      /* DEFAULT MSGCLASS           */ 03240000
        /*                */ 03250000
        /****** TSU DEFAULTS *****/ 03260000
TSUCLASS TIME=(60,00), /* JOB STEP TIME              */ 03270000
        REGION=1M,      /* REGION SIZE                 */ 03280000
        COMMAND=DISPLAY, /* EXECUTE COMMANDS           */ 03290000
        BLP=YES,        /* USE BLP PARM                */ 03300000
        AUTH=ALL,       /* ALLOW ALL COMMANDS         */ 03310000
        MSGLEVEL=(1,1), /* JOB, ALL MSGS              */ 03320000
        IEFUJP=YES,     /* DO TAKE SMF JOB PURGE EXIT */ 03330000
        IEFUSO=YES,     /* DO TAKE SYSOUT EXCESS EXIT */ 03340000
        LOG=NO,         /* DON'T PRINT JES2 JOB LOG   */ 03350000
        OUTPUT=YES,     /* PRODUCE OUTPUT FOR JOBS    */ 03360000

```

```

        PERFORM=0,          /* SRM PERFORMANCE GROUP          */ 03370000
        PROCLIB=00,        /* USE //PROCOO DD                 */ 03380000
        TYPE6=YES,         /* PRODUCE SMF 6 RECORDS          */ 03390000
        TYPE26=YES,        /* PRODUCE SMF 26 RECORDS         */ 03400000
        MSGCLASS=Z         /* DEFAULT MSGCLASS                */ 03410000
        /*                  */ 03420000
        /****** TSU DEFAULTS *****/ 03430000
TPDEF  BELOWBUF=(LIMIT=10, /* NUMBER OF TP BUFFERS          */ 03440000
        SIZE=520,          /* SIZE OF BSC BUFFERS           */ 03450000
        WARN=80),         /* THRESHOLD PERCENTAGE          */ 03460000
        MBUFSIZE=400,     /* SIZE IN BYTES OF MULTILEVELING */ 03470000
        RMTMSG=255,       /* MAX NO. OF MSG'S QUEUED       */ 03480000
        SESSION=999,      /* VTAM SESSION                   */ 03490000
        EXTBUF=(LIMIT=46, /* SNA TELEPROCESSING            */ 03500000
        SIZE=520,         /*                  */ 03510000
        WARN=80)         /*                  */ 03520000
        /******                */ 03530000
        /** BUFFER DEF'S      */ 03540000
BUFDEF  EXTBUF=(LIMIT=160, /*                  */ 03550000
        WARN=80)         /*                  */ 03560000
        /******                */ 03570000
SMFDEF  BUFNUM=500,       /* SMF DEF'S                      */ 03580000
        BUFWARN=85       /*                  */ 03590000
        /******                */ 03600000
DISPLAY SPOOLDEF VOLUME 03610000
DISPLAY CKPTDEF CKPT1   03620000

```

A.7 JES2 Definitions on SLCD01

```

/*****
/* LIB: SYS1.PARMLIB(JES2PARAM) */
/* GDE: CBIPO JES2                */
/* DOC: THIS MEMBER CONTAINS A MINIMUM JES2 INITIALIZATION          */
/* STREAM FOR THE MVS/SP JES2 VERSION 4 RELEASE 3.0 (HJE4430). */
/* PARAMETERS IN THIS MEMBER HAVE CHANGED FOR THIS LEVEL          */
/* OF JES2 AND WILL NOT WORK WITH OLDER LEVELS OF JES2.           */
/*                  */
/* FULL DESCRIPTIONS OF JES2 INITIALIZATION                        */
/* PARAMETERS AND DEFAULTS ARE CONTAINED IN:                       */
/* MVS/SP VERSION 4 JES2 INITIALIZATION AND                        */
/* TUNING SC23-0082                                                */
/*                  */
/*****
/*****
/* NOTE: CHANGING ANY OF THE FOLLOWING PARAMETERS WILL PREVENT A  */
/* JES2 WARMSTART; THEY CAN ONLY BE CHANGED ON A COLDSTART        */
/*                  */
/*                  */
/* JOBDEF JOBNUM=                                                  */
/* NJEDEF OWNNOE=                                                  */
/* OUTDEF JOENUM=                                                  */
/* SPOOLDEF BUFSIZE=, DSNAME=, SPOOLNUM=, TGNUM=,                 */
/* TRKCELL=, VOLUME=                                              */
/*****
        /****** MULTI -ACCESS SPOOL *****/
MASDEF  DORMANCY=(10,100), /* Min/Max Dormancy Time          */
        LOCKOUT=1000,     /* Lock-out Warning Time          */

```

```

        SHARED=NOCHECK,      /* Check for Shared DASD      */
        SID(1)=IP01,        /* IDS of all MAS Members .NU..RU. */
        SYNCTOL=120        /* Synch.Tolerance (Sec.)      */
/*      HOLD=100,          Minimum Hold Time          */
/*****/
NJEDEF  NODENUM=100,
        LINENUM=10,
        SRNUM=4,
        JRNUM=4,
        OWNNODE=1

TPDEF   BELOWBUF=(LIMIT=3960), /* NUMBER OF TP BUFFERS      */
        EXTBUF=(SIZE=3840),
        MBUFSIZE=550

LOGON1  APPLID=WTSCSL2      /* VIA $SLGN1 CONNECTION TO VTAM */

APPL(WTSCSL2)  NODE=1      /* APPLICATION FOR VTAM TO OWN SYSTEM */
/* APPL(PVM2)    NODE=2    APPLICATION NAME FOR VTAM TO VM/9221 */
/* L(RSCSPVM2)  NODE=2    APPLICATION NAME FOR VTAM TO VM/9221*/
APPL(SL2SL408) NODE=4      /* APPLICATION NAME FOR VTAM TO AS400 */
APPL(PNETVSE)  NODE=9      /* APPLICATION NAME FOR VTAM TO VSE   */
APPL(SCGRSCS)  NODE=5      /* APPLICATION NAME FOR WTSCPOK       */
APPL(SLP39001) NODE=6      /* APPLICATION NAME FOR SERVER P/390   */
APPL(WTSCSL1)  NODE=2      /* APPLICATION NAME FOR WTSCSL1       */

NODE(1) NAME=WTSCSL2,      /* NODES THIS SYSTEM IS ALLOWED TO   */
        SUB=MVS
NODE(2) NAME=WTSCSL1,      /* TALK TO                             */
        SUB=NONMVS,
        PATHMGR=NO
NODE(3) NAME=WTSCMXA,      /* ITSC MVS FLOOR SYSTEM              */
        SUB=WTSCNET,
        PATHMGR=YES
NODE(4) NAME=WTSCSL4,      /* AS/400 NJE STATION                 */
        SUB=AS400,
        PATHMGR=NO
NODE(5) NAME=WTSCPOK,      /* WTSCPOK SYSTEM                     */
        SUB=WTSCNET,
        PATHMGR=NO
NODE(6) NAME=P390NJE,      /* SERVER P/390 15SET95               */
        SUB=MVS,
        PATHMGR=YES
NODE(7) NAME=PKEDPS1,      /*                                     */
        PATHMGR=NO,
        SUBNET=WTSCNET
NODE(9) NAME=WTSCSL9,      /* VSE                                  */
        SUB=NONMVS,
        PATHMGR=NO
NODE(10) NAME=WTSCNET,     /* WTSCNET SYSTEM                     */
        SUB=WTSCNET,
        PATHMGR=YES,
        LINE=1

CONNECT NODEA=0006,MEMBERA=1,NODEB=0001,MEMBERB=1,REST=100
CONNECT NODEA=0009,MEMBERA=1,NODEB=0002,MEMBERB=1,REST=100
/* CONNECT NODEA=0003,MEMBERA=1,NODEB=0005,MEMBERB=1,REST=100 */
/* CONNECT NODEA=0007,MEMBERA=1,NODEB=0005,MEMBERB=1,REST=100 */

```

```

LINE(1) UNIT=4104          /* LOGICAL LINES FOR COMMUNICATION */
LINE(2) UNIT=SNA          /*     VIA LOGON1 TO VTAM          */
LINE(3) UNIT=SNA
LINE(4) UNIT=SNA
LINE(5) UNIT=SNA
LINE(6) UNIT=SNA
LINE(7) UNIT=SNA
LINE(8) UNIT=SNA
LINE(9) UNIT=SNA

/****** CONSOLE PARAMETERS *****/
/****** CONSOLE PARAMETERS *****/
CONDEF  AUTOCMD=50,        /* NUMBER OF AUTOMATIC COMMANDS    */
/*      BSPACE=5F,         /* BACKSPACE CHARACTER              */
      BUFNUM=400,         /* NUMBER OF CMB'S                 */
      BUFWARN=80,         /* WARNING THRESHOLD %             */
      CONCHAR=$,          /* CONSOLE COMMAND CHARACTER       */
      DISPLEN=65,         /* SCAN CMD/INIT DISPLAY LINE      (NEW) */
      DISPMAX=100,        /* SCAN CMD/INIT MAX LINE          (NEW) */
      MASMSG=200,         /* NUMBER OF QUEUED MESSAGES       */
      RDRCHAR=$           /* READER COMMAND CHARACTER        */
/****** SPOOL DEFINITIONS *****/
SPOOLDEF BUFSIZE=3992,    /* MAXIMUM BUFFER SIZE              */
          DSNAME=SYS1.HASPACE, /* SPOOL DATA SETS' NAME          */
/*      FENCE=NO,          /* DON'T FORCE TO MINIMUM VOL.     */
          SPOOLNUM=32,     /* MAXIMUM NUMBER OF SPOOL VOLUMES */
          TGBPERVL=10,     /* TRACK GROUPS/BLOB              */
          TGNUM=32576,     /* FITS TGMS INTO 4K PAGE         */
          TGSIZE=33,       /* BUFFERS/TRACK GROUP            */
          TGWARN=85,       /* WARNING THRESHOLD              */
/*      TRACE=NO,         /* SPECIFY SUBSYSTEM              (NEW) */
          TRKCELL=5,       /* BUFFERS/TRACK-CELL            */
/******
/*
/* * * * N O T E * * *
/*
/* THE FOLLOWING PARAMETER STATEMENT (VOLUME) IS MODIFIED BY JOB
/* JS2PROC. AS SHIPPED, THIS PARAMETER CONTAINS SIX (6) CHARACTERS.*/
/* IT IS MODIFIED TO FIVE CHARACTERS (5) BY JOB JS2PROC. THE COMMENT*/
/* LINE CONTAINING '**HASPSPOL***HASP...' MUST BE POSITIONED EXACTLY*/
/* AS IT IS, IMMEDIATELY BEFORE THE VOLUME PARAMETER.
/*
/*
/* JES2 REQUIRES THIS PARAMETER TO BE FIVE CHARACTERS IN LENGTH.
/*
/*
/*HASPSPOL***HASPSPOL***HASPSPOL***HASPSPOL***HASPSPOL***HASPSPOL*****/
          VOLUME=M53SM      /* SPOOL VOLUME SERIAL            */
/****** CHECKPOINT PARAMETERS *****/
CKPTDEF CKPT1=(DSN=SYS1.HASPKPT, /*DATA SET NAME FOR CHECKPOINT*/
          VOLSER=M53SMP,        /* CHECKPOINT VOLSER              */
          INUSE=YES),          /* USE THIS DATA SET FOR CHECKPOINT */
/*      CKPTOPT=HIGHEST,      /* DISPLAY WHICH CHECKPOINT DS      (NEW) */
          MODE=DUAL,          /* NO DUPLEXING                    */
          LOGSIZE=1,          /* NUMBER 4K PAGES FOR CHANGE LOG  */
          APPLCOPY=NONE,      /* none for NQS APPLICATION        */
/*      APPLCOPY=COMMON,      /* COMMON FOR NQS APPLICATION      */
/*      APPLCOPY=NONE,        /* NO COPY FOR APPLICATION PGMS    */
          VERSIONS=(NUMBER=00, /* MAX NUMBER OF CKPTDEF          */
          WARN=80)           /* WARN=80%                        */

```

```

/*
/* LOADMOD(DCZCEX16) STORAGE=PVT /*SETUP EXIT16 FOR NQS
/* EXIT(016) ROUTINES=(EXIT16),
/* STATUS=ENABLED
/*
OUTDEF COPIES=30, /* MAX NUMBER OF COPIES ALLOWED
DMNDSET=YES, /* DEMAND SETUP
JOENUM=1500, /* MAX NUMBER OF JOES
JOEWARN=80, /* WARNING THRESHOLD %
PRTYHIGH=10, /* CEILING FOR PRTY AGING
PRTYLOW=1, /* FLOOR FOR PRTY AGING
PRTYOUT=NO, /* NO PRTY= ON // OUTPUT
STDFORM=STD, /* DEFAULT FORMS ID
USERSET=NO /* NO USER DEMAND-SETUP
/*
/** DEFAULT ESTIMATED SYSOUT LINES/JOB*/
ESTLNCT NUM=12, /* # OF LINES FOR FIRST MESSAGE
INT=6000, /* THEN AT 6000 LINE INTERVALS
OPT=0 /* ALLOW JOBS TO CONTINUE
/*
/** DEFAULT ESTIMATED SYSOUT CARDS/JOB*/
ESTPUN NUM=500, /* 500 CARDS FOR FIRST MESSAGE
INT=500, /* THEN AT 500 CARD INTERVALS
OPT=0 /* ALLOW JOBS TO CONTINUE
/*
/***** JOB CHARACTERISTICS *****/
JOBDEF ACCTFLD=OPTIONAL, /* ACCOUNTING FIELD OPTIONAL
JCLERR=YES, /* TERMINATE JOB W/JCL ERROR
JOBNUM=2000, /* JOB QUEUE SIZE
JOBWARN=80, /* WARNING THRESHOLD %
JNUMWARN=80, /* WARNING THRESHOLD % (NEW)
PRTYHIGH=10, /* UPPER LIMIT FOR AGING
PRTYJECL=YES, /* PRIORITY JECL SUPPORTED
PRTYJOB=NO, /* PRTY= ON JOB NOT SUPPORTED
PRTYLOW=1, /* LOWER LIMIT FOR AGING
PRTYRATE=1, /* PRTY AGING RATE X/DAY
RANGE=(1-9999) /* LOCAL JOB NUMBER RANGE
/*
/* XBATC=$$$$ /* XBM JOB NAME PREFIX - deleted
/*
/***** INITIATORS *****/
INITDEF PARTNUM=12 /* NUMBER OF INITIATORS
/*
/***** DEFAULT OUTPUT PRIORITY *****/
OUTPRTY1 PRIORITY=9, /* OUTPUT PRTY IS 9 IF
RECORD=600 /* < 600 RECORDS
OUTPRTY2 PRIORITY=8, /* OUTPUT PRTY IS 8 IF
RECORD=1200 /* < 1200 RECORDS
OUTPRTY3 PRIORITY=7, /* OUTPUT PRTY IS 7 IF
RECORD=2400 /* < 2400 RECORDS
OUTPRTY4 PRIORITY=6, /* OUTPUT PRTY IS 6 IF
RECORD=4800 /* < 4800 RECORDS
OUTPRTY5 PRIORITY=5, /* OUTPUT PRTY IS 5 IF
RECORD=9600 /* < 9600 RECORDS
OUTPRTY6 PRIORITY=4, /* OUTPUT PRTY IS 4 IF
RECORD=20000 /* < 20000 RECORDS
OUTPRTY7 PRIORITY=3, /* OUTPUT PRTY IS 3 IF
RECORD=40000 /* < 40000 RECORDS
OUTPRTY8 PRIORITY=2, /* OUTPUT PRTY IF 2 IF

```

```

RECORD=80000 /* < 80000 RECORDS */
OUTPRTY9 PRIORITY=1, /* OUTPUT PRTY IS 1 IF */
RECORD=16777215 /* < 16777215 RECORDS */
/*
/***** INTERNAL READER *****/
INTRDR RDINUM=15 /* NUMBER OF INTERNAL READERS */
/*
FSSDEF(PRT07FSS) PROC=REMPRTS
/***** PRINTING CHARACTERISTICS *****/
PRINTDEF CCWNUM=50, /* # OF CCWS / PRINT BUFFER */
DBLBUFR=YES, /* DOUBLE BUFFER LOCAL PRINTERS */
FCB=6, /* INITIAL FCB LOADED */
NIUCS=GT12, /* INITIAL CHARS SET */
LINECT=61 /* 61 LINES PER PAGE */
/*
DES(PR3825MV) DEST=U11 /*
DES(PR3262) DEST=U12 /*
/*
/***** PRINTER PARAMETERS *****/
PRT(1) UNIT=8C0,TRKCELL=YES,CLASS=A,R=(U12,LOCAL)

PRT(2) FSS=FSS2,MODE=FSS,PRMODE=(LINE,PAGE), /* 3820 */
CLASS=S,SEP,DRAIN,MARK,TRKCELL=NO,CKPTPAGE=100
FSS(FSS2) PROC=CH3820,HASPFSSM=HASPFSSM

PRT(3) FSS=FSS3,MODE=FSS,PRMODE=(LINE,PAGE),UNIT=8B0, /* 3825 */
R=(U11,LOCAL),WS=(/R,PRM,Q),SETUP=NOHALT,
CLASS=TUIC,SEP,DRAIN,MARK,TRKCELL=YES,CKPTPAGE=100
FSS(FSS3) PROC=CH3825,HASPFSSM=HASPFSSM

PRT(4) FSS=FSS5,MODE=FSS,PRMODE=(LINE,PAGE), /* 3816 */
CLASS=6,SEP,DRAIN,MARK,TRKCELL=YES,CKPTPAGE=10
FSS(FSS5) PROC=REMPRTS,HASPFSSM=HASPFSSM
PRT(5) FSS=FSS5,MODE=FSS,PRMODE=(LINE,PAGE), /* 4028 */
CLASS=8,SEP,DRAIN,MARK,TRKCELL=YES,CKPTPAGE=10
FSS(FSS5) PROC=REMPRTS,HASPFSSM=HASPFSSM

/*****
/* PRT6 definition for psf/2 dpf 3820 START */
/* using outclass=1
/* PRT7 definition for PSF2 ATTACHED 3820 START */
/* using outclass=2
/* PRT8 definition for PSF2 ATTACHED 4019 START */
/* using outclass=3
/*****
PRT(6) FSS=FSS6,MODE=FSS,PRMODE=(LINE,PAGE),R=(U06,LOCAL),
CLASS=1,SEP,DRAIN,MARK,TRKCELL=YES,CKPTPAGE=100
FSS(FSS6) PROC=DPF3820A,HASPFSSM=HASPFSSM
PRT(7) FSS=FSS7,MODE=FSS,PRMODE=(LINE,PAGE),R=(U07,LOCAL),
CLASS=2,SEP,DRAIN,MARK,TRKCELL=YES,CKPTPAGE=100
FSS(FSS7) PROC=DPF3820B,HASPFSSM=HASPFSSM
PRT(8) FSS=FSS8,MODE=FSS,PRMODE=(LINE,PAGE),R=(U08,LOCAL),
CLASS=3,SEP,DRAIN,MARK,TRKCELL=YES,CKPTPAGE=100
FSS(FSS8) PROC=DPF4019C,HASPFSSM=HASPFSSM
/*****
/* PRT6 definition for 92pr1001r = psf/2 dpf 3825 END */
/* PRT7 definition for 92pr1001r = rpm v3 3820 END */
/* PRT8 definition for 92pr1001r = psf/2 dpf 4019 end */
/*****

```

```

/*      PRT9 defined for NPF usage                                */
PRT(9)  FSS=FSS9,MODE=FSS,PRMODE=(LINE,PAGE),
        CLASS=9,SEP,DRAIN,MARK,TRKCELL=YES,CKPTPAGE=10
FSS(FSS9) PROC=NPFPROC,HASPFSSM=HASPFSSM
/*      PRT10 defined for LANRES connection (RJE, not VTAM)     */
PRT(10) FSS=HLFSS,MODE=FSS,CKPTPAGE=100,PAGECKPT,START=NO,CLASS=N
FSS(HLFSS) PROC=HLPPROC,HASPFSSM=HASPFSSM

/*****
/*  EXAMPLE OF SPECIFICATIONS FOR A 3800 PRINTER                */
/*  PRT(2) UNIT=C18,CLASS=ADOY46,                               */
/*          CKPTPAGE=100,DRAIN,                                 */
/*          UCS=GF10,FCB=STD3,MARK,                            */
/*          WS=(W,R,Q,PMD,LIM,F/T,C,P)      *ALLOW ENTRY FOR UCS, */
/*                                          *FCB, AND PRIORITY  */
/*****

/*
/***** LOGICAL INITIATORS *****/
I1  NAME=1,
    CLASS=A,
    START
/* INITIATOR NAME
/* INITIAL JOB CLASSES
/* START AUTOMATICALLY

I2  NAME=2,
    CLASS=IA,
    START

I3  NAME=3,
    CLASS=IBA,
    START

I4  NAME=4,
    CLASS=IFEDBA,
    DRAIN

I5  NAME=5,
    CLASS=IFEDBA,
    DRAIN

I6  NAME=6,
    CLASS=IFEDBA,
    DRAIN

I7  NAME=7,
    CLASS=IFEDBA,
    DRAIN

I8  NAME=8,
    CLASS=IFEDBA,
    DRAIN

I9  NAME=9,
    CLASS=IFEDBA,
    DRAIN

I10 NAME=10,
    CLASS=IFEDBA,
    DRAIN

I11 NAME=11,
    CLASS=IFEDBA,
    DRAIN

I12 NAME=12,
    CLASS=IFEDBA,
    DRAIN

/***** JOB CLASS DEFINITIONS *****/
JOBCLASS(A) ACCT=NO,
            PGMRNAME=NO,
            TIME=(60,0),
            REGION=6M,
/* ACCT # NOT REQUIRED
/* PROGRAMMER NAME NOT REQUIRED
/* JOB STEP TIME
/* REGION SIZE

```

```

XBM=, /* XBATC H KEYWORD */
COMMAND=DISPLAY, /* DISPLAY COMMANDS */
BLP=YES, /* PROCESS BLP */
AUTH=ALL, /* ALLOW ALL COMMANDS */
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */
JOBCLASS(B) ACCT=NO, /* ACCT # NOT REQUIRED */
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */
TIME=(60,0), /* JOB STEP TIME */
REGION=6M, /* REGION SIZE */
XBM=, /* XBATC H KEYWORD */
COMMAND=DISPLAY, /* DISPLAY COMMANDS */
BLP=YES, /* PROCESS BLP */
AUTH=ALL, /* ALLOW ALL COMMANDS */
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */
JOURNAL=yes /* DON'T JOURNAL THIS JOB CLASS */
JOBCLASS(I) ACCT=NO, /* ACCT # NOT REQUIRED */
PGMRNAME=NO, /* PROGRAMMER NAME NOT REQUIRED */
TIME=(60,0), /* JOB STEP TIME */
REGION=6M, /* REGION SIZE */
XBM=, /* XBATC H KEYWORD */
COMMAND=DISPLAY, /* DISPLAY COMMANDS */
BLP=YES, /* PROCESS BLP */
AUTH=ALL, /* ALLOW ALL COMMANDS */
MSGLEVEL=(1,1), /* INPUT/PROCEDURE, ALL MESSAGES */
JOURNAL=NO /* DON'T JOURNAL THIS JOB CLASS */
/*
/***** OUTPUT CLASS ATTRIBUTES *****/
OUTCLASS(A) OUTDISP=WRITE, /* NORMAL CLASS A OUTPUT */
OUTPUT=PRINT, /*
TRKCELL=YES /*
OUTCLASS(B) OUTDISP=WRITE, /* NJE USES PUNCH, I THINK. */
OUTPUT=PUNCH, /*
TRKCELL=NO /*
OUTCLASS(N) OUTDISP=WRITE, /* CLASS N FOR LANRES */
OUTPUT=PRINT, /*
TRKCELL=YES /*
OUTCLASS(P) OUTDISP=WRITE, /* CLASS P FOR RPM OUTPUT (LOCAL TR) */
OUTPUT=PRINT, /*
TRKCELL=YES /*
OUTCLASS(S) OUTDISP=WRITE, /* CLASS S FOR AFP OUTPUT (3820) */
OUTPUT=PRINT, /*
TRKCELL=NO /*
OUTCLASS(R) OUTDISP=HOLD, /* CLASS R FOR STARTED TASKS */
OUTPUT=PRINT, /*
TRKCELL=YES /*
OUTCLASS(T) OUTDISP=WRITE, /* CLASS T FOR AFP OUTPUT (3825) */
OUTPUT=PRINT, /*
TRKCELL=YES /*
OUTCLASS(U) OUTDISP=WRITE, /* CLASS U FOR RPM OUTPUT (REMOTE) */
OUTPUT=PRINT, /*
TRKCELL=YES /*
OUTCLASS(V) OUTDISP=WRITE, /* CLASS V FOR RPM OUTPUT (REMOTE TR) */
OUTPUT=PRINT, /*
TRKCELL=YES /*
OUTCLASS(W) OUTDISP=WRITE, /* CLASS W FOR 3816 PRT (VIA VTAM) */
OUTPUT=PRINT, /*
TRKCELL=YES /*
OUTCLASS(Y) OUTDISP=WRITE, /* CLASS Y FOR 4028 PRT (VIA VTAM) */

```

```

        OUTPUT=PRINT,      /* */
        TRKCELL=YES       /* */
OUTCLASS(X) OUTDISP=HOLD, /* THE TSO HELD CLASS */
        OUTPUT=PRINT,    /* */
        TRKCELL=NO       /* */
OUTCLASS(Z) OUTDISP=(PURGE,WRITE),
        OUTPUT=DUMMY,    /* */
        TRKCELL=NO       /* */
/*****
/* outclass for 3825 psf/2 dpf - local TR          START */
/*****
OUTCLASS(1) OUTDISP=WRITE, /* CLASS 1 FOR DPF OUTPUT (local TR) */
        OUTPUT=PRINT,    /* */
        TRKCELL=YES      /* */
/*****
/* outclass for 3825 psf/2 dpf - local TR          END */
/*****
/***** STC DEFAULTS *****/
STCCCLASS TIME=(60,00),   /* JOB STEP TIME */
        REGION=6M,       /* REGION SIZE */
        COMMAND=DISPLAY, /* EXECUTE COMMANDS */
        BLP=YES,         /* USE BLP PARM */
        AUTH=ALL,        /* ALLOW ALL COMMANDS */
        MSGLEVEL=(1,1),  /* JOB, ALL MSGS */
        IEFUJP=YES,      /* DO TAKE SMF JOB PURGE EXIT */
        IEFUSO=YES,      /* DO TAKE SYSOUT EXCESS EXIT */
        LOG=NO,          /* DON'T PRINT JES2 JOB LOG */
        OUTPUT=YES,      /* PRODUCE OUTPUT FOR JOBS */
        PERFORM=0,       /* SRM PERFORMANCE GROUP */
        PROCLIB=00,      /* USE //PROCOO DD */
        TYPE6=YES,       /* PRODUCE SMF 6 RECORDS */
        TYPE26=YES,      /* PRODUCE SMF 26 RECORDS */
        OUTDISP=WRITE,   /* NOT A HELD CLASS */
        MSGCLASS=Z       /* The bitbucket */
/***** TSU DEFAULTS *****/
TSUCLASS TIME=(60,00),   /* JOB STEP TIME */
        REGION=6M,       /* REGION SIZE */
        COMMAND=DISPLAY, /* EXECUTE COMMANDS */
        BLP=YES,         /* USE BLP PARM */
        AUTH=ALL,        /* ALLOW ALL COMMANDS */
        MSGLEVEL=(1,1),  /* JOB, ALL MSGS */
        IEFUJP=YES,      /* DO TAKE SMF JOB PURGE EXIT */
        IEFUSO=YES,      /* DO TAKE SYSOUT EXCESS EXIT */
        LOG=NO,          /* DON'T PRINT JES2 JOB LOG */
        OUTPUT=YES,      /* PRODUCE OUTPUT FOR JOBS */
        PERFORM=0,       /* SRM PERFORMANCE GROUP */
        PROCLIB=00,      /* USE //PROCOO DD */
        TYPE6=YES,       /* PRODUCE SMF 6 RECORDS */
        TYPE26=YES,      /* PRODUCE SMF 26 RECORDS */
        MSGCLASS=Z       /* DEFAULT MSGCLASS */
/*****
/**  BUFFER DEF'S */
BUFDEF  EXTBUF=(LIMIT=200), /*
        BELOWBUF=(LIMIT=200) /*
/*****
SMFDEF  BUFNUM=500,        /* SMF DEF'S
        BUFWARN=85        /*

```

/*****
DISPLAY SPOOLDEF VOLUME
DISPLAY CKPTDEF CKPT1

A.8 The AWSICA Device Manager and BSC NJE

The PC Server System/390 support programs include a device manager that emulates an integrated communications adapter (ICA). An ICA is supported by VSE and VM, and is a common way to connect SDLC lines to smaller mainframes. AWSICA uses PC multiprotocol adapters or WAC (wide area communications) adapters to emulate ICA lines.

MVS/ESA VTAM does not support an ICA, and the AWSICA device manager is normally not used with MVS/ESA systems. However, there are a few instances when the AWSICA device manager can be useful with MVS/ESA. Although these are seldom used today, MVS/ESA does support individual communication lines not connected through VTAM. These were the lines provided by IBM 2701/2703 control units and later provided by the Emulator Program (EP) on 37x5 control units. Each line is generated as an individual S/390 channel address and has its own MVS UCB.

We used one of these lines to connect two PC Server System/390 MVS/ESA systems through NJE, and this configuration worked quite well. The process included:

- Defining a channel address to the PC Server System/390 Configurator as described in 2.3.2, "Use of PC Server System/390 Configurator" on page 16.
- Defining the channel address to MVS/ESA. With MVS/ESA Version 5 or later, this requires the use of HCD. We defined a single line at address 038, with UNIT type BSC1 on both of our PC Server System/390 MVS/ESA systems. This is a point-to-point bisynchronous connection using a leased line. We did not define any optional features for the line.
- Altering JES2PARMS to include the following:

```
NJEDEF JRNUM=1,JTNUM=1,LINENUM=2,NODENUM=10,OWNNODE=2,  
      SRNUM=1,STNUM=1  
LINE2 TRANSPAR=YES,UNIT=038  
NODE1 NAME=P390L,LINE2  
NODE2 NAME=P390R  
TPDEF BELOWBUF=(SIZE=520)  
PCEDEF CNVTNUM=10  
BUFDEF EXTBUF=(LIMIT=120,WARN=70)
```

In this example, the OWNNODE parameter would be 1 on the adjacent system (P390R). There are many ways to define JES2 parameters, and your environment might differ from that shown here.

- We needed to IPL MVS to use the new address. We also started JES2 with a COLD start because we had made other JES2PARM changes as well.
- When JES2 was up, we used \$SLINE commands to start the lines, and were able to route jobs and SYSOUT data between systems. We used ROUTE parameters in JCL to control this.

WAC adapters were used to connected through a 9600bps modem eliminator. Note that, BSC requires *synchronous* modems, not *asynchronous* modems, which

are commonly used with PCs. Some modems offer both sync and async modes, but default to asynchronous operation.

In a similar way, BSC lines (emulated through AWSICA) could be used for BSC RJE stations, or for other application programs that support direct BSC use. We assume BTAM would work correctly with these lines, but we did not try a direct BTAM application.

A.9 JCL Used to Assemble VTAM Tables

This is the JCL we used to assemble our VTAM USSTAB, COS and LOGMODE tables.

```
//P390D JOB (ACCT#),
//      'THEILL', /*OPER*/
//      CLASS=A,REGION=6000K, /*JCLAS*/
//      MSGLEVEL=(1,1),
//      MSGCLASS=X,
//      NOTIFY=P390,
//      TIME=30,
//      USER=P390 /*RACF*/
//*
//ASMBLE PROC M=
//ASM EXEC PGM=ASMA90,PARM='OBJECT,NODECK,RENT',REGION=256K
//STEPLIB DD DSN=SYS1.LINKLIB,DISP=SHR
//SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR
// DD DSN=SYS1.SISTMAC1,DISP=SHR
//SYSUT1 DD UNIT=SYSALLDA,SPACE=(1700,(600,100))
//SYSUT2 DD UNIT=SYSALLDA,SPACE=(1700,(600,100))
//SYSUT3 DD UNIT=SYSALLDA,SPACE=(1700,(600,100))
//SYSPRINT DD SYSOUT=*
//SYSIN DD DSN=SYS1.VTAMLST.NEW(&M),DISP=SHR,VOL=SER=TSOPAK,
//      UNIT=3380
//SYSPUNCH DD DUMMY,SYSOUT=B
//SYSLIN DD DSN=&OBJSET,DISP=(NEW,PASS),
//      UNIT=SYSALLDA,SPACE=(80,(200,50))
//* LINK-EDIT OBJECT TO VTAMLIB
//LKED EXEC PGM=IEWL,PARM='XREF,LET,LIST,NCAL,',
//      COND=(8,LE,ASM),REGION=256K
//SYSLIN DD DSN=&OBJSET,DISP=(OLD,DELETE)
//SYSLMOD DD DSN=SYS1.VTAMLIB.NEW(&M),DISP=SHR
//SYSUT1 DD UNIT=SYSALLDA,SPACE=(1024,(50,20))
//SYSPRINT DD SYSOUT=*
//ASMBLE PEND
//*
/*
/*
/* EXECUTION OF ASSEMBLIES AND LINKS--- MANY STEPS
/*
/*MODENJE EXEC ASMBLE,M=MODENJE
/*SCMODIMS EXEC ASMBLE,M=SCMODIMS
/*USSSNA EXEC ASMBLE,M=USSSNA
/*USSTAB EXEC ASMBLE,M=USSTAB
/*ISTEXCCS EXEC ASMBLE,M=ISTEXCCS
/*AMODETAB EXEC ASMBLE,M=AMODETAB
/*SNADSAIX EXEC ASMBLE,M=SNADSAIX
/*AGWTAB EXEC ASMBLE,M=AGWTAB
/*ISTSDCOS EXEC ASMBLE,M=ISTSDCOS
```

```
/*EMSMODE EXEC ASMBLE,M=EMSMODE  
/*
```

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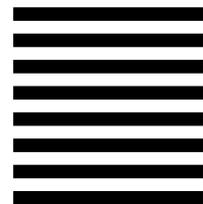
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