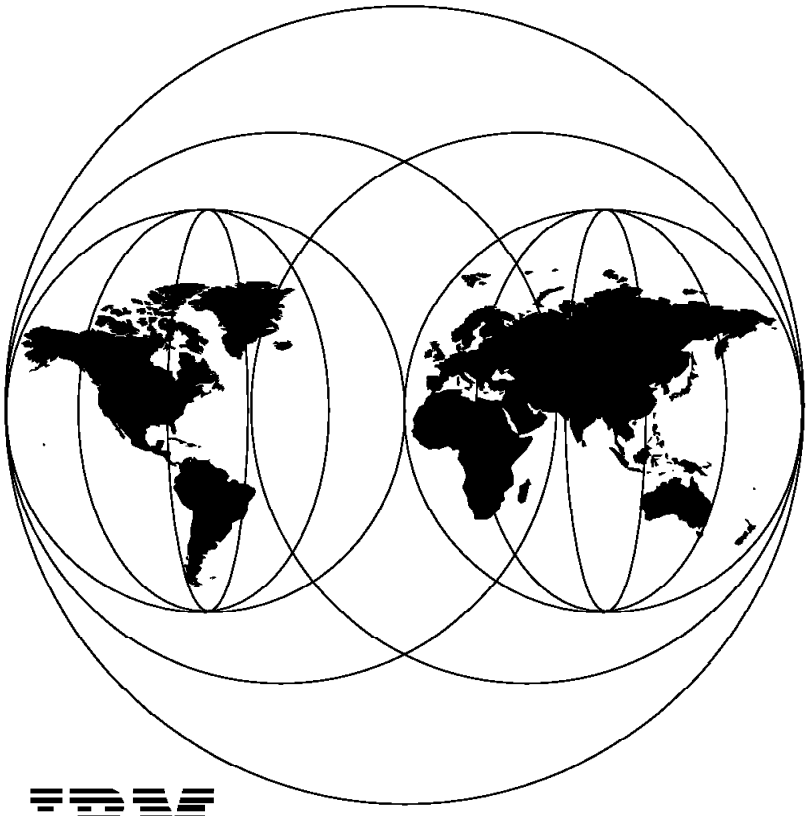
SG24-2101-00

Converging TCP/IP and SNA Networks: Web Access over SNA

August 1997



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International Technical Support Organization
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Take Note!

Before using this information and the product it supports, be sure to read the general information in Appendix D, “Special Notices” on page 219.

First Edition (August 1997)

This edition applies to:

- Version 4 Release 4 of VTAM for MVS/ESA and OS/390
- Version 4 Release 2 of IBM Communication Server for AIX
- Version 5.0 of IBM Communication Server for Windows NT
- Version 4.1 of IBM Communication Server for OS/2 Warp

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Contents

Preface

In today's diverse environment, many enterprises are running multiple networking protocols. Often multiple enterprises need to interconnect their networks. With the current emphasis on the accessibility of the Internet and intranets, often there is a need to merge SNA and TCP/IP technology.

This redbook will help you design a solution to integrate Web access into an existing SNA network. This redbook gives a broad understanding of Sockets over SNA implementation of the multiprotocol transport networking (MPTN) architecture. It goes into the details of implementing Sockets over SNA in a network to allow Internet and Intranet access in an enterprise with SNA connectivity.

The new Host On-Demand capability introduced in the IBM Communication Server line of products is also explored.

The Team That Wrote This Redbook

This redbook was produced by a team of specialists from around the world working at the Systems Management and Networking ITSO Center, Raleigh.

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Chapter 1. Introduction

Today's networks are very diverse. With the growth in networking and local area networks in particular, most large networks now run multiple networking protocols. Many alliances are being formed that cause customers to seek inter-enterprise network interconnection.

Both hardware and software options exist for integrating SNA and TCP/IP networks at a variety of levels. These range from reducing the cost of carrying duplicate networks by allowing resource sharing, to eliminating one network protocol. Enterprises with existing SNA and TCP/IP networks have choices that include:

- Sharing links between the two networks by using frame relay or ATM.
- Encapsulation of TCP/IP over SNA using Data Link Switching (2216, 6611).
- Concentration of backbone protocol using software solutions.

In this book we will concentrate on the last option listed and how it can be used to enable Web access for workstations in a mixed TCP/IP and SNA environment.

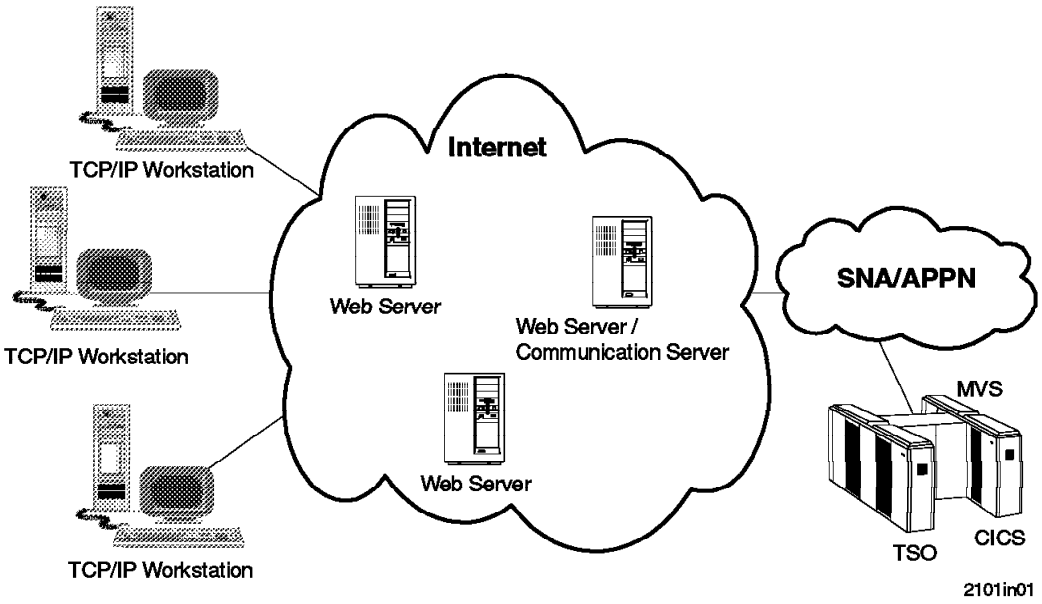
Single backbone protocol concentration eliminates the complexity of multiple protocol stacks. With multiple protocol stacks, each packet flowing in the network has different structures and each protocol needs to be managed differently. By concentrating multiprotocol protocols over a single networking protocol, the network is simpler to manage. One such solution is AnyNet, which utilizes the MPTN architecture to run an application over a networking protocol that it wasn't designed to run over (a non-native protocol). The application data transfer can take advantage of features of the underlying network protocol.

IBM has introduced many products and features to allow the co-existence of TCP/IP and SNA networks. The products we look into in detail are the Communication Server Sockets over SNA and IBM eNetwork Host On-Demand.

Other products you may find of interest are:

- Files on Demand
- Lotus Connect for SNA
- CICS Internet Gateway
- CICS Gateway for Java
- IBM Net.Data

1.1 TCP/IP Workstations with Requirements for an SNA Application

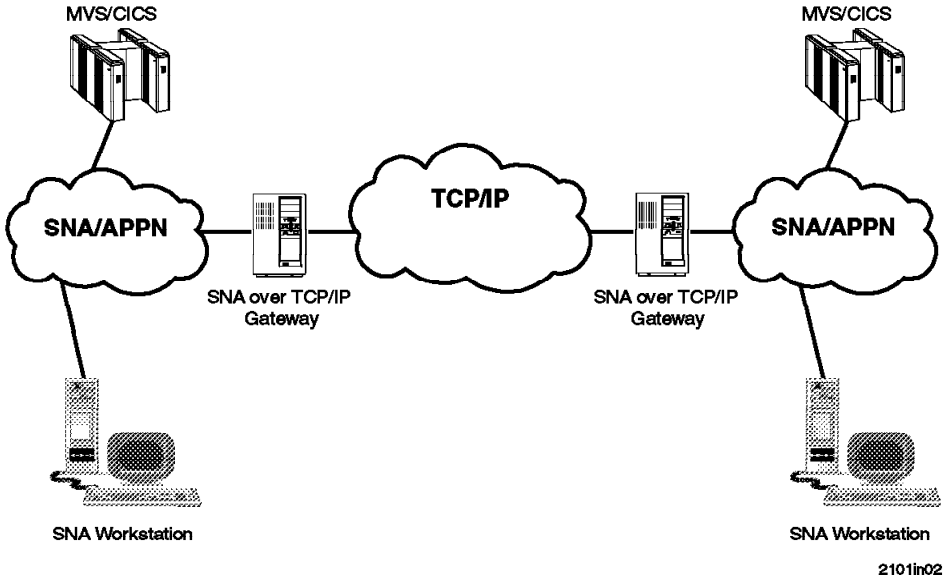


TCP/IP workstations that require access to SNA applications have several possible solutions for connectivity to an SNA host, including:

- TN3270E functions provided by:
  - IBM Communications Server for Windows NT Version 5.0
  - IBM SNA Application and Client Access for AIX
  - IBM Communications Server for OS/2 Warp Version 4.1

  TN3270E provides connectivity between TCP/IP workstations and SNA hosts. Clients can connect to the SNA network using client functions such as TN3270E, TN3270, TN5250, and 5250 and 3270 emulation provided by Personal Communications, and IBM eNetwork Host On-Demand.
- A Web server with Host On-Demand and the TN3270E functions provided by Communication Server provide Java enabled Web browsers with connectivity to SNA applications. Host On-Demand gives users with Web browsers access to SNA applications without having to install additional software.

1.2 Connecting Two SNA Networks Over TCP/IP

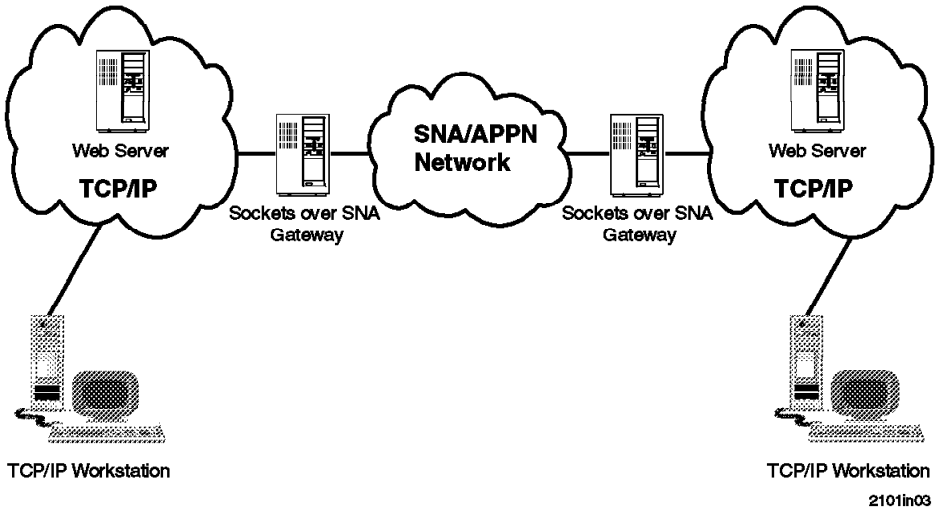


Communication between SNA applications can be transported over TCP/IP networks using SNA over TCP/IP AnyNet functions.

Installing SNA over TCP/IP access node capability at the end nodes allows SNA applications to communicate over TCP/IP ports.

Another option is to install SNA over TCP/IP gateways between the SNA and TCP/IP networks. This would allow communication between the SNA clients without any change in software on the client platform.

1.3 Connecting Two TCP/IP Networks Over SNA

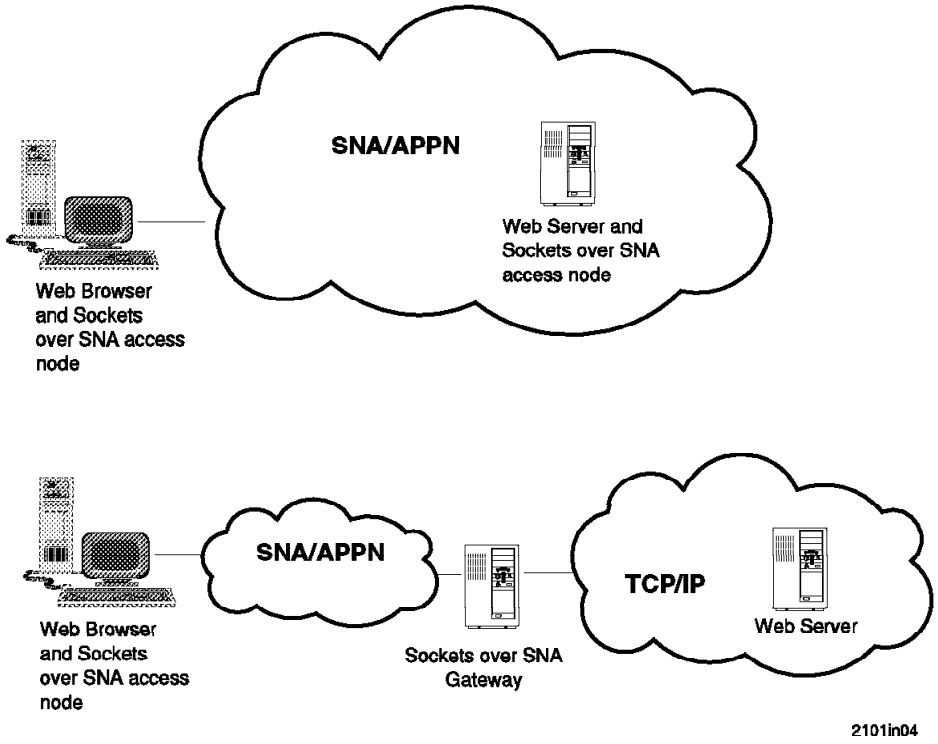


Communication between sockets applications can be transported over SNA networks using Sockets over SNA AnyNet functions.

Installing Sockets over SNA access node capability at the end nodes would allow sockets applications like Web browsers to communicate over SNA ports.

Or, installing Sockets over SNA gateways between the SNA and TCP/IP networks would allow communication between the sockets clients without any change in software on the client platform.

1.3.1.1 Browsing the Internet from an SNA Workstation



Installing the Sockets over SNA function in the client and in the server would allow Web browsing over SNA connections.

A Sockets over SNA gateway could be used in combination with a Sockets over SNA access node to provide the gateway between the SNA and TCP/IP protocols.

1.4 Why Should You Utilize Your SNA Network?

Non-SNA applications running over SNA benefit from SNA networking features. A single protocol enables value-adds to be available to all protocols. When the backbone is SNA, the value-adds include:

- Cost-effective bandwidth utilization and predictable response times: non-SNA applications benefit from the steady throughput and predictable response time of SNA networks, achieved through SNA's flow control prevention algorithms. For example, performance tests on AIX, OS/2, OS/400 and MVS/ESA have shown that for large file sizes, sockets applications running over SNA may outperform sockets applications running over native TCP/IP.
- Traffic prioritization: the configuration of Sockets over SNA combinations allows the association of class of service (COS) and priority for well-known TCP/IP applications such as FTP and Telnet. Interactive applications such as Telnet can be configured to have a higher priority than batch or file transfer traffic such as FTP.

- Data compression reduces the amount of data being exchanged between partners, thus improving response time and improving data rates over the network.
- APPN Dynamics: AnyNet extends the benefits of APPN by allowing additional application types, such as sockets applications, to communicate over APPN networks. AnyNet increases the number of applications that can communicate over APPN networks. APPN works on any combination of APPN and subarea networks.
- High performance routing.

1.5 The IBM Communications Server Product Line

The Communications Server is a powerful, multifunction gateway, providing the technology to build global, heterogeneous networks. IPX, NetBIOS, SNA, and TCP/IP networks can be integrated with the flexibility to use and move critical applications across the organization independent of the underlying protocols. The Communications Server product line includes solutions for OS/390, AIX, OS/2, Windows NT, and NetWare server environments, and is fully interoperable with OS/400 networks.

The Communications Server product family:

- Supports workstations running OS/2, Windows 3.1, Windows NT, Windows 95, or DOS
- Provides SNA over TCP/IP and Sockets over SNA network communication
- Features APPN network node, end node, including support for HPR and dependent LU requester (DLUR)
- Delivers a rich set of APIs to develop applications for distributed computing including support for APPC, Common Programming Interface for Communications (CPI-C), and LUA
- Supports TN3270E server functions
- Enables easy 3270 SNA access to any Java-enabled Web browser with Host On-Demand
- Accommodates a broad range of LAN and wide area network (WAN) protocols, including Fiber Distributed Data Interface (FDDI), Synchronous Data Link Control (SDLC), asynchronous transfer mode (ATM), X.25, integrated services digital network (ISDN), frame relay, twinaxial, token-ring, and Ethernet
- Provides S/390 channel and ESCON support with efficient, high-capacity access to multiple large computers
- Offers remote access to SNA applications over asynchronous, synchronous, Hayes Autosync, digital, and cellular connections
- Supports a wide range of IBM and OEM adapters and modems
- Enables remote installation and configuration
- Allows easy-to-use Web-based, remote server administration
- Provides simplified configuration

Information about IBM networking products can be found at http://www.networking.ibm.com.

Chapter 2. AnyNet Sockets over SNA Overview

AnyNet is a family of software products consisting of multiprotocol access nodes and multiprotocol gateway nodes that are based on the multiprotocol transport networking (MPTN) architecture.

The multiprotocol transport networking architecture describes the logical structures, formats, protocols and operating principles that allow applications to use networks other than the one originally written for, without any change to the existing application. Included among the implementations of the MPTN architecture include:

- SNA over IPX
- SNA/APPC over TCP/IP
- SNA over TCP/IP
- Sockets over IPX
- Sockets over NetBIOS
- Sockets over SNA
- IPX over TCP/IP
- IPX over SNA
- NetBIOS over TCP/IP
- NetBIOS over SNA

Traditionally, networking APIs are tied to one particular network protocol family. For example, if you develop a program that uses the sockets API, such a program is traditionally tied to the TCP/IP protocol stack. If you develop a program that uses the CPI-C API, such a program is traditionally tied to the SNA protocol stack. Multiprotocol transport networking removes the tie between a particular API and a particular network protocol family, allowing your socket programs to use an SNA network and your CPI-C programs to use a TCP/IP network. Other APIs and networking protocol families are supported too, but in this book the focus is on the Sockets over SNA functions.

See Figure 1 on page 8 for an example of AnyNet node types.

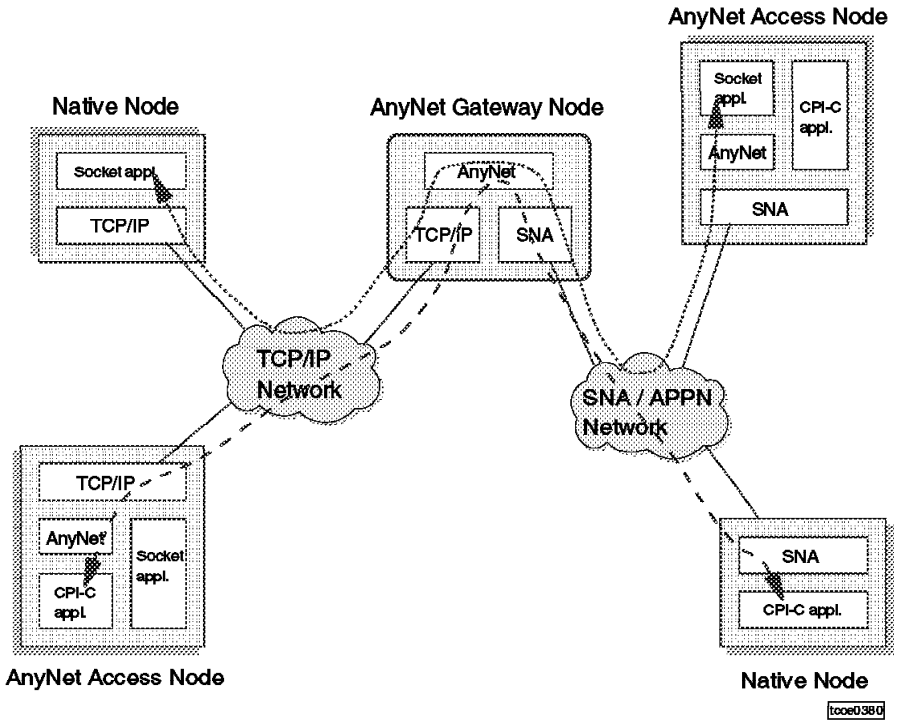


Figure 1. AnyNet Node Types

AnyNet implements two different node types:

- An AnyNet Access Node

  An access node provides functions that allow an application program running on the access node to use a network for which the API was not originally intended. On an access node you can, for example, run a socket program that uses an SNA network to communicate with another socket program on another access node.

- An AnyNet Gateway Node

  A gateway node connects two different networks and provides network protocol conversions between the related network protocols. A gateway node can, for example, connect a TCP/IP and a SNA/APPN network, allowing a socket program on an access node in the SNA/APPN network to communicate with a socket program that runs on a native TCP/IP host attached to the TCP/IP network.

A native node is defined in the MPTN architecture as a node that does not implement MPTN functions. An example could be a non-IBM UNIX platform that implements native socket applications on a standard TCP/IP stack. To use AnyNet functions, such a host has to route IP packets via an AnyNet gateway node.

The following IBM products provide AnyNet functions:

- Sockets over SNA access node and gateway functions:
  - IBM Communications Server for NT Warp, Version 5
  - IBM Communications Server for OS/2 Warp, Version 4.1
  - IBM Communications Server for AIX, Version 4 Release 2

- Sockets over SNA access node only:
  - IBM Communications Server for MVS/ESA (which includes VTAM Version 4 Release 4)
  - IBM Operating System/400 (OS/400) Version 3.7 (AnyNet/400)
- Sockets over SNA gateway node only:
  - IBM 2217 NWAYS Multiprotocol Concentrator (MPC)

2.1 Sockets over SNA Functional Overview

In this book we focus on the Sockets over SNA AnyNet function. Sockets over SNA allows application programs written to the socket API to run over an SNA transport. In the context of this book, that means we use SNA networks to transport requests and data between Web servers and Web browsers.

In general when considering the coexistence of TCP/IP and Sockets over SNA you should keep in mind that:

- Sockets over SNA and TCP/IP are identified by separate internet protocol (IP) addresses. In addition, if you are using IP subnets, you need to assign these separate IP addresses in different IP subnets.
- Sockets over SNA and TCP/IP operate independently of one another and have no awareness of the other's presence.

2.1.1 IP-LU Mapping

When you use the Sockets over SNA functions of AnyNet, the involved AnyNet nodes have to map IP addresses to SNA logical unit names.

If you look at a combined TCP/IP and AnyNet network from an IP network topology point of view, the SNA/APPN section of the network constitutes a separate IP net or subnet. The Sockets over SNA gateway nodes act as normal IP routers that route IP packets between two interfaces: one standard TCP/IP interface and an AnyNet interface (the *sna0*) interface. See Figure 2 on page 10 for an overview of the IP network topology in a combined TCP/IP and AnyNet network.

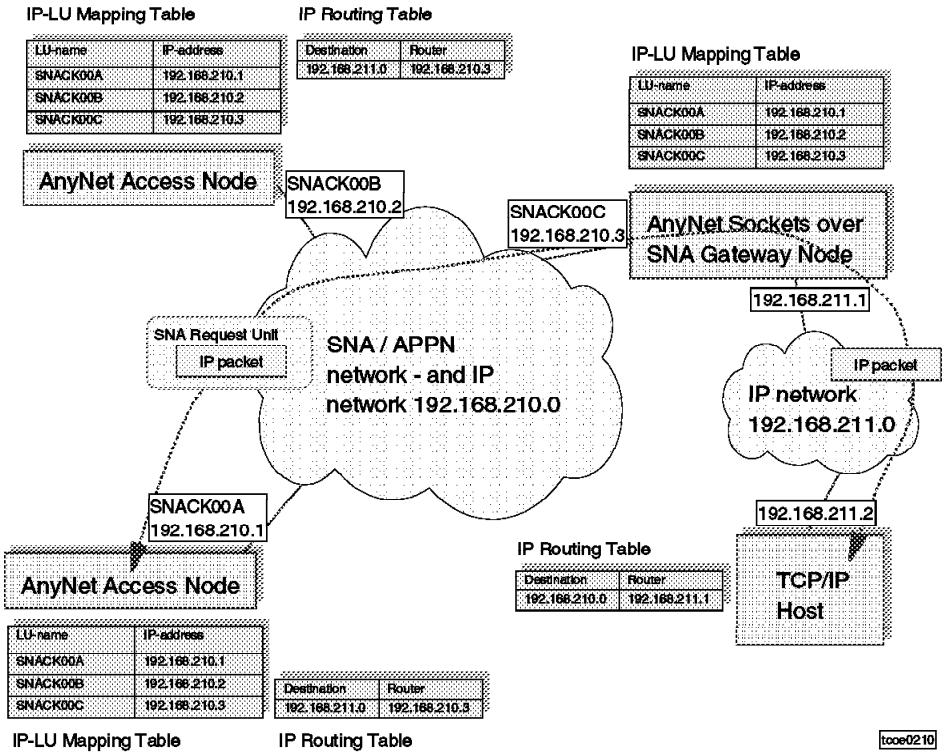


Figure 2. IP Topology of a Combined TCP/IP and AnyNet Network

For data sent to the sna0 interface Sockets over SNA maps the IP address to an SNA LU name and sends the data over LU 6.2 sessions established between Sockets over SNA nodes.

The address mapping process is as follows:

1. A socket application passes the IP address of the destination host to Sockets over SNA.
2. Sockets over SNA queries the IP-LU mapping table to map (translate) the IP address to a fully qualified LU name.
3. Sockets over SNA allocates an LU 6.2 session to the fully qualified LU name which is the remote Sockets over SNA.

Sockets over SNA can use the *algorithmic* or the *explicit* approach to map an IP address to an SNA fully qualified LU name.

The difference between algorithmic and explicit mapping lies in the address mask. A mask with all bits set (255.255.255.255) says you are providing the explicit LU name. In algorithmic addressing the address mask has less than all bits set. The LU name is created by combining the LU template with an alogorithmically generated suffix based on bits of the destination IP address designated by the addressing map.

If you want to use a specific LU-name, use a 32-bit subnet mask (FFFFFFFF or 255.255.255.255). In that case, you manually define an explicit mapping of an IP address to an LU-name that will be different from what the algorithm would calculate.

The *IP-LU mapping table* contains four columns:

1. IP Address
2. Address Mask
3. SNA Network ID
4. LU Name Template

Table 1 shows an example of an IP-LU mapping table that contains three entries.

Table 1. Example of an IP-LU Mapping Table

IP Address	Address Mask	SNA Network ID	LU Name Template
128.109.140.0	255.255.255.192	NETA	SNACK...
128.109.140.0	255.255.254.0	NETA	SNACK...
128.109.130.0	255.255.254.0	NETA	SNACK...

The IP-LU mapping table is searched for the entry that matches the destination IP address and has the longest address mask (that is, the most number of ″one″ bits in the address mask). Comparisons between the destination IP address and the addresses in the table are done using the mask value of the table entry.

The address mask from the entry just selected determines how many bits of the IP address should be used to generate the LU name. The LU template and the bits from the previous step are used to generate the LU name using an internal algorithm.

The SNA Network ID from the entry just selected is used.

Let us consider an example with the IP address 128.109.140.14 and with Table 1 as our IP-LU mapping table.

1. Sockets over SNA will use the first entry to map 128.109.140.14 because only the first two entries match the IP address, and the first entry has a longer address mask.
2. Sockets over SNA uses NETA as the SNA network ID.
3. Sockets over SNA now finds that it needs to use the last 6 bits in the mask 255.255.255.192 (FFFFFFC0) of the IP address to generate the LU name.
4. Sockets over SNA uses the LU template, SNACK..., and the last 6 bits of the IP address to generate the LU name SNACK00F.

To summarize, the IP address 128.109.140.14 is mapped to the fully qualified LU name NETA.SNACK00F.

Let us assume now that the first entry in Table 1 is deleted. The table now only has two entries. Notice that the two different IP addresses, 128.109.130.14 and 128.109.140.14, would both be mapped to the same network ID and LU name, NETA.SNACK00F, which, by the way, is the same as resulted from the previous example.

You can see from the above two examples that it is possible to define entries in the IP-LU mapping table that may result in some undesired effects.

You are responsible for setting up correct mappings. It is a good idea to ensure all machines have the same mapping table.

Depending on the class of IP address or the length of the subnet mask in use, the number of characters that can be used for the LU template varies, as shown in Table 2 on page 12.

Table 2. Limitations for Defining LU Templates

Number of bits in the mask	Range of mask	Size of LU template
8-11 (includes class A addresses)	FF000000-FFE00000	1-3 characters
12-16 (includes class B addresses)	FFF00000-FFFF0000	1-4 characters
17-21	FFFF8000-FFFFF800	1-5 characters
22-26 (includes class C addresses)	FFFFFC00-FFFFFFC0	1-6 characters
27-31	FFFFFFE0-FFFFFFFE	1-7 characters
32	FFFFFFFF	1-8 characters

2.2 Sockets over SNA MPTN Sockets Transport Gateway

An MPTN transport gateway for Sockets over SNA allows communications between native TCP/IP hosts and Sockets over SNA nodes. Figure 3 illustrates how native TCP/IP hosts and MPTN access nodes can communicate via a Sockets over SNA gateway:

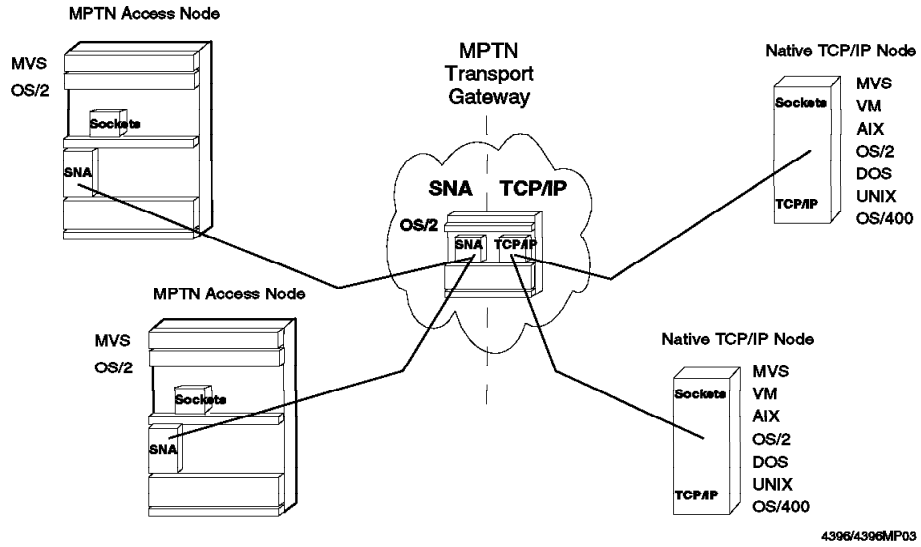


Figure 3. Sockets over SNA - MPTN Sockets Transport Gateway (OS/2)

Figure 4 on page 13 illustrates how native TCP/IP hosts can communicate across an SNA backbone network by virtue of two Sockets over SNA gateways:

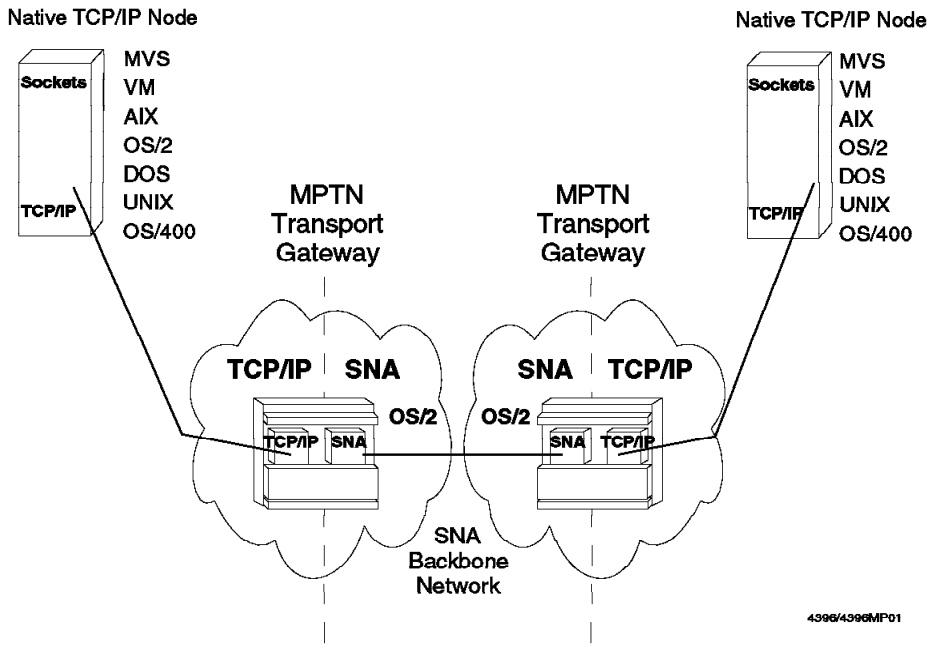


Figure 4. Native TCP/IP Communication Across SNA Backbone

Figure 5 illustrates how Sockets over SNA nodes can communicate across a TCP/IP backbone network by virtue of two Sockets over SNA gateways:

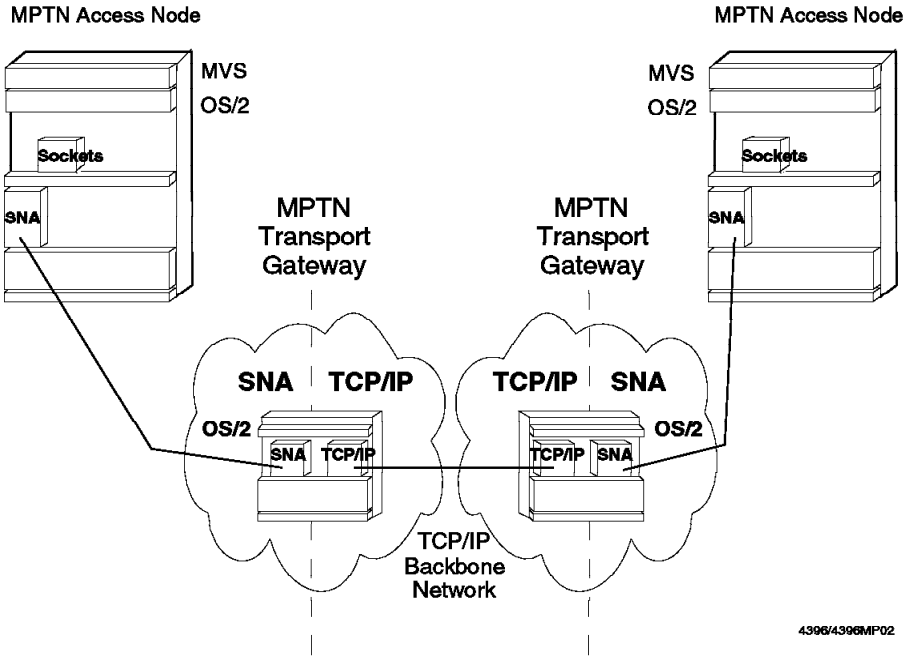


Figure 5. Sockets over SNA Communication Across TCP/IP Backbone

Chapter 3. IBM eNetwork Host On-Demand Overview

IBM eNetwork Host On-Demand is a small TN3270 emulator application that operates as a Java applet on a Web browser. Host On-Demand allows a user to use his Web browser to access a host 3270 application through the Web.

Host On-Demand provides:

- Customized 3270 windows
- Multiple sessions
- Persistant connections
- Platform flexibility
- Security

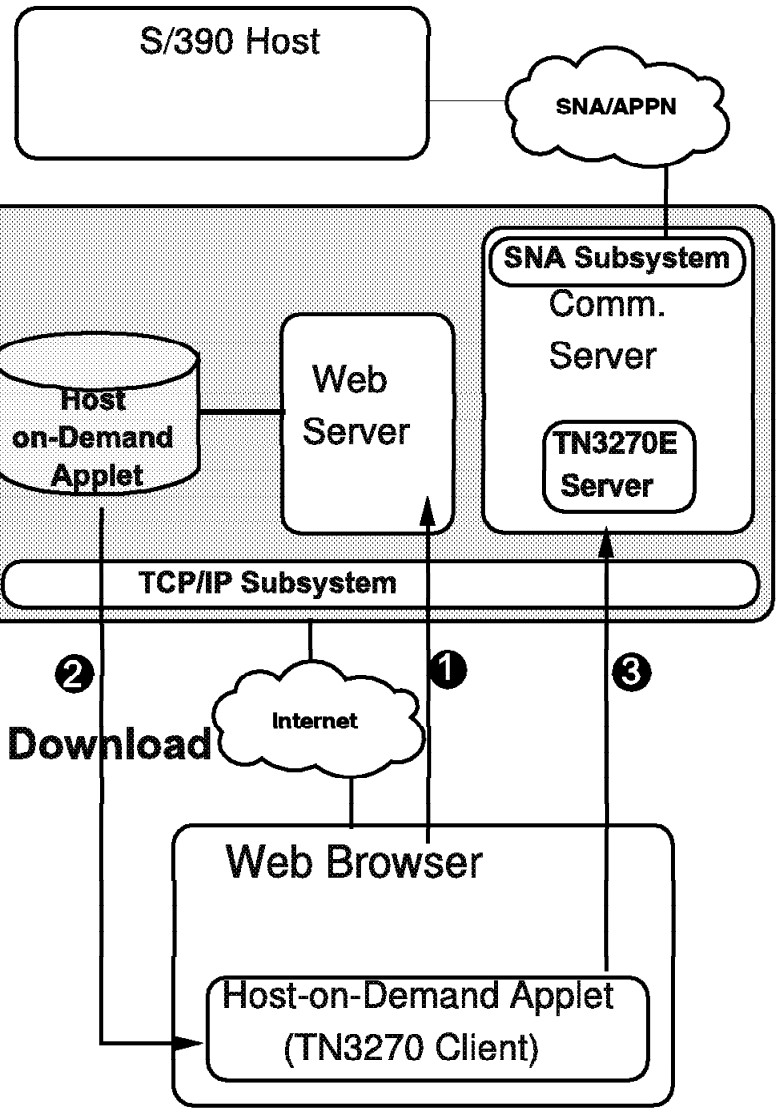


Figure 6. Host On-Demand Overview

The diagram in Figure 6 shows the basic flow of a Host On-Demand session.

1. The user connects to a Web server. Depending on how this Internet server is configured, he either gets the Host On-Demand application by default or he requests it specifically by entering a specific URL such as http://servername/he3270en.htm.
2. The server then downloads to the browser a Java applet, which is a small standard Telnet 3270 application.
3. This application then contacts the same server and connects into the TN3270E server of Communications Server.

Additional information on Host On-Demand can be found on the Web at http://www.networking.ibm.com/eNetwork/OnDemand/hod.html.

3.1 Host On-Demand Platforms

Host On-Demand is available for the following products:

- IBM Communication Server for OS/2 Warp, Version 4 Release 1
- IBM Communication Server for AIX, Version 4 Release 2
- Netware for SAA, Version 2 Release 2
- IBM Communications Server for Windows NT
- IBM Communications Server for MVS/ESA
- IBM TCP/IP Version 3 Release 2 for MVS/ESA
- OS/390 Release 3

3.2 Host On-Demand Comparison

A quick look at Host On-Demand compared with IBM Personal Communications is shown below. As you can see, Host On-Demand has limited function but is very useful in certain situations.

Table 3 (Page 1 of 2). Host On-Demand Comparison

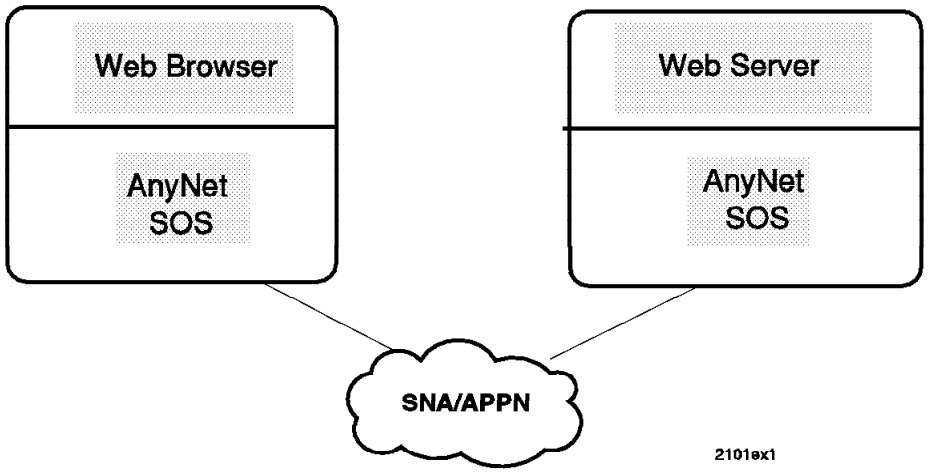
	PCOM Full	**PCOM Entry**	**HOD**
3270 Emulation	X	X	X
5250 Emulation	X	X	
HLLAPI, DDE, CPIC, APPC	X		
Run/Load from server	X	X	X
Run/Load from internet			X
Launch from container			X
Macros	X		
Scripting	X		
Edit functions	X	X	
Host graphics	X		
Full MFI capability	X	X	
File transfer	ind$file	Cmd line	
Pop-up keypads	X	X	subset
NLS	X	X	
CICS client support	X		
IPX, IP, SNA	X		

Table 3 (Page 2 of 2). Host On-Demand Comparison

	PCOM Full	**PCOM Entry**	**HOD**
Data compression	X		
Host print	X		
Zipprint	X		
Hotspots	X		
Drag&Drop color mapping	X		

Chapter 4. Web Access Using Sockets over SNA Access Nodes

This chapter includes two scenarios illustrating communication between a Web browser and a Web server residing on Sockets over SNA access nodes. These scenarios show how to configure the AnyNet parameters and in addition they showcase some of the connectivity options of the platforms involved.



Scenario 1 covers many basic ideas that are referred to in later scenarios and should be reviewed before proceeding to other chapters. Topics included in scenario 1 that provide technical information relevant to other scenarios are:

- AnyNet
  - Logmode and class of service
  - IP-LU mapping correlation between CS/AIX and MVS
  - Explicit address mapping
  - Sessions allocation
- Communication Server for AIX (CS/AIX)
  - Sockets over SNA access node configuration
  - AnyNet automatic startup
  - Commands for starting, stopping and displaying SNA and AnyNet
  - XSNA tool
- MVS VTAM
  - Sockets over SNA access node configuration
  - VTAM displays of NCP connections and AnyNet sessions
- Connectivity
  - SNA SDLC link between CS/AIX and MVS VTAM

Scenario 2 adds:

- AnyNet
  - Algorithmic mapping
- Communication Server for Windows NT (CS/NT)
  - Sockets over SNA access node configuration
- Connectivity
  - SNA Ethernet link between CS/AIX and MVS VTAM
  - SNA token-ring connectivity between CS/NT and MVS VTAM

4.1 Scenario 1: AIX Web Browser to MVS Web Server

In the first scenario we take a look at a simple configuration. We demonstrate a Netscape Web browser on an RS/6000 connecting to an MVS Internet Connection Secure Server (ICSS for OS/390) over SDLC. Both systems are AnyNet Sockets over SNA access nodes.

Using AnyNet over an SDLC line shows the big advantage of the MPTN technology. You cannot define a native IP connection over an SDLC line, but with AnyNet Sockets over SNA it is possible to run IP traffic over an SDLC link.

The MVS Internet Connection Secure Server, available for MVS/ESA and OS/390, is an excellent Web server for an environment where an MVS host system exists. MVS systems provide reliable connectivity, file availability, and management. Both TCP/IP and SNA connectivity is possible.

Traditional MVS and SNA enterprises can offer users a Web server without installing TCP/IP on the host by using VTAM Sockets over SNA and MVS OpenEdition to communicate with ICSS.

Scenario 1 involves an AIX system and an MVS system. It is designed to show Web communication between a Web browser and server on two Sockets over SNA access nodes. This scenario illustrates:

- Web products:
  - Netscape on AIX
  - OS/390 Internet Connection Secure Server
- Network products:
  - CS/AIX Sockets over SNA
  - MVS VTAM Sockets over SNA
- Network connectivity:
  - AnyNet explicit mapping
  - CS/AIX to MVS VTAM over SDLC

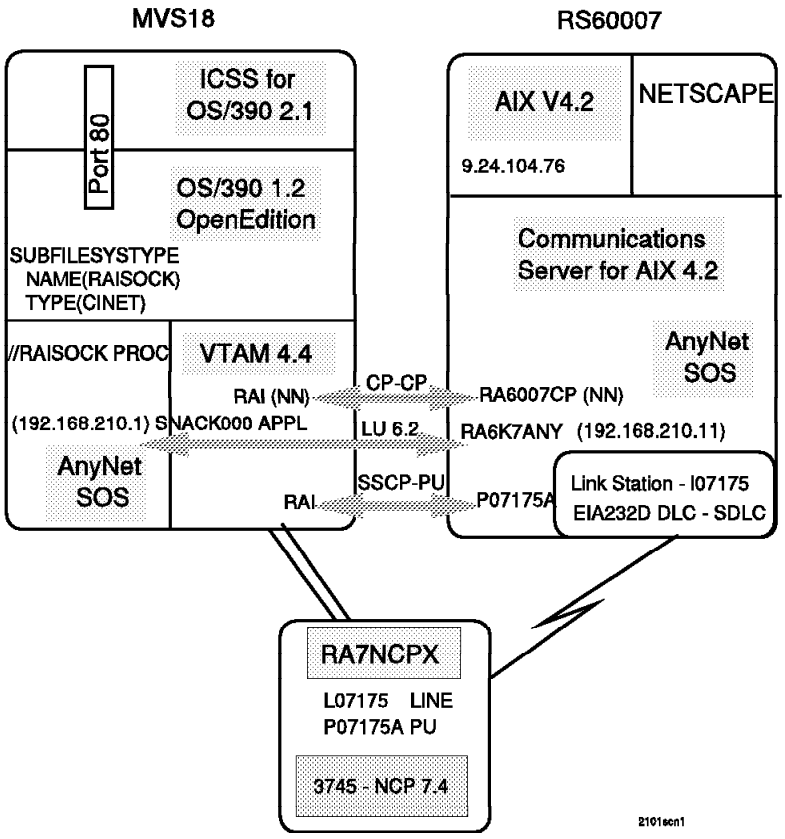


Figure 7. Scenario 1 Overview

Figure 8 on page 22 shows the routing tables used by AnyNet to determine how to route a packet. In this example AnyNet is the only transport protocol. Packets destined to the 192.168.210 network are routed over the sna0 interface. The IP-LU mapping table determines the LU names needed to set up an LU 6.2 session to route the packet over.

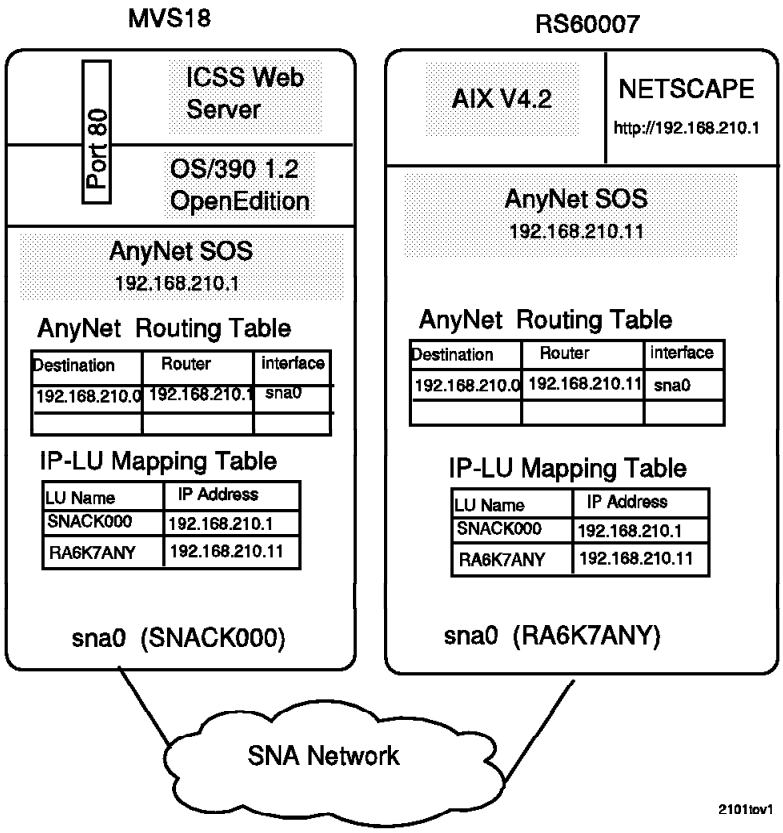


Figure 8. Scenario 1 IP Routing Overview

4.1.1 RS60007 Definitions

The RS/6000, referred to as RS60007, is running AIX 4.2.0 with Communication Server for AIX 4.2.

4.1.1.1 Control Point Configuration

The SNA control point profile used for this scenario is shown in Figure 9 on page 23. The CP name for RS60007 is RA6007CP.

```
                    Change/Show Control Point Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                        node_cp
  XID node ID                                      1 [*]
* Network name                                       [USIBMRA]
* Control Point (CP) name                           [RA6007CP]
  Control Point alias                               [RA6007CP]
  Control Point type                               2 appn_network_node
  Maximum number of cached routing trees            [500]
  Maximum number of nodes in the TRS database       [500]
  Route addition resistance                         [128]

  Comments                                          []




F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Reset         F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 9. AIX SNA Control Point Profile for RS60007

We do not need to enter an XID (**1**) value. The connection to MVS is over a leased SDLC line. XID is used for switched links such as switched SDLC, token-ring, Ethernet or X.25 and only if you do not use APPN (NetID.CPName) for identification at the partner node.

Both systems are defined as APPN network nodes (**2**) in this example. If one of the systems is an end node the scenario works the same way. If one or both of the systems are LEN nodes (you do not have CP-CP sessions), then you also have to define an *LU 6.2 Partner LU* profile and a *Partner LU 6.2 Location* profile.

4.1.1.2 CS/AIX SDLC Link Configuration

A DLC and link station profile need to be defined on RS60007 for the SDLC line.

```
                        Add SDLC EIA232D SNA DLC Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* Profile name                                         [sdlc]
  Data link device name                                [mpq0]
  Force disconnect time-out (1-600 seconds)            [120]
  User-defined maximum I-Field size?                 1 no
     If yes, Max. I-Field size (265-4096)              [265]
  Link type                                            point_to_point
  Max. num of active link stations (1-255)             [1]
     Number reserved for inbound activation            [0]
     Number reserved for outbound activation           [0]
  Serial encoding                                      nrzi
  Request to send (RTS)                                controlled
  DTR control                                          DTR
  Bit clocking                                         external
     If internal, Transmit rate (600-38400)            [1200]
  Network type                                         nonswitched
  Answer mode                                          automatic
  Transmit window count                                7
  Retransmit count (1-50)                              [10]
  Retransmit threshold (0-100)                         [10]

  Secondary and Negotiable stations
     Secondary inactivity time-out (1-255 sec)         [30]

  Primary and Negotiable stations
     Primary repoll frequency (1-250, .1 sec)          [30]
     Primary repoll threshold (1-100%)                 [10]
     Primary repoll count (3-50 repolls)               [15]

  Primary stations
     Primary idle list poll frequency (30-180 sec)     [60]
     Primary slow list poll frequency (1-60 sec)       [1]

  Link Recovery Parameters
     Retry interval (1-10000 seconds)                  [60]
     Retry limit (0-500 attempts)                    2 [0]

  Comments                                             []

F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 10. SDLC EIA232D SNA DLC Profile for RS60007

We do not specify the maximum I-Field size (**1**) in the definitions shown in Figure 10. If you do, the maximum value you can define for an SDLC DLC is 4002. This is due to limitations in the SDLC code. Always define the I-field size equal to or less than 4096 minus *rdto*. Rdto is the *receive data transfer offset* specified for a specific multiprotocol port. As long as you use the rdto default value 92, 4002 is the I-frame size limit. To change or show the rdto value for a specific port enter `smit chgmp`.

Setting the retry limit to 0 (**2**) in the DLC profile provides infinite retry. You also have to set the Restart Parameters in the following link station profile accordingly to get interventionless recovery in case of a link down situation.

```
                    Add SDLC EIA232D Link Station Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* Profile name                                         [l07175]
  Use Control Point's XID node ID?                      yes
     If no, XID node ID                                 [*]
* SNA DLC Profile name                                 [sdlc]
  Stop link station on inactivity?                      no
     If yes, Inactivity time-out (0-10 minutes)         [0]
  LU address registration?                              no
     If yes,
        LU Address Registration Profile name            []
  Trace link?                                           no
     If yes, Trace size                                 long
  High performance routing (HPR) supported?             yes
  Station type                                          secondary
     If primary,
        Remote secondary station address                [1]
     If secondary or negotiable,
        Local secondary station address              1 [193]

  Adjacent Node Identification Parameters
     Verify adjacent node?                              no
     Network ID of adjacent node                       []
     CP name of adjacent node                          []
     XID node ID of adjacent node (LEN node only)      [*]
     Node type of adjacent node                         learn

  Link Activation Parameters
     Solicit SSCP sessions?                          2 yes
     Initiate call when link station is activated?     yes
     Activate link station at SNA start up?          3 yes
     Activate on demand?                               no
     CP-CP sessions supported?                         yes
     If yes,
        Adjacent network node preferred server?        no
     Partner required to support CP-CP sessions?       no
     Initial TG number (0-20)                          [0]

  Restart Parameters
     Restart on normal deactivation?                 4 yes
     Restart on abnormal deactivation?               5 yes

  Transmission Group COS Characteristics
     Effective capacity                                [9600]
     Cost per connect time                             [0]
     Cost per byte                                     [0]
     Security                                           nonsecure
     Propagation delay                                  telephone
     User-defined 1                                    [128]
     User-defined 2                                    [128]
     User-defined 3                                    [128]

  Comments                                             []

F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 11. SDLC EIA232D Link Station Profile for RS60007

Notes:

1 This address must match the address specified with the VTAM PU ADDR statement (see Figure 16 on page 30 for the VTAM PU definition). Usually X'C1' is used for the first PU. In the CS/AIX link station profile this value has to be entered in decimal format (193).

2 We do not require dependent LU sessions so this field is set to ″no″. If you use yes (which is the default), then CS/AIX reserves LFSIDs and requests ACTPU during XID negotiation.

Local-form session identifiers (LFSIDs) are used to uniquely identify sessions across a link. LFSIDs range from x′0101′ to x′FEFF′. If a link supports dependent LU sessions, both session endpoints should reserve LFSIDs x′0101 to x′01FF′ for these sessions. If one session endpoint reserves the LFSIDs for dependent sessions but the other endpoint does not, the BIND from the partner that does not will be failed with sense 80090000. This problem could be encountered (with various results) between any two nodes that do not agree on LFSID reservation for dependent sessions. The problem happens more often on connections to AS/400 systems, because they usually have no dependent LUs defined. The solution is to either change the AIX node to not request SSCP-PU sessions (Solicit SSCP sessions = no) or to define a dependent LU on the partner node.

3 Starts the link station automatically each time the SNA subsystem is started.

4 Restart on normal deactivation restarts the link station after a nonerror disconnect is received from the remote node (host shutdown).

5 Restarts the link if the link terminates abnormally (broken line). See also the Link Recovery Parameters in Figure 10 on page 24.

4.1.1.3 CS/AIX AnyNet Configuration

1. The first step in setting up AnyNet in CS/AIX is to add a Sockets over SNA minimum configuration profile. The minimum profile for our scenario is shown in Figure 12.

```
                    Add a Minimum Configuration Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       [rs7]

  Local information (required):
*    IP address                                    1 [192.168.210.11]
*    Subnet mask                                   2 [255.255.255.0]
*    Mode name                                     3 [SNACKETS]
     Maximum send buffer size                      [8300]
     Datagram conversation timeout                 [90]
     Connection start timeout                      [90]

  LU mapping information (required):
     LU name template                              4 [RA6K7ANY]
     LU mapping mask                               5 [255.255.255.255]

  Comments                                         []

F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Reset         F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 12. AnyNet Minimum Configuration Profile for RS60007

Notes:

1 **2** Enter the local IP address and network mask used by the sna0 network interface. This IP address will show up in the routing table. AnyNet will use this routing table to determine whether to send packets over the sna0 interface or out through one of the native TCP/IP network interfaces if they are up. You must consider your IP routing scheme for both TCP/IP and AnyNet when designing and choosing your IP addresses for AnyNet.

3 Select SNACKETS as the default mode to be used for all sessions initiated by CS/AIX Sockets over SNA. If a different mode is specified for a particular port, that mode will be used for any connections with that port.

4 Enter either a template for algorithmic IP-LU mapping or an explicit LU name. In this example we used explicit addressing and RA6K7ANY is the complete local LU name. See scenario 2 for an algorithmic address mapping example. Algorithmic and explicit address mapping are discussed in 2.1.1, “IP-LU Mapping” on page 9.

5 Enter 255.255.255.255 which defines this as an explicit address mapping.

2. When you configure the minimum configuration profile, CS/AIX Sockets over SNA automatically creates an LU6.2 local LU profile for the local AIX Sockets over SNA node. The LU definition is based on the IP address and LU mapping information specified in the minimum configuration profile. To display the local LU profile named anynetlu enter smit _snalocalu6ch.

```
                    Change/Show LU 6.2 Local LU Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
  Current profile name                                anynetlu
  New profile name                                   []
* Local LU name                                      [RA6K7ANY]
  Local LU alias                                     [RA6K7ANY]
  Local LU is dependent?                              no
     If yes,
        Local LU address (1-255)                     []
        System services control point
           (SSCP) ID (*, 0-65535)                    [*]
        Link Station Profile name                    []
  Conversation Security Access List Profile name     []
  Recovery resource manager (RRM) enabled?            no

  Comments                                           []


F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 13. LU 6.2 Local LU Profile for RS60007 AnyNet

Since we used explicit address mapping, the LU name is the name provided in the minimum configuration profile without any further extension.

3. SNACKETS is the default logmode for IBM AnyNet products and is shipped with the products. The default class of service associated with the SNACKETS logmode may or may not be the same on different platforms. This is generally not a problem. It does, however, point out that the user can

have a definite influence on network performance by changing the class of service and logmode parameters used.

We used the default mode SNACKETS, but changed the class of service name in the mode profile from #CONNECT to #INTER to match the VTAM SNACKETS mode defaults. The #CONNECT class of service provides LU-LU connectivity at medium transmission priority. #INTER provides LU-LU connectivity geared toward interactive sessions, providing high transmission priority and considering a short delay time more important that high bandwidth and lost cost.

```
                        Change/Show LU 6.2 Mode Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
  Current profile name                                  SNACKETS
  New profile name                                     []
  Mode name                                            [SNACKETS]
  Maximum number of sessions (1-5000)                  [100]
  Minimum contention winners (0-5000)                  [50]
  Minimum contention losers (0-5000)                   [0]
  Auto activate limit (0-500)                          [0]
  Upper bound for adaptive receive pacing window       [16]
  Receive pacing window (0-63)                         [7]
  Maximum RU size (128,...,32768: multiples of 32)     [3840]
  Minimum RU size (128,...,32768: multiples of 32)     [128]
  Class of Service (COS) name                          [#INTER]

  Comments                                             []


F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 14. SNACKETS Logmode for CS/AIX

4. Since we used explicit address mapping, we have to configure a remote address mapping profile to map the LU name for the MVS system to its IP address.

```
                    Add Remote Address Mapping Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                    [Entry Fields]
* Profile name                                     [snack000]
* Remote IP address                              1 [192.168.210.1]
* LU mapping mask                                2 [255.255.255.255]
  LU name template                               3 [SNACK000]
  Network name                                     [USIBMRA]

  Comments                                         []

F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Reset         F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 15. Remote Address Mapping Profile for RS60007

Notes:

1 The IP address for the remote host (MVS) is 192.168.210.1.

2 LU mapping mask is set to 255.255.255.255 for explicit mapping.

3 The LU name for AnyNet on the MVS VTAM host (shown in Figure 19 on page 32).

4.1.1.4 Startup at Boot Time

If you want AnyNet to be active after an AIX reboot without operator intervention, you should update the corresponding startup files called from /etc/inittab during system boot.

Uncomment the line (by removing the # sign):

```
#/usr/bin/sna -start
```

in file /etc/rc.sna to have SNA started by the boot sequence.

Also uncomment the line:

```
#/usr/bin/sna -s anynet
```

in file /etc/rc.anynet to have AnyNet started by the boot sequence.

You also should set `Activate link station at SNA startup = yes` in the link station profile (see Figure 11 on page 25).

4.1.2 MVS18 Definitions

The MVS system is running VTAM 4.4 as an interchange node, meaning it acts as both a subarea PU 5 and as an APPN network node. VTAM Sockets over SNA is being used to communicate with ICSS for OS/390.

ICSS for OS/390 is the Web server in this scenario. ICSS for OS/390 interfaces with the MVS OpenEdition component to communicate with TCP/IP and VTAM AnyNet. In this scenario we did not use TCP/IP on MVS. AnyNet received the

requests for ICSS over the Sockets over SNA connection with RS60007. The setup for ICSS for OS/390 was the same for all scenarios so they are described once in Chapter 8, “MVS Web Server Setup for AnyNet Scenarios” on page 161. The MVS AnyNet setup is described in Chapter 9, “AnyNet MVS Setup for AnyNet Scenarios” on page 165.

4.1.2.1 SDLC Connection between RS60007 and MVS18

The SDLC DLC and link station profiles shown earlier in Figure 10 on page 24 and Figure 11 on page 25 are definitions to connect RS60007 to MVS over an SDLC line in an NCP. The NCP definitions in Figure 16 allow the SSCP to PU subarea connection to take place. The CP-CP session between RA6007CP and VTAM (RAI) is established using the PU (P07175A) as an adjacent link station.

```
G07S1    GROUP LNCTL=SDLC,         SYNCHRONOUS DATA LINK              *
               CLOCKNG=EXT,        MODEM PROVIDES CLOCKING ####       *
               DUPLEX=FULL,        REQUEST TO SEND ALWAYS UP          *
               NRZI=YES,                                              *
               REPLYTO=1,          1 SECOND FOR SDLC                  *
               RETRIES=(7,4,5),    7 RETRY PER SECOND FOR 5 TIMES     *
               TYPE=NCP            NCP ONLY
*************************************************************************
L07175   LINE ADDRESS=(175,FULL),                                      *
               ANS=CONTINUE,                                          *
               ISTATUS=INACTIVE,                                      *
               DUPLEX=FULL,                                           *
               OWNER=RAI,                                             *
               SPEED=9600
*************************************************************************
P07175A  PU ADDR=C1,               1 Must match RS6k link station     *
               MAXDATA=521,        MAXIMUM AMOUNT OF DATA             *
               MAXOUT=7,           MAX SDLC FRAMES BEFORE RESPONSE    *
               CPCP=YES,           CP-CP SESSIONS SUPPORTED           *
               PACING=7,           PACING SET BY BIND IMAGE           *
               ANS=CONTINUE,       KEEPS CROSS-DOMAIN RUNNING         *
               PASSLIM=7,                                             *
               PUTYPE=2,                                              *
               RETRIES=(,1,4),     4 RETRIES, 1 SECOND BETWEEN        *
               MODETAB=MODEVR,     (V) VTAM                           *
               DLOGMOD=M2SDLCQ,    (V) VTAM                           *
               DISCNT=(NO),        (V) VTAM ONLY                      *
               XID=YES,            PU T 2.1  NODE                     *
               ISTATUS=ACTIVE,     (V) VTAM ONLY                      *
               VPACING=8           (V) VTAM ONLY
*
```

Figure 16. NCP SDLC Line to RS60007

The PU addr parameter (1) is set to X’C1’. This must match the local secondary station address set in the CS/AIX SDLC link station profile (in Figure 11 on page 25). In the CS/AIX profile the address is represented in decimal (193).

```
C RAIAN    DISPLAY NET,ID=LO7175,SCOPE=ALL
  RAIAN    IST097I  DISPLAY  ACCEPTED
' RAIAN
IST075I  NAME = LO7175           , TYPE = LINE
IST486I  STATUS= ACTIV     , DESIRED STATE= ACTIV
IST087I  TYPE = LEASED             , CONTROL = SDLC, HPDT = *NA*
IST1440I  USE = NCP, DEFINED RESOURCE, CANNOT BE REDEFINED
IST134I  GROUP = GO7S1   , MAJOR NODE = RA7NCPX
IST1500I  STATE TRACE = OFF
IST084I  NETWORK RESOURCES:
IST089I  PO7175A  TYPE = PU_T2.1          , ACTIV--L--  1
IST089I  RA6007CP TYPE = ADJACENT CP      , ACT/S----Y  2
IST314I  END
```

Figure 17. VTAM Display of SDLC Line

Figure 17 shows a VTAM display of the NCP line. When the SDLC link station is started in RS60007 and the NCP line and PU are active, a SSCP-PU connection (**1**) and a CP-CP session (**2**) are established since MVS18 is an interchange node, providing both APPN and subarea functions.

4.1.2.2 MVS AnyNet Definitions

In this scenario we used explicit mapping to assign LU names to each node. We did not use the algorithmic method to generate LU names.

The AnyNet IP address for RS60007 is 192.168.210.11 and corresponds to the LU name RA6K7ANY. This relationship is defined in CS/AIX while configuring the Sockets over SNA minimum configuration as shown in 4.1.1.3, “CS/AIX AnyNet Configuration” on page 26.

The AnyNet IP address for MVS18 is 192.168.210.1 and corresponds to the LU name SNACK000. This relationship is defined in VTAM AnyNet by issuing the ISTSKIFC command to define the IP address for the sna0 interface. The LU name is determined by taking the sna0 IP address and mapping it to the LU name determined by the ISTSKMAP commands (mapping table). These commands are issued during the start of the AnyNet address space. Figure 18 on page 32 shows an overview of the correlation between the MVS AnyNet and the CS/AIX AnyNet mapping definitions.

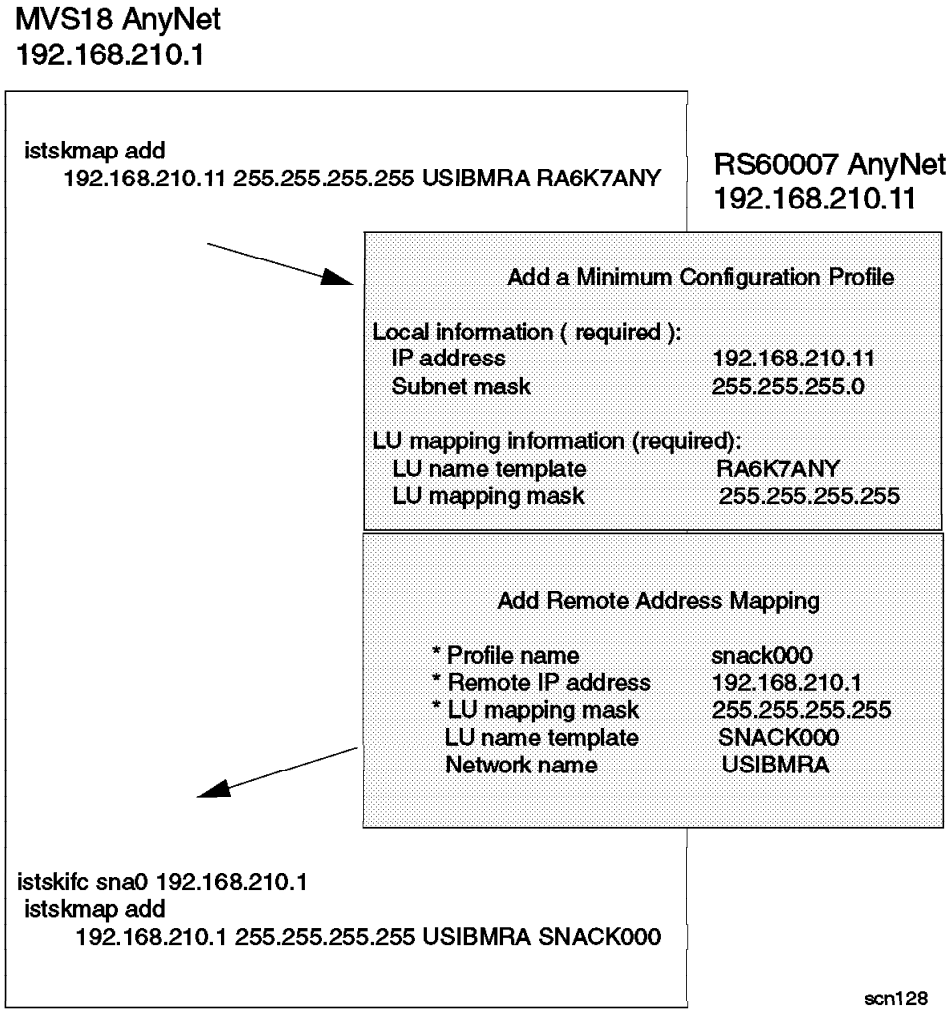


Figure 18. MVS and AIX AnyNet LU Mapping Overview

An overview of the IP-LU mapping tables and routing tables built as a result of these definitions can be seen in Figure 8 on page 22.

4.1.2.3 MVS VTAM APPL Definition for AnyNet

A VTAM application major node must be defined to connect the AnyNet address space to VTAM. All LU 6.2 sessions from other AnyNet nodes are established with this LU.

```
*        APPL statement for Sockets over SNA                    *  00002200
         VBUILD TYPE=APPL                                         00010000
SNACK000 APPL  ACBNAME=SNACK000,                                 *00020000
               APPC=YES,                                         *00030000
               PARSESS=YES,                                      *00040000
               DSESLIM=100,                                      *00050002
               DMINWNL=50,                                       *00060000
               DMINWNR=0,                                        *00070000
               AUTOSES=0,                                        *00080007
               AUTH=(ACQ,PASS),                                  *00090000
               OPERCNOS=ALLOW,                                   *00100000
               ATNLOSS=ALL,                                      *00110000
               MODETAB=ISTINCLM  1                               0 0120001
```

Figure 19. VTAM Application Major Node for AnyNet

1 The default logmode, SNACKETS, is in the VTAM default logmode table (ISTINCLM) shipped with VTAM. The parameters for SNACKETS are shown in Figure 204 on page 169.

4.1.3 Start and Test Scenario 1

After setting up scenario 1 the connectivity can be tested on each platform by verifying the network connections, IP routing, using the ping command, and finally testing Web connectivity from the browser to the server.

4.1.3.1 Verify AIX SNA Profiles and Start Link Station on RS60007

1. Verify the SNA configuration by issuing the command `verifysna -U`.
2. Start SNA by issuing the command `sna -s` (`sna -start`).

   Link station l07175 is automatically started by the SNA subsystem because we set `Activate link station at SNA start up = yes` in the link station profile.
3. Check the link by issuing `sna -d l` (`sna -display link`) from the command line. If you have an APPN link, than you should see two active local sessions, which are the CP-CP sessions.

```
rs60007:/ # sna -d l
    Link           Adjacent      Node    Device            # of local  In
   station         CP name       type     name     State    sessions   use
------------- ----------------- ----- --------- ---------- ---------- -----
l07175         USIBMRA.RAI       NN    mpq0      Active              2 Yes
rs60007:/ #
```

Figure 20. RS60007 SDLC Link Station Display

4. Check the SNA global information display for correct CP name and APPN node type by issuing `sna -d g` (`sna -display global`).

```
rs60007:/ # sna -d g
*************************************
       SNA Global Information
*************************************
Status                                 Active
Control point (CP) name                USIBMRA.RA6007CP
CP alias                               RA6007CP
Node ID (for XID)                      X'00000000'
Node type                              Network node (NN)
Max. number of cached routing trees    500
Max. number of nodes in the TDB        500
Route additional resistance            128
Number of licensed sessions            200
Maximum number of conversations        200
Implicit partner LU support?           Yes
NMVT action when no NMVT process       Reject
Control Point (CP) profile comment
Product version                        3.1.2.3
Local hostname (TCP/IP)                rs60007
Time of last verified configuration    Fri May 30 16:31:42 1997
rs60007:/ #
```

Figure 21. RS60007 Global Information Display

4.1.3.2 Verify VTAM Connections

Both the NCP line and PU must be active for the connection with RS60007 to become active. Once the connection is made, display the CP (RA6007CP) and the PU (P07175) to verify they are active. The output of the VTAM display, `D NET,ID=RA6007CP` can be seen in Figure 22.

```
IST075I  NAME = USIBMRA.RA6007CP , TYPE = ADJACENT CP
IST486I  STATUS= ACT/S----Y, DESIRED STATE= ACTIV
IST1447I  REGISTRATION TYPE = NO
IST977I  MDLTAB=***NA*** ASLTAB=***NA***
IST1333I  ADJLIST = ***NA***
IST861I  MODETAB=***NA*** USSTAB=***NA*** LOGTAB=***NA***
IST934I  DLOGMOD=CPSVCMG  USS LANGTAB=***NA***
IST597I  CAPABILITY-PLU ENABLED  ,SLU ENABLED  ,SESSION LIMIT NONE
IST231I  CDRSC    MAJOR NODE = ISTCDRDY
IST1184I  CPNAME = USIBMRA.RA6007CP  - NETSRVR = ***NA***
IST1044I  ALSLIST = ISTAPNPU
IST082I  DEVTYPE = INDEPENDENT LU / CDRSC
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I  STATE TRACE = OFF
IST171I  ACTIVE SESSIONS = 0000000002, SESSION REQUESTS = 0000000000
IST206I  SESSIONS:
IST1081I  ADJACENT LINK STATION = P07175A  1
IST634I  NAME     STATUS         SID          SEND RECV VR TP NETID
IST635I  RAI      ACTIV/CP-S E07F381377BE2F8F 004C 0001  0  0 USIBMRA
IST635I  RAI      ACTIV/CP-P F86FE1644A54CDC0 0001 0051  0  0 USIBMRA
IST924I  -------------------------------------------------------------
IST075I  NAME = USIBMRA.RA6007CP , TYPE = DIRECTORY ENTRY
IST1186I  DIRECTORY ENTRY = DYNAMIC    NN
IST1184I  CPNAME = USIBMRA.RA6007CP  - NETSRVR = ***NA***
IST314I  END
```

Figure 22. Display Status of CP for RS60007 from VTAM

1 P07175A, defined in Figure 16 on page 30, acts as an adjacent link station for RA6007CP.

```
C RAIAN    DISPLAY NET,ID=P07175A,SCOPE=ALL
  RAIAN    IST097I  DISPLAY  ACCEPTED
' RAIAN
IST075I  NAME = P07175A          , TYPE = PU_T2.1
IST486I  STATUS= ACTIV--L--, DESIRED STATE= ACTIV
IST1043I  CP NAME = RA6007CP, CP NETID = USIBMRA , DYNAMIC LU = YES
IST1589I  XNETALS = YES
IST1105I  RESOURCE STATUS TGN CP-CP TG CHARACTERISTICS
IST1106I  P07175A  AC/R    21 YES   982D000000000000000000017100808080
IST1482I  HPR = ANR  - OVERRIDE = N/A - CONNECTION = YES
IST1510I  LLERP = REQUIRED - RECEIVED = REQUIRED
IST081I  LINE NAME = L07175  , LINE GROUP = G07S1   , MAJNOD = RA7NCPX
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I  STATE TRACE = OFF
IST355I  LOGICAL UNITS:
IST080I  RA6007CP ACT/S----Y
IST314I  END
```

Figure 23. Display Status of PU for RS60007 from VTAM

4.1.3.3 Start AnyNet and Check Network Interface sna0 on RS60007

Now that the physical connection has been established, start AnyNet by issuing the command `sna -s anynet` from the command line.

```
rs60007:/ # sna -s anynet
0105-3002 Starting AnyNet.
0105-3003 AnyNet has been started.
rs60007:/ #
```

Figure 24. Starting AnyNet on RS60007

Check the characteristics of the new TCP/IP interface sna0 by issuing the command `ifconfig sna0`.

```
rs60007:/ # ifconfig sna0
sna0: flags=21<UP,NOTRAILERS>
        inet 192.168.210.11 netmask 0xffffff00
rs60007:/ #
```

Figure 25. Display sna0 Interface on RS60007

4.1.3.4 Start AnyNet and Check the Routing Tables on MVS

Start AnyNet by using the procedures outlined in 9.1.4, “AnyNet MVS Started Task and Configuration Data Sets” on page 171. Use the ISTSKNST -r command from TSO to display the routing tables. The display shows more definitions than what we have covered in this scenario. The entry we are interested in is the highlighted entry. This says that any packets destined for the 192.168.210 network are to be sent out over the sna0 interface.

```
   destination           gateway     refcnt        use  flags    intrf

    9.24.104.0      192.168.210.8       0            0    U      sna0
    9.24.104.0      192.168.210.8       0            0    U      sna0
  192.168.210.0     192.168.210.1       0           39    U      sna0
  192.168.221.0     192.168.210.3       0            0    U      sna0
  192.168.221.0     192.168.210.3       0            0    U      sna0
```

Figure 26. ISTSKNST MVS AnyNet Command to Display Routing Table

4.1.3.5 Check the IP Routing Table on RS60007

Check your route table for a correct entry of sna0. Note that this table is used for routing to AnyNet and to TCP/IP.

```
rs60007:/ # netstat -rn
Routing tables
Destination      Gateway           Flags     Refs     Use  PMTU  Netif Expire
Netmasks:
(0) 0 ff00
(0) 0 ffff
(0) 0 ffff ff00

Route Tree for Protocol Family 2:
default          9.24.104.1        UG           1      229     -    tr0   -
9.24.104         9.24.104.76       U           21    10919     -    tr0   -
127              127.0.0.1         U            4      245     -    lo0   -
127.127          127.127.0.2       U            1        0     -    gw0   -  1
192.168.210      192.168.210.11    U            1        0     -   sna0   -  2
rs60007:/ #
```

Figure 27. Routing Table on RS60007

Notes:

1 gw0 is the currently unused network interface for the AnyNet Sockets over SNA gateway function. Do not delete gw0 and don't put it in a "down" state, as this can cause problems with your AnyNet access node connection.

2 Packets destined for the 192.168.210 network will be routed over the sna0 (AnyNet) interface.

In the route tables you may see static routes from other network interfaces (for instance tr0 in this example). Although they exist, they are not used and not necessary for establishing the AnyNet connections. They may be necessary to have the Common Desktop Environment (CDE) up and running, CDE needs an active TCP/IP network interface to work properly. They may also be useful for host name resolution if domain name service is used in your network.

4.1.3.6 Test AIX Sockets over SNA IP Connectivity

Try using your AnyNet connection with a ping command. Figure 28 shows a successful ping from RS60007 to MVS.

```
rs60007:/ # ping 192.168.210.1
PING 192.168.210.1: (192.168.210.1): 56 data bytes
64 bytes from 192.168.210.1: icmp_seq=0 ttl=255 time=3462 ms
64 bytes from 192.168.210.1: icmp_seq=1 ttl=255 time=2402 ms
64 bytes from 192.168.210.1: icmp_seq=2 ttl=255 time=1600 ms
64 bytes from 192.168.210.1: icmp_seq=3 ttl=255 time=800 ms
64 bytes from 192.168.210.1: icmp_seq=4 ttl=255 time=268 ms
64 bytes from 192.168.210.1: icmp_seq=5 ttl=255 time=298 ms
64 bytes from 192.168.210.1: icmp_seq=6 ttl=255 time=257 ms
64 bytes from 192.168.210.1: icmp_seq=7 ttl=255 time=257 ms
64 bytes from 192.168.210.1: icmp_seq=8 ttl=255 time=260 ms
64 bytes from 192.168.210.1: icmp_seq=9 ttl=255 time=251 ms

----192.168.210.1 PING Statistics----
10 packets transmitted, 10 packets received, 0% packet loss
round-trip min/avg/max = 251/985/3462 ms
rs60007:/ #
```

Figure 28. Pinging MVS AnyNet from RS60007

The SDLC line in our scenario had only a 9600 bps line speed. This gives slow response to the ping packets. There is also a typical delay seen for the first packets. The delay results from the time needed by AnyNet Sockets over SNA to establish the underlying LU6.2 sessions to the partner node.

4.1.3.7 Display RS60007 SNA Resources Used in Example

The `sna -d s` command shows the actived SNA sessions.

```
rs60007:/ # sna -d s
             Local            Partner        Mode      Link
 CGID       LU name          LU name         name     station     State
------ ---------------- ---------------- -------- ----------- ---------
5      USIBMRA.RA6K7ANY  USIBMRA.SNACK000  SNACKETS l07175      Allocated
4      USIBMRA.RA6K7ANY  USIBMRA.SNACK000  SNACKETS l07175      Allocated
3      USIBMRA.RA6K7ANY  USIBMRA.SNACK000  SNASVCMG l07175      Available
1      USIBMRA.RA6007CP  USIBMRA.RAI       CPSVCMG  l07175      Available
2      USIBMRA.RA6007CP  USIBMRA.RAI       CPSVCMG  l07175      Available
rs60007:/ #
```

Figure 29. Display Sessions From RS60007

CGIDs (Conversation group identifier) 1 and 2 are the CP-CP sessions (mode CPSVCMG). CGID 3 is the SNA service manager session (SNASVCMG) needed to establish the application sessions. CGIDs 4 and 5 are the active SNACKETS sessions.

The long version of the above information can be displayed using `sna -d s -o 'long'`. The long version also gives the session ID and can be used to match the sessions with those seen on the MVS VTAM display.

AnyNet establishes a separate SNACKETS session for each datagram transfer direction.

To see the initiator from each of the LU6.2 sessions use the command `sna -d s -o long`. In the resulting output, the line `Primary LU` indicates either `Local LU` or `Partner LU` as session initiator.

CGID 4 and 5 SNACKETS sessions are still in the ″allocated″ state. These datagram conversations are deallocated only if they are unused for the period of time specified in the Datagram conversation timeout field of the CS/AIX AnyNet minimum configuration profile.

This behavior is different when Sockets over SNA emulates full-duplex TCP connections by using two half-duplex LU6.2 conversations (for instance Telnet or FTP). These conversations are deallocated immediately when the stream socket connection is closed.

The same information can be seen from the MVS VTAM display shown in Figure 30 on page 38.

```
 C RAIAN    DISPLAY NET,ID=SNACK000,SCOPE=ALL
   RAIAN    IST097I  DISPLAY  ACCEPTED
 ' RAIAN
 IST075I  NAME = USIBMRA.SNACK000 , TYPE = APPL
 IST486I  STATUS= ACT/S     , DESIRED STATE= ACTIV
 IST1447I  REGISTRATION TYPE = CDSERVR
 IST977I  MDLTAB=***NA*** ASLTAB=***NA***
 IST861I  MODETAB=ISTINCLM USSTAB=***NA*** LOGTAB=***NA***
 IST934I  DLOGMOD=***NA*** USS LANGTAB=***NA***
 IST1632I  VPACING =  7
 IST597I  CAPABILITY-PLU ENABLED  ,SLU ENABLED  ,SESSION LIMIT NONE
 IST231I  APPL     MAJOR NODE = RAIANYAP
 IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
 IST1500I  STATE TRACE = OFF
 IST271I  JOBNAME = RAISOCK , STEPNAME = RAISOCK , DSPNAME = IST141B0
 IST1050I  MAXIMUM COMPRESSION LEVEL - INPUT = 0   , OUTPUT = 0
 IST1633I  ASRCVLM =  1000000
 IST1634I  DATA SPACE USAGE: CURRENT =          0 MAXIMUM  =       7048
 IST171I  ACTIVE SESSIONS = 0000000005, SESSION REQUESTS = 0000000000
 IST206I  SESSIONS:
 IST634I  NAME     STATUS         SID          SEND RECV VR TP NETID
 IST635I  RA6K7ANY ACTIV-S    F86FE1644A54CDC5 0029 0000  0  0 USIBMRA
 IST635I  RA6K7ANY ACTIV-S    F86FE1644A54CDC4 0029 0000  0  0 USIBMRA
 IST635I  RA6K7ANY ACTIV-P    E07F381377BE2F92 0000 0028  0  0 USIBMRA
 IST635I  RA6K7ANY ACTIV-P    E07F381377BE2F91 0000 0016  0  0 USIBMRA
 IST635I  RA6K7ANY ACTIV/SV-P E07F381377BE2F90 0001 0001  0  0 USIBMRA
IST314I  END
```

Figure 30. Display Sessions From MVS18

4.1.3.8 Display RS60007 AnyNet Resources Used in Example

1. Display AnyNet global information

   The AIX AnyNet Global Information display provides information about global parameter settings for AnyNet and summary information for connections using AIX Sockets over SNA. Enter the command `sna -d anyg` (`sna -d anynet_global`) from the command line.

```
rs60007:/ # sna -d anyg
***********************************************
      AnyNet Global Information
***********************************************
AnyNet Status                              Started
          Connection retry duration        300
    Sockets over SNA                       Active
          Gateway status                 1 Inactive
          Number of Gateway Connections    0
          Local LU name                    RA6K7ANY
          Connection start timeout         90
          Datagram timeout               2 90
          Default mode                     SNACKETS
          Maximum send buffer size         8300
    APPC over TCP/IP                       Active
          Gateway status                   Active
          Number of Gateway Connections    0
          Gateway Control Point name       $ANYNET.$GWCP
          SNA domain name suffix           SNA.IBM.COM
          Connection wait time limit       30
          Well known port                  397
          Unacked datagram retry interval  30
          Unsent datagram retry interval   3
          Inactivity sweep interval        120
rs60007:/ #
```

Figure 31. RS60007 AnyNet Global Information

Notes:

1 Gateway status inactive is displayed on AnyNet access nodes.

2 Datagram conversation timeout value in seconds.

The AnyNet global information display also shows the APPC over TCP/IP component when installed.

2. Display AIX Sockets over SNA connection information

Display a brief summary report by issuing the command `sna -d anynet`.

```
rs60007:/ # sna -d anynet
     Sockets over SNA     2 connection(s)
     ---------------

AnyNet ID          Local                   Partner               State      GW
--------- ------------------------ ------------------------ --------------- ---
11        192.168.210.11 0                                   Registered      No
21254     192.168.210.11 4902      192.168.210.1 21          Connected       No

rs60007:/ #
```

Figure 32. RS60007 AnyNet Summary Display

Display a detailed report by issuing the command `sna -d anynet -o long`.

```
rs60007:/ # sna -d anynet -o long
************************************************
Sockets over SNA          2 connection(s)
************************************************
       1>AnyNet ID                          1 11
         State                                Registered
         Local IP address                     192.168.210.11 0
         Remote IP address
         Local LU name
         Partner LU name
         Sending CGID                         0
         Receiving CGID                       0
         Mode
         Gateway Connection                   No
         Correlator

       2>AnyNet ID                            21254
         State                                Connected
         Local IP address                   2 192.168.210.11 4902
         Remote IP address                  3 192.168.210.1 21
         Local LU name                        USIBMRA.RA6K7ANY
         Partner LU name                      USIBMRA.SNACK000
         Sending CGID                       4 7
         Receiving CGID                     5 4
         Mode                                 SNACKETS
         Gateway Connection                   No
         Correlator                           c1d2d5b10042

rs60007:/ #
```

Figure 33. RS60007 AnyNet Detail Display

Note:

1 The first group represents the sna0 network interface which is registered as an AnyNet resource.

2 **3** The second entry shows an active Sockets over SNA connection. The local and remote IP address lines include the port numbers that are used on this connection. Since 21 is the well-known port for FTP, you can conclude that an AIX user has started an FTP session to the MVS system.

Note that the AnyNet Display command shows only TCP/IP connections. All applications using UDP or ICMP packets do not create an ″AnyNet connection″, even though they use allocated conversations for transporting their datagrams over the AnyNet link.

4 **5** In addition you can identify which LU6.2 sessions are used for the FTP connection by comparing the CGID numbers in this display with those in the display created by `sna -d s` command.

The AnyNet display command provides a lot of options to obtain various information displays about Sockets over SNA. Refer to the *Communications Server for AIX AnyNet Guide to Sockets over SNA*, SC31-8217 for a more detailed explanation.

4.1.3.9 Stopping CS/AIX AnyNet and SNA

To stop the AnyNet component of CS/AIX enter `sna -stop anynet` from the command line. The stop of AnyNet may take up to 30 seconds under certain circumstances.

The command `sna -stop sna` stops the whole SNA subsystem. `sna -stop l -p l07175 -t f` stops the link station l07175. The type force (-t f) is only necessary when the link station is just in starting state; otherwise, the link station will not stop.

4.1.4 Using Netscape over AnyNet

We used Netscape Navigator Version 3.01 on the AIX workstations as the Web browser software.

4.1.4.1 Start Netscape and Connect to the MVS Web Server

Since we used the Netscape Navigator only in the intranet and not for outside connections over a firewall, we didn′t define a proxy server in the Network Preferences.

Start the browser by entering `netscape` from the AIX command line. After the browser comes up, enter the TCP/IP address of MVS AnyNet (http://192.168.210.1) as the target URL. Netscape will specify port 80, which is the port MVS AnyNet serves the MVS Web server (ICSS for OS/390) from. The first screen loaded will be the welcome page. The welcome page from the MVS Web server is shown in Figure 34 on page 41.

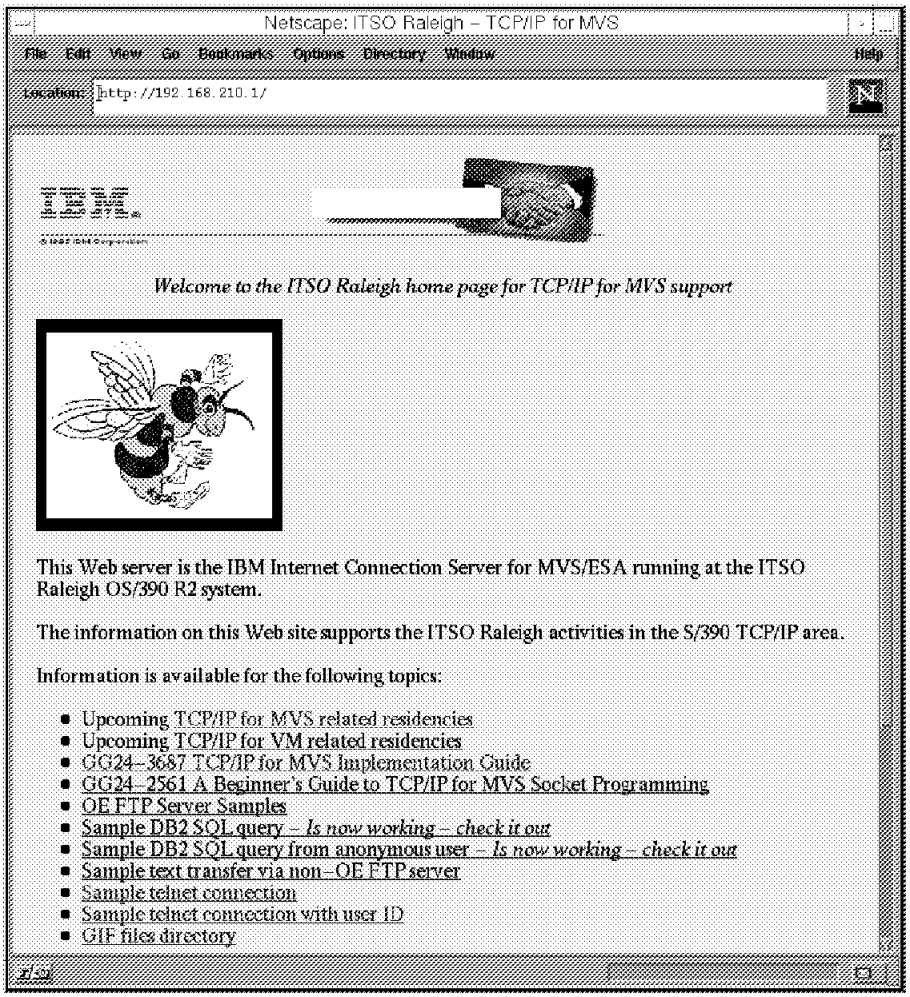


Figure 34. Netscape Web Browser

4.1.4.2 AnyNet Session Allocation for Netscape

We used the XSNA tool from CS/AIX to display the active LU6.2 sessions for RS60007 after loading the Web home page. The XSNA tool requires a running Common Desktop Environment (CDE) or X-server environment. To start XSNA enter xsna from the AIX command line. After the XSNA start screen is displayed, select the **Display** menu, select **Communications Server for AIX** and select **APPC Sessions...**.

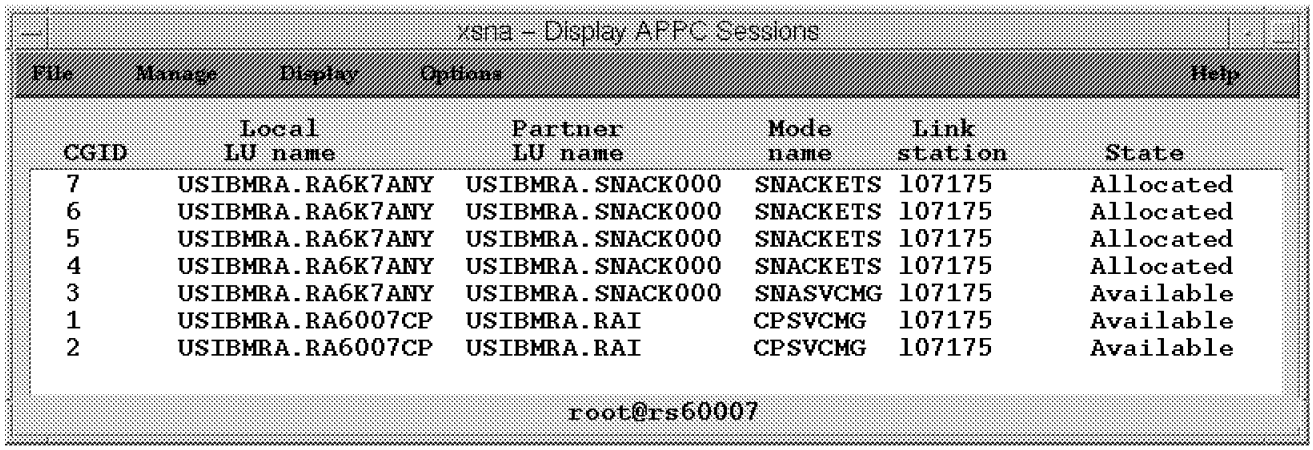


Figure 35. XSNA Display APPC Sessions from RS60007

This query as seen in Figure 35 has been issued while the first Web page was loading from the MVS Web server. In the figure you see four SNACKETS sessions in ″Allocated″ state. The number of activated and allocated sessions depends on the contents being transfered from the server.

In this case the loaded Web page consists of text and two graphical images. The browser sends three separate calls to the Web server, one to load the text, the others to get the graphics. The Web browser first receives the text document. Note that http is running over TCP as an underlying protocol. Each full-duplex TCP/IP connection is emulated in AnyNet by running two half-duplex LU6.2 conversations. Therefore every request sent out by the Web browser results in two LU6.2 conversations.

After or while receiving the text document, Netscape evaluates the received data and detects that two graphical images have to be loaded. The load of the text document was already completed in this case; therefore the same SNACKETS sessions can be used for loading one of the graphics. Since Netscape is able to open more than one connection at a time, it sends out the request for the second graphic while the first request is still running. Two more SNACKETS sessions are started for handling the second request. After the load of the whole Web page is completed, you see four SNACKETS sessions in ″Available″ state.

In general, the number of LU6.2 conversations used in an AnyNet Sockets over SNA Web client/server environment depends on the design and contents of the Web pages and is always twice the number of simultaneous connections opened by the Web browser. You can customize the number of simultaneous connections that Netscape will use in the Netscape Network Preferences setup menu (the default is 4).

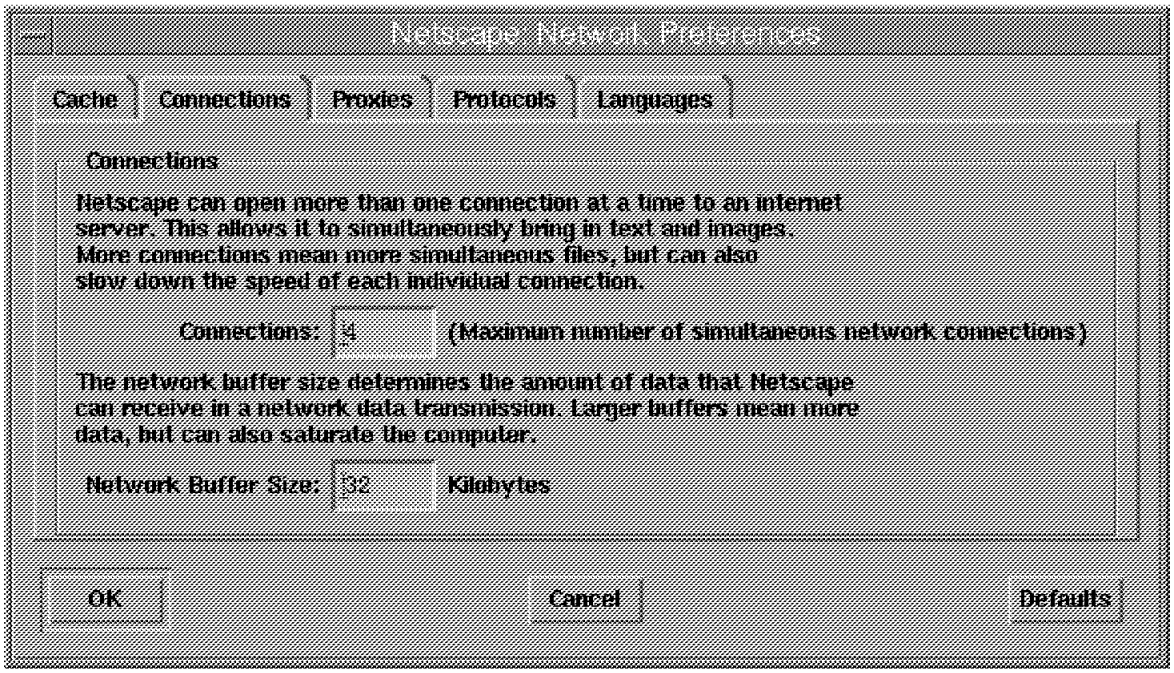


Figure 36. Netscape Connections Network Preferences

Note that we have defined 100 as the maximum number of sessions in the SNACKETS mode definition (see Figure 14 on page 28). 100 sessions is the default in the AIX SNA SNACKETS mode profile. We changed the MVS mode definition to match this value. The minimum number of contention winners on each side is 50. With these settings, a maximum of 50 simultaneous Web client requests can be handled over the AnyNet link. You might have a problem with this limit if you have a large number of users on the same client machine using Web browsers at the same time. If you need more conversations than allowed in the default SNACKETS mode, you can increase the maximum number of parallel sessions in the mode definitions on all participating AnyNet nodes.

You can easily check the session limits for LU6.2 sessions by issuing the command `sna -d sl` (`sna -display session_limits`) from the command line or by calling the session limits panel from XSNA.

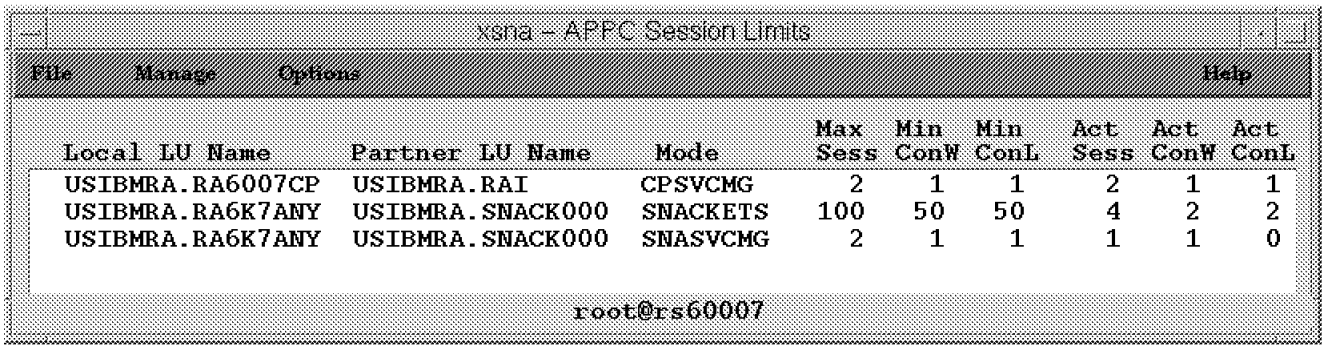


Figure 37. XSNA Display APPC Session Limits from RS60007

4.1.4.3 Display RS60007 AnyNet Resources Used by Netscape

Figure 38 shows the status of AnyNet displayed using XSNA AnyNet display facility while the welcome Web page was transferred.

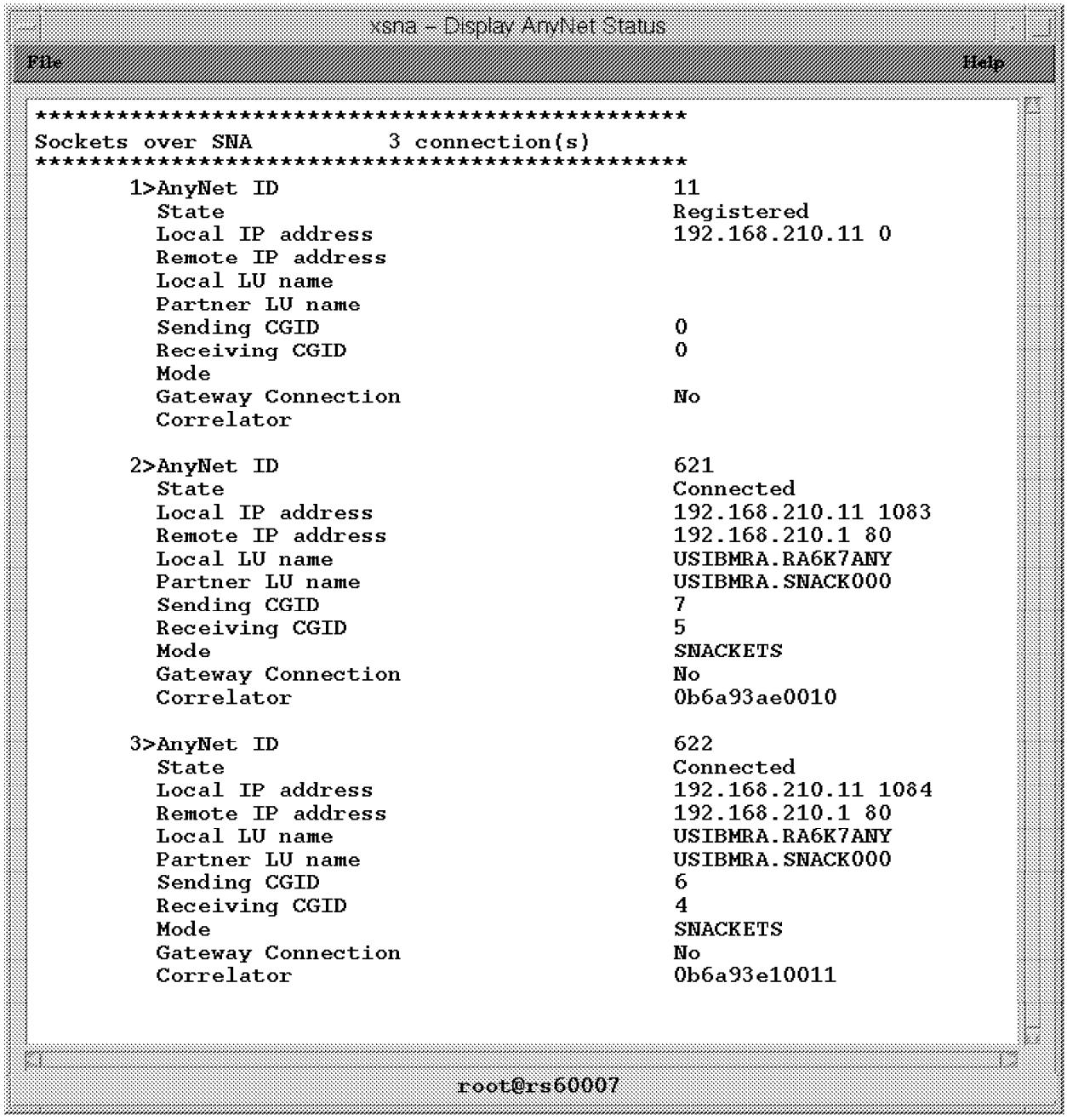


Figure 38. XSNA Display AnyNet Status from RS60007

You can see the two connections using port 80 (www port) from the MVS Web server. Each connection has a sending and a receiving LU6.2 conversation (CGID) in use.

4.2 Scenario 2: Windows NT Web Browser to AIX Web Server

Scenario 2 is similar to scenario 1 in that it shows AnyNet communication between two AnyNet access nodes. This scenario introduces Communication Server for Windows NT (CS/NT) Sockets over SNA. Algorithmic AnyNet mapping is also introduced in this scenario. This scenario illustrates:

- Web products:
  - Netscape on Windows NT
  - Internet Connection Secure Server on AIX
- Network products:
  - CS/AIX Sockets over SNA
  - CS/NT Sockets over SNA
- Network connectivity:
  - AnyNet algorithmic mapping
  - CS/NT MVS SNA over token-ring
  - CS/AIX to MVS VTAM over Ethernet

Figure 39 on page 46 shows an overview of the configuration for this scenario. The MVS system represents an SNA wide area network and does not provide any TCP/IP or AnyNet functions.

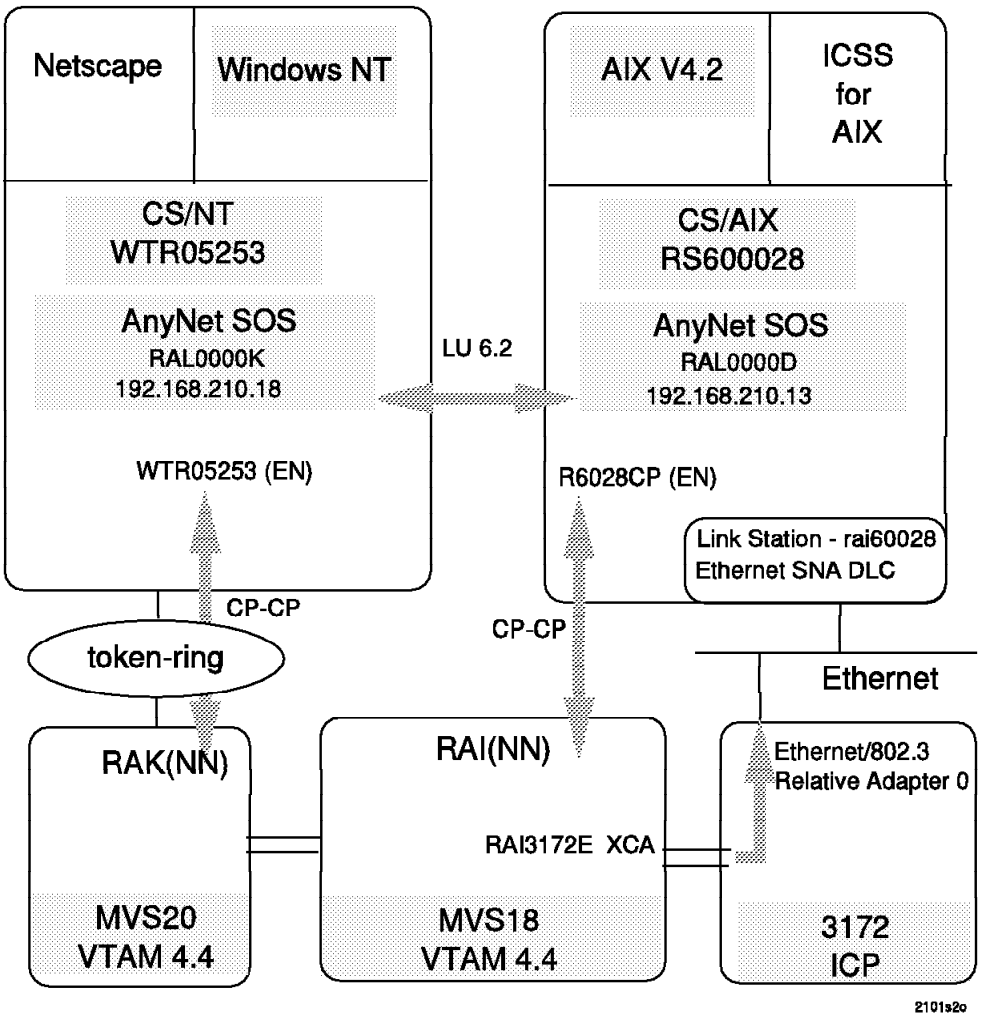


Figure 39. AIX Web Browser to AIX Web Server Network Overview

Figure 40 on page 47 is an overview of the AnyNet routing an IP-LU mapping.

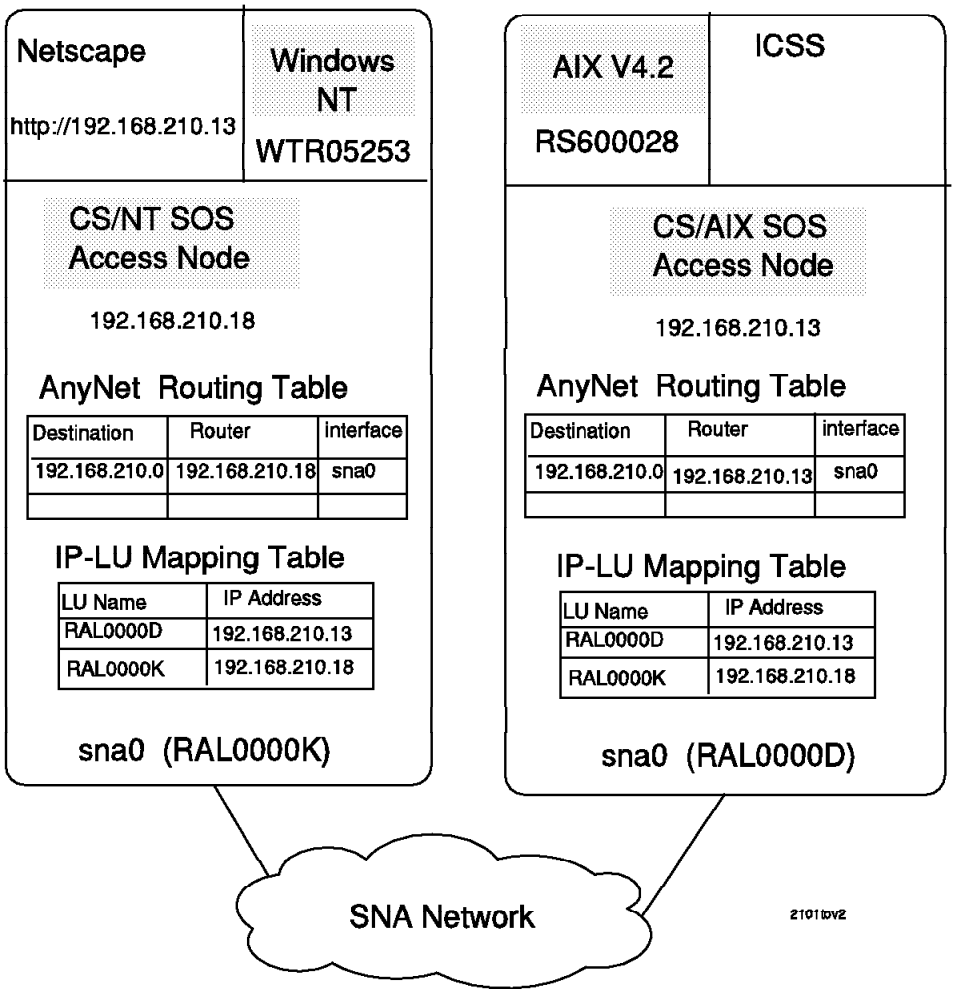


Figure 40. AIX Web Browser to AIX Web Server IP Routing Overview

4.2.1 RS600028 Definitions

RS600028, an RS/6000 running AIX 4.2.0 and CS/AIX 4.2, provides the Netscape browser in this scenario. It is an AnyNet access node.

4.2.1.1 Control Point Configuration

RS600028 is configured as an APPN end node in this scenario. The CP name is R6028CP.

```
                    Change/Show Control Point Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                        node_cp
  XID node ID                                        [*]
* Network name                                       [USIBMRA]
* Control Point (CP) name                            [R6028CP]
  Control Point alias                                [R6028CP]
  Control Point type                                 appn_end_node
  Maximum number of cached routing trees             [500]
  Maximum number of nodes in the TRS database        [500]
  Route addition resistance                          [128]

  Comments                                           []




F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 41. Control Point Profile for RS600028

4.2.1.2 CS/AIX Ethernet Link Configuration

The network connection between MVS and RS600028 is over an Ethernet link. Figure 42 on page 49 shows the DLC definition for the Ethernet port. The Ethernet link station definition is shown in Figure 43 on page 50.

```
                        Add Ethernet SNA DLC Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       [ent0]
  Data link device name                              [ent0]
  DLC protocol type                                1  802.3
  Force disconnect time-out (1-600 seconds)          [120]
  User-defined maximum I-Field size?                  no
     If yes, Max. I-Field size (265-4096)            [4096]
  Max. num of active link stations (1-255)           [100]
     Number reserved for inbound activation          [0]
     Number reserved for outbound activation         [0]
  Transmit window count (1-127)                    2 [16]
  Retransmit count (1-30)                            [8]
  Receive window count (1-127)                     3 [4]
  Inactivity time-out (1-255 seconds)                [48]
  Response time-out (1-40, 500 msec intervals)       [4]
  Acknowledge time-out (1-40, 500 msec intervals)    [1]
  Local link name                                    []
  Local SAP address (02-fa)                          [04]
  Trace base listening link station?                  no
     If yes, Trace format                             long
  Dynamic link stations supported?                    yes

  Link Recovery Parameters
     Retry interval (1-10000 seconds)                [60]
     Retry limit (0-500 attempts)                    [0]

  Dynamic Link Activation Parameters
     Solicit SSCP sessions?                           yes
     CP-CP sessions supported?                        yes
     Partner required to support CP-CP sessions?      no
     High performance routing (HPR) supported?        yes

  Dynamic Link TG COS Characteristics
     Effective capacity                              [4300800]
     Cost per connect time                           [0]
     Cost per byte                                   [0]
     Security                                         nonsecure
     Propagation delay                                lan
     User-defined 1                                  [128]
     User-defined 2                                  [128]
     User-defined 3                                  [128]

  Comments                                           []

F1=Help           F2=Refresh        F3=Cancel         F4=List
F5=Reset          F6=Command        F7=Edit           F8=Image
F9=Shell          F10=Exit          Enter=Do
```

Figure 42. Ethernet DLC Profile for RS600028

Notes:

1 Since VTAM only supports IEEE 802.3 Ethernet protocol on 3172 switched major nodes, you must change this parameter from ″standard″ (which is the default) to ″802.3″. Otherwise, the 3172 will ignore the connection request from AIX SNA.

2 **3** Transmit window count and receive window count.

A 3172 (running ICP) Ethernet port can have a transmit window size defined. The transmit window is the number of unacknowledged frames allowed on a given link station. It is not recommended that this value be

set greater than 8, because doing so increases the amount of data buffered inside the 3172. The default value is 2.

```
                    Add Ethernet Link Station Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                      [Entry Fields]
* Profile name                                       [rai60028]
  Use Control Point's XID node ID?                    yes
     If no, XID node ID                              [*]
* SNA DLC Profile name                               []
  Stop link station on inactivity?                    no
     If yes, Inactivity time-out (0-10 minutes)      [0]
  LU address registration?                            no
     If yes,
        LU Address Registration Profile name         []
  Trace link?                                         no
     If yes, Trace size                               long
  High performance routing (HPR) supported?           yes

  Adjacent Node Address Parameters
     Access routing                                   link_address
     If link_name, Remote link name                  []
     If link_address,
        Remote link address                          [400052005006]
        Remote link address format                   1 non-canonical
        Remote SAP address (02-fa)                   [04]

  Adjacent Node Identification Parameters
     Verify adjacent node?                            no
     Network ID of adjacent node                     []
     CP name of adjacent node                        []
     XID node ID of adjacent node (LEN node only)    [*]
     Node type of adjacent node                       learn

  Link Activation Parameters
     Solicit SSCP sessions?                           yes
     Initiate call when link station is activated?    yes
     Activate link station at SNA start up?           yes
     Activate on demand?                              no
     CP-CP sessions supported?                        yes
     If yes,
        Adjacent network node preferred server?       no
     Partner required to support CP-CP sessions?      no
     Initial TG number (0-20)                        [0]

  Restart Parameters
     Restart on activation?                           no
     Restart on normal deactivation?                  yes
     Restart on abnormal deactivation?                yes

  Transmission Group COS Characteristics
     Effective capacity                              [4300800]
     Cost per connect time                           [0]
     Cost per byte                                   [0]
     Security                                         nonsecure
     Propagation delay                                lan
     User-defined 1                                  [128]
     User-defined 2                                  [128]
     User-defined 3                                  [128]

  Comments                                           []

F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 43. Ethernet Link Station Profile for RS600028

4.2.1.3 AnyNet Configuration

The first step in defining Sockets over SNA is to add a Sockets over SNA minimum configuration profile.

```
                        Add a Minimum Configuration Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       [rs28]

  Local information (required):
*    IP address                                      [192.168.210.13]
*    Subnet mask                                     [255.255.255.0]
*    Mode name                                       [SNACKETS]
     Maximum send buffer size                        [8300]
     Datagram conversation timeout                   [90]
     Connection start timeout                        [90]

  LU mapping information (required):
     LU name template                              1 [RAL]
     LU mapping mask                                 [255.255.255.0]

  Comments                                           []


F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 44. Sockets Over SNA Minimum Configuration

In this example we used algorithmic IP-LU mapping. We specified an appropriate LU name template (**1**) to be used to generate SNA LU names. The LU mapping mask allows you to specify up to 6 characters as the LU name template, leaving 2 digits for the algorithmic index. The rule is: For every set of 5 bits in the IP address field that is not masked out by the LU mapping mask, one unspecified character is required in the template. Algorithmic and explicit mapping are discussed in 2.1.1, “IP-LU Mapping” on page 9.

A local LU 6.2 profile will be automatically created based on the LU name that results from the IP-LU mapping algorithm for the local IP address. In this case the LU name is RAL0000D. Figure 45 on page 52 shows the LU 6.2 profile that was created.

```
                    Change/Show LU 6.2 Local LU Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
  Current profile name                                anynetlu
  New profile name                                   []
* Local LU name                                      [RAL0000D]
  Local LU alias                                     [RAL0000D]
  Local LU is dependent?                              no
     If yes,
        Local LU address (1-255)                     []
        System services control point
           (SSCP) ID (*, 0-65535)                    [*]
        Link Station Profile name                    []
  Conversation Security Access List Profile name     []
  Recovery resource manager (RRM) enabled?            no

  Comments                                           []


F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 45. LU 6.2 Local LU Profile for RS600028

4.2.2 WTR05253 CS/NT Definitions

The Netscape Web browser in this scenario is running on a Windows NT platform. Communication Server for Windows NT (CS/NT) provides the SNA connectivity and Sockets over SNA function.

When configuring a CS/NT node for Sockets over SNA you start by choosing the **AnyNet Sockets over SNA...** scenario option.

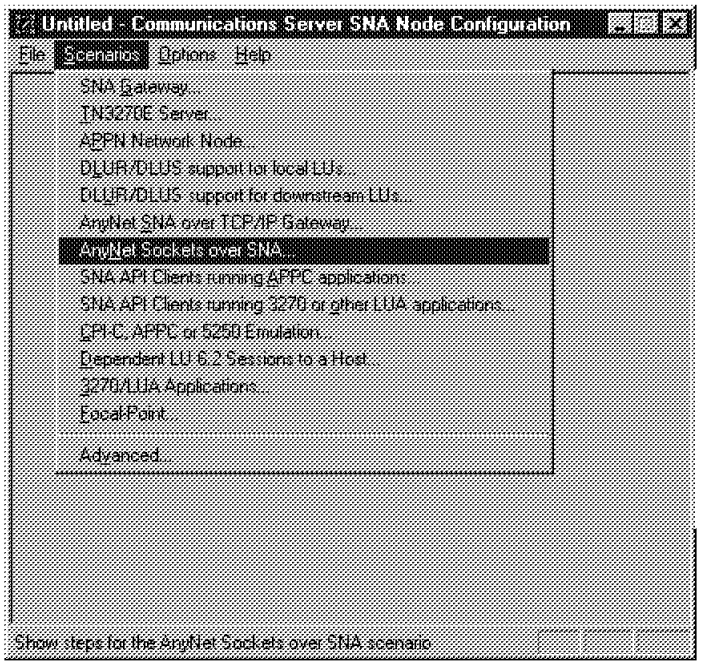


Figure 46. Initial CS/NT Configuration Menu

To define Sockets over SNA you must configure the node, the network connection, and the AnyNet parameters.

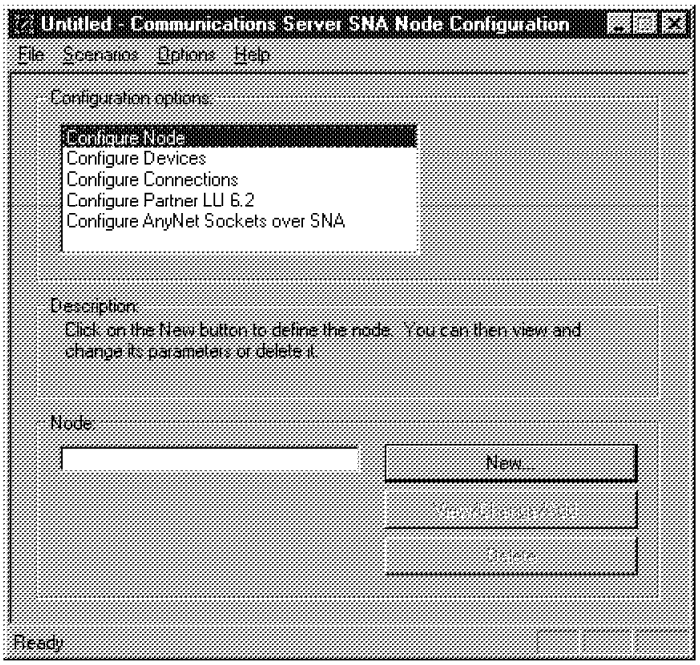


Figure 47. CS/NT AnyNet Scenario

WTR05253 is defined as an APPN end node. The block ID and PU ID identify the node to VTAM.

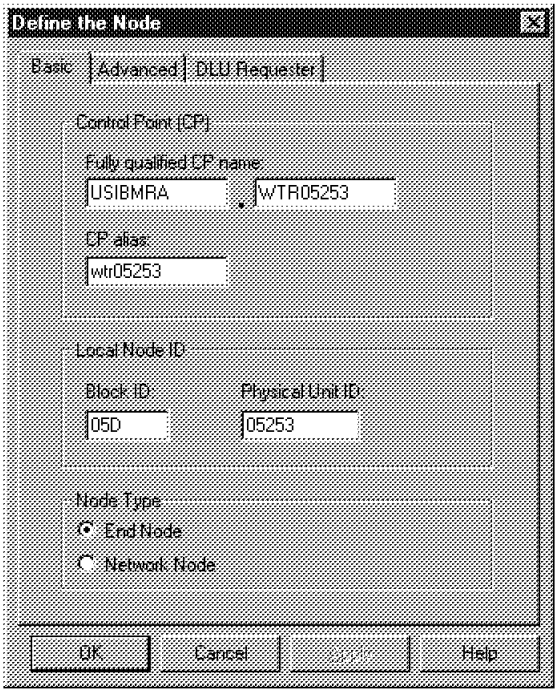


Figure 48. CS/NT Node Configuration

In this scenario CS/NT is connected over token-ring LAN to the network. This requires a LAN port to be defined and a LAN connection to a destination.

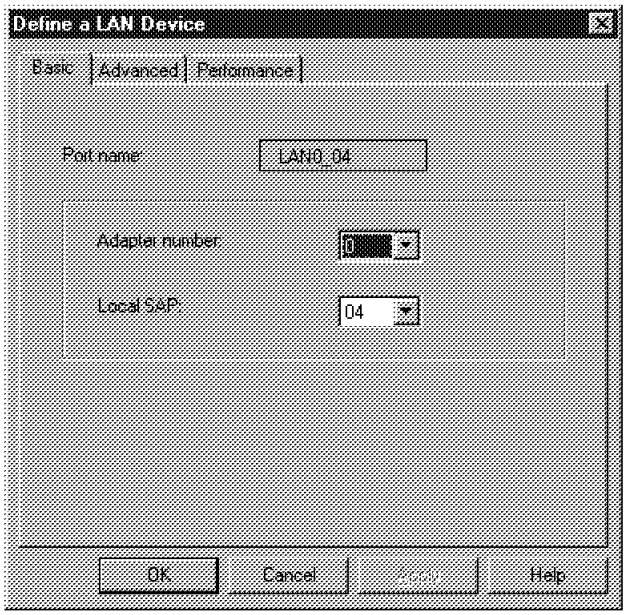


Figure 49. CS/NT LAN Device Definition

The LAN connection is using a destination TIC on a 3745 connected to the host.

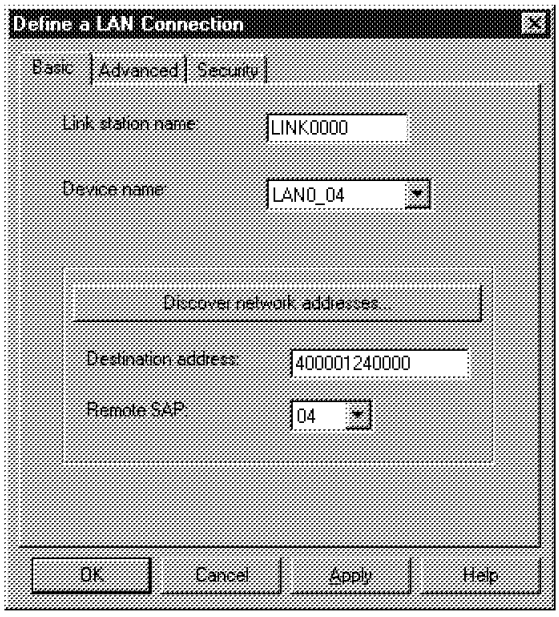


Figure 50. CS/NT LAN Connection

For this scenario we took the defaults for the connection. As you can see CS/NT supports HPR connectivity.

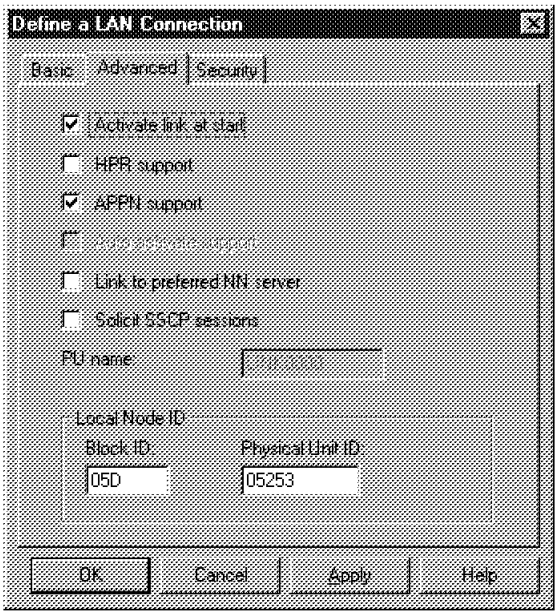


Figure 51. CS/NT LAN Connection Characteristics

The next definitions are the AnyNet Sockets over SNA definitions. This is an AnyNet access node. The sna0 interface is the first thing to define. It determines the local IP address of this AnyNet node.

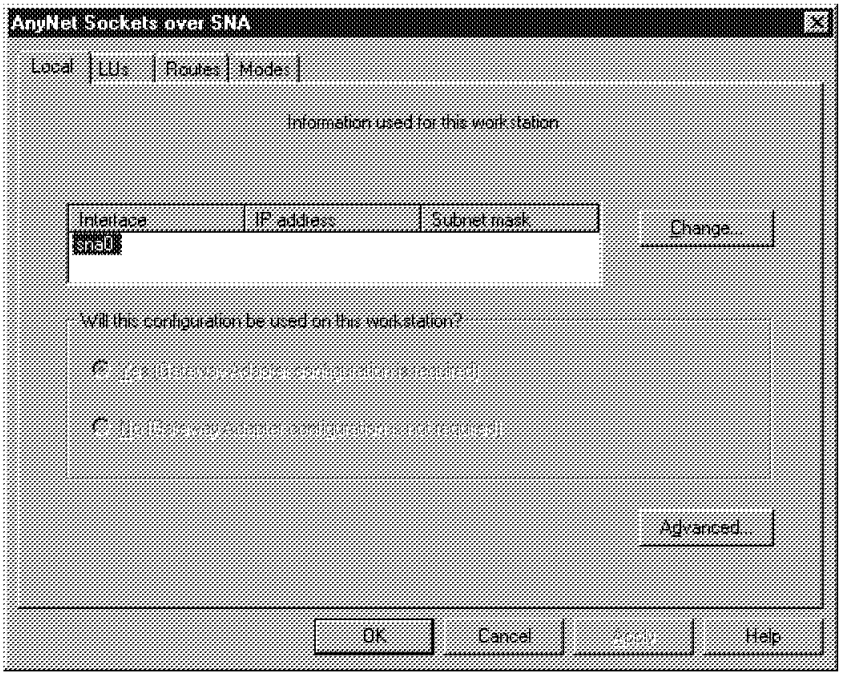


Figure 52. CS/NT AnyNet Definition Menu

This node will use the IP address 192.168.210.18.

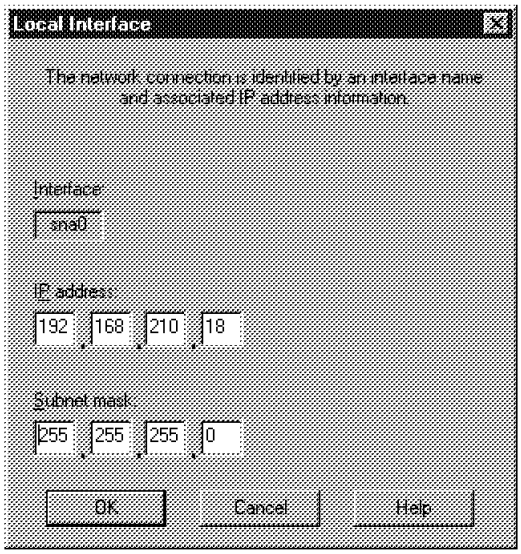


Figure 53. CS/NT AnyNet sna0 Interface

The LU option allows you to select the addressing type. This node will use algorithmic mapping with a template of RAL. AnyNet's internal algorithm will resolve the IP address for this node, 192.168.210.18, to the LU name RAL0000K.

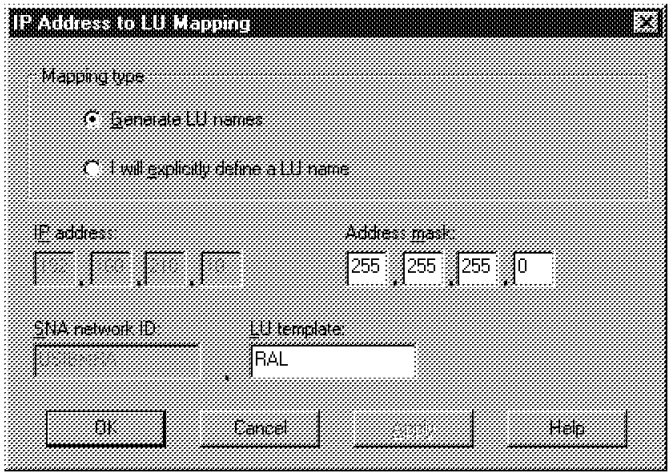


Figure 54. CS/NT IP-LU Mapping

CS/NT allows you to choose or define logmodes for the Sockets over SNA session. We chose to use #INTER.

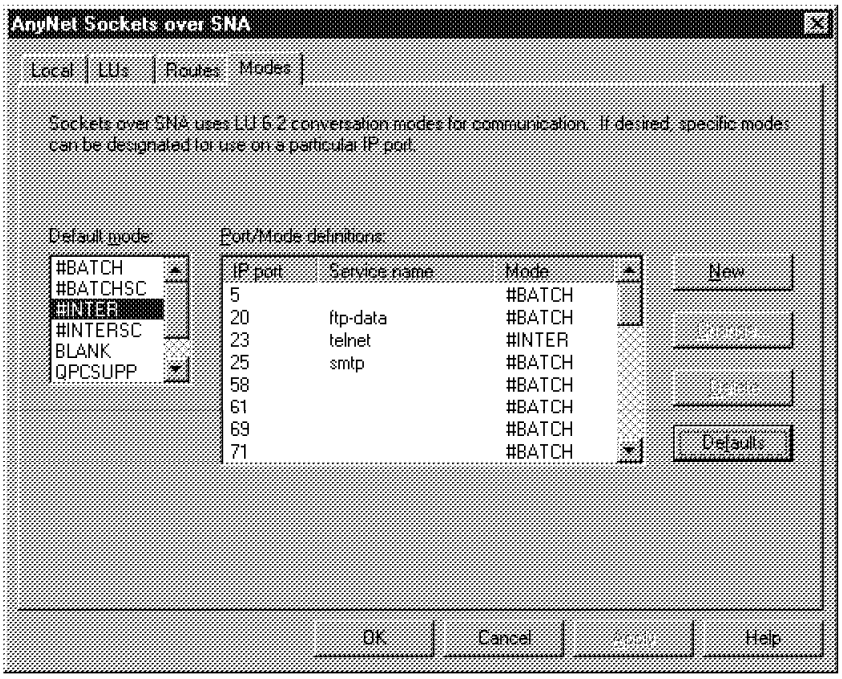


Figure 55. CS/NT AnyNet Mode Selection

CS/NT provides a Node Operations icon to start and stop configurations and to monitor CS/NT devices and connections. The displays are very useful for problem determination.

The AnyNet connection here was initially established by using Netscape on this node to request the Web server on the AIX machine. The session was established using the #INTER mode. This is the mode we chose in Figure 55.

A ping was done from the AIX machine to this node, establishing another connection. This time the SNACKETS mode was used, since that is the default in the AIX AnyNet configuration.

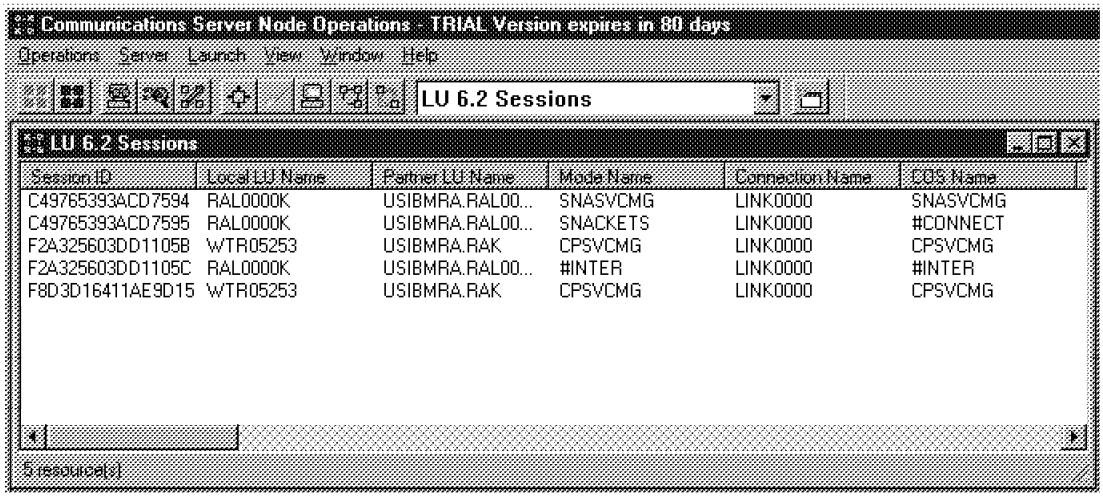


Figure 56. CS/NT Node Operations LU 6.2 Session Display

The AnyNet Sockets Devices window shows the sna0 interface added for this node.

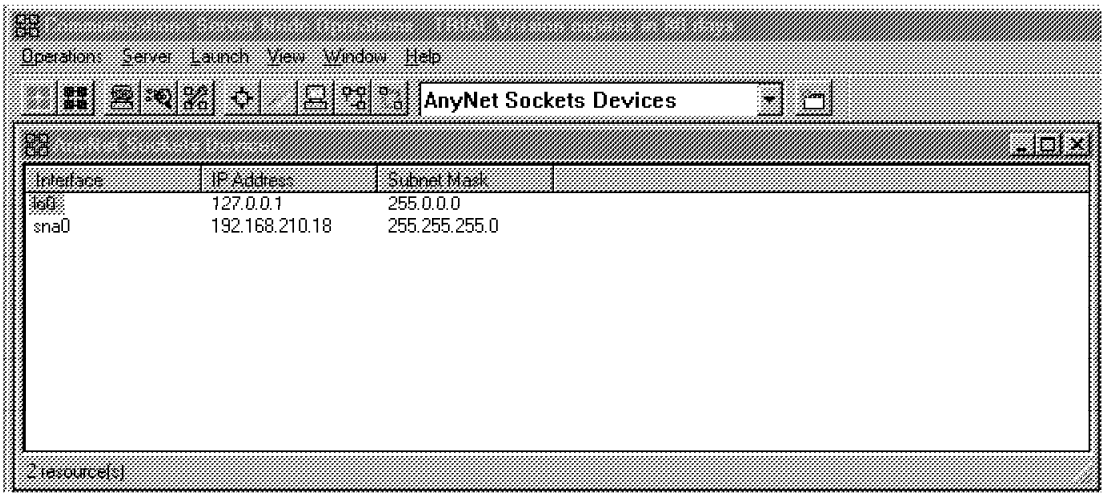


Figure 57. CS/NT Node Operations Sockets Devices Display

The AnyNet Sockets Routes window shows the routes added to AnyNet. The routes shown were added because of the AnyNet node definition. Other routes could be added manually in the AnyNet configuration panels.

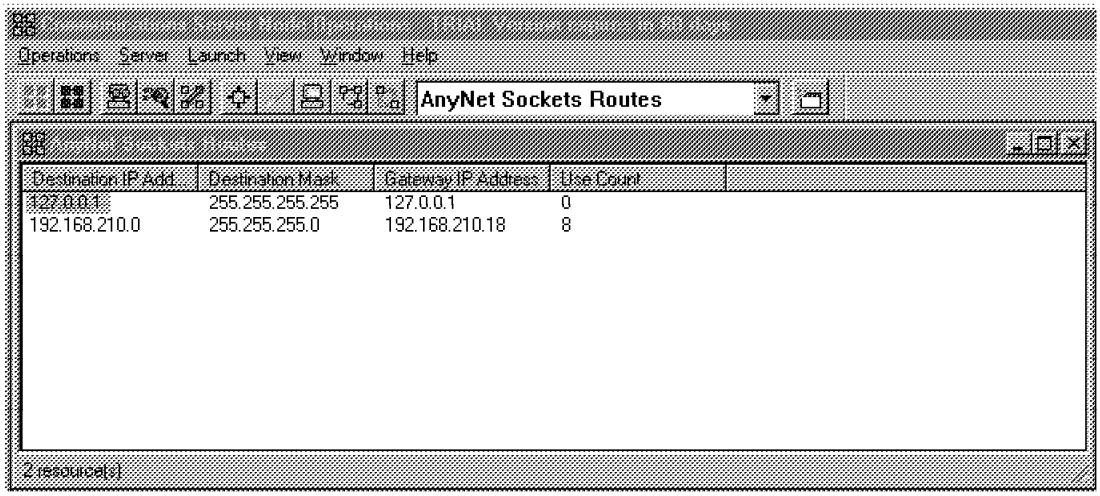


Figure 58. CS/NT Node Operations Sockets Routes Display

The AnyNet Sockets Statistics window shows statistics useful for problem determination and tuning.

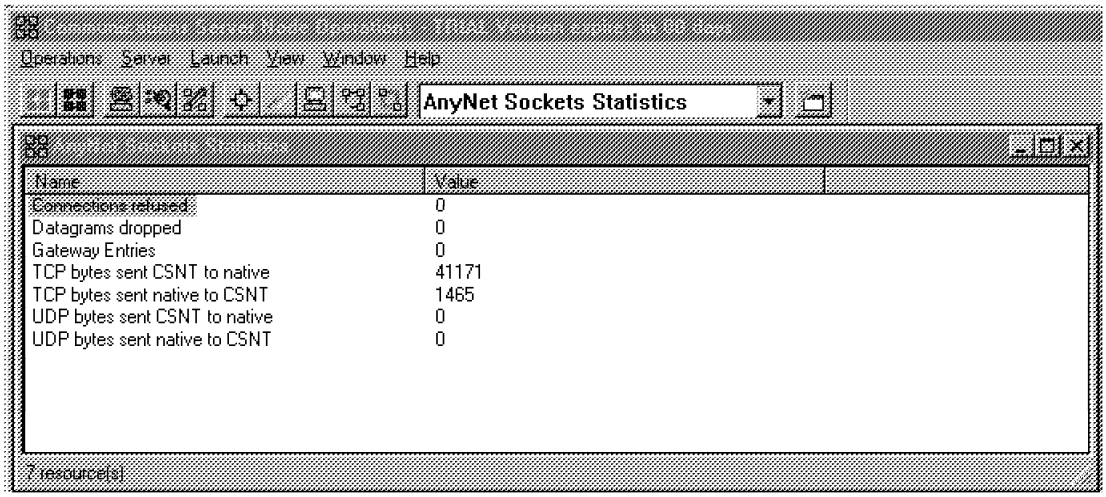


Figure 59. CS/NT Node Operations Sockets Statistics Display

The Local LU 6.2 window shows the LUs defined as a result of this configuration. There is an LU for the basic node definition and the LU for the sna0 interface.

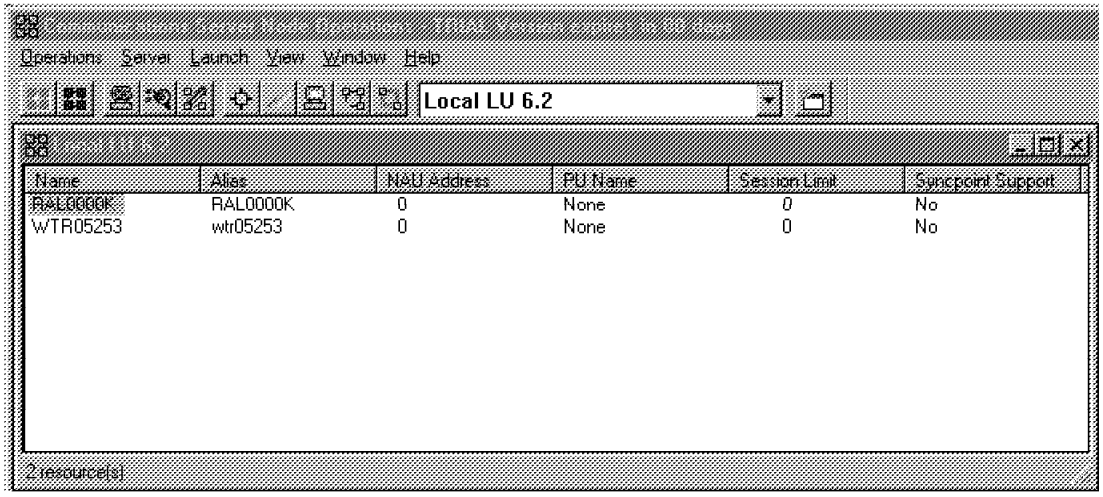


Figure 60. CS/NT Node Operations Local LU 6.2 Display

4.2.3 MVS Definitions

Both AIX machines connect to MVS as end nodes. This makes no difference in the way the MVS VTAM and 3172 definitions are defined. It does make a difference in the APPN routing mechanisms and in the entries for each machine in the APPN directory and topology databases.

4.2.3.1 MVS VTAM Ethernet Connection to AIX

RS600028 was connected to the network through an Ethernet interface. The Ethernet connection to the MVS host was through an Ethernet port on a 3172 running ICP 3.4. To complete the connection, the MVS host must have an XCA major node to define the 3172 and a switched major node to define RS600028.

```
RA3172E VBUILD TYPE=XCA
**
RAK3172A PORT  ADAPNO=0,                                          * X
               CUADDR=301,                                        * X
               MEDIUM=CSMACD
**
RA3172E1 GROUP DIAL=YES,CALL=INOUT,DYNPU=YES,AUTOGEN=(10,L,P)
```

Figure 61. VTAM XCA Definition for 3172 Ethernet Port

The autogen parameter tells VTAM to dynamically generate line statements for connections. This definition will build an XCA node with 10 line definitions. A display of this node can be seen in Figure 62.

```
 C RAIAN    DISPLAY NET,ID=RAI3172E,SCOPE=ALL
   RAIAN    IST097I  DISPLAY  ACCEPTED
 ' RAIAN
 IST075I  NAME = RAI3172E         , TYPE = XCA MAJOR NODE
 IST486I  STATUS= ACTIV     , DESIRED STATE= ACTIV
 IST1021I  MEDIUM=CSMA/CD ,ADAPNO=   0,CUA=0301,SNA SAP=   4
 IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
 IST170I  LINES:
 IST232I  L0301000 ACTIV
 IST232I  L0301001 ACTIV
 IST232I  L0301002 ACTIV
 IST232I  L0301003 ACTIV
 IST232I  L0301004 ACTIV
 IST232I  L0301005 ACTIV
 IST232I  L0301006 ACTIV
 IST232I  L0301007 ACTIV
 IST232I  L0301008 ACTIV
 IST232I  L0301009 ACTIV
 IST314I  END
```

Figure 62. VTAM Display of 3172 XCA Node

When the link station is activated on the RS/6000, the connection to MVS is made over the next available line. The VTAM log in Figure 63 shows the connection being made.

```
 IST590I  CONNECTIN  ESTABLISHED FOR PU RAI60028 ON LINE L0301000
 IST1086I  APPN CONNECTION FOR USIBMRA.R6028CP   IS ACTIVE - TGN =  21
 IST1096I  CP-CP SESSIONS WITH USIBMRA.R6028CP   ACTIVATED
```

Figure 63. VTAM Log of Ethernet Connection

Figure 64 on page 61 shows a VTAM display of the XCA line once the connection is made.

```
C RAIAN    DISPLAY NET,ID=LO301000,SCOPE=ALL
  RAIAN    IST097I  DISPLAY  ACCEPTED
' RAIAN
IST075I  NAME = LO301000         , TYPE = LINE
IST486I  STATUS= ACTIV     , DESIRED STATE= ACTIV
IST087I  TYPE = SWITCHED DIAL-INOUT, CONTROL = SDLC, HPDT = *NA*
IST936I  ANSWER MODE = ENABLED
IST134I  GROUP = RA3172E1, MAJOR NODE = RAI3172E
IST1500I  STATE TRACE = OFF
IST084I  NETWORK RESOURCES:
IST089I  RAI60028 TYPE = PU_T2.1          , ACTIV--L--
IST089I  R6028CP  TYPE = ADJACENT CP      , ACT/S----Y
IST314I  END
```

Figure 64. VTAM Display of 3172 Line

The 3172 ICP panel in Figure 65 shows the Ethernet adapter definitions used. The address for the port is entered in canonical format, where the most significant bit is on the right in each byte. This is as opposed to MAC bit order where the most significant bit is on the left within each byte. The non-canonical translation of this address is 400052005006.

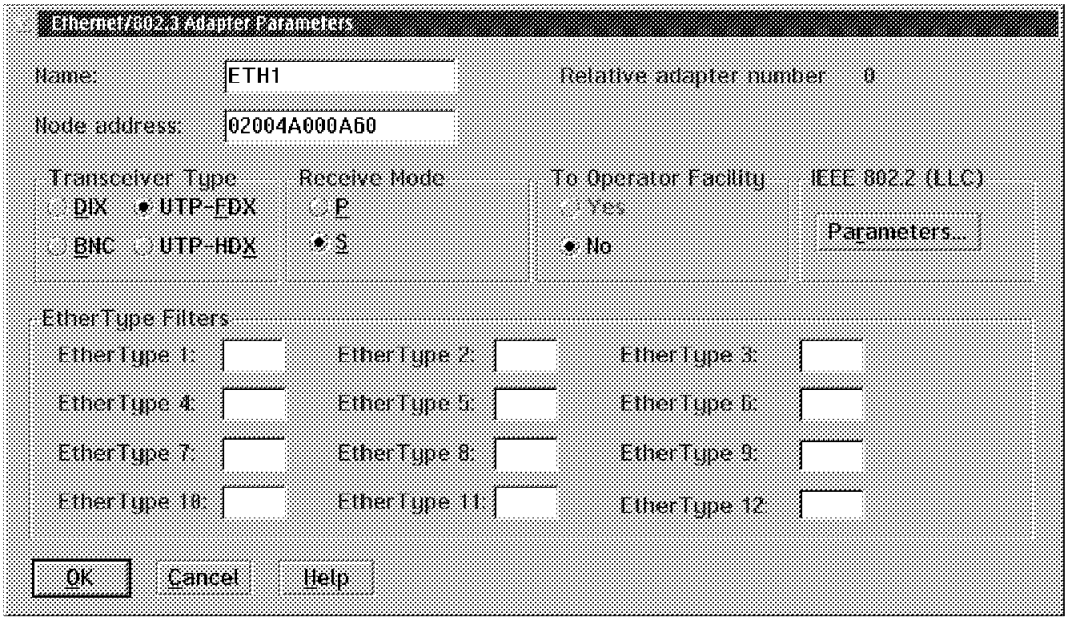


Figure 65. 3172 Ethernet Port Definition

The 3172 connects a port definition to a host sub-channel address and application by function definitions. The definitions in Figure 66 on page 62 define the port known as ETH1 as a VTAM application and using host sub-channel address 01. The IOCP for the host system defines this address as 301.

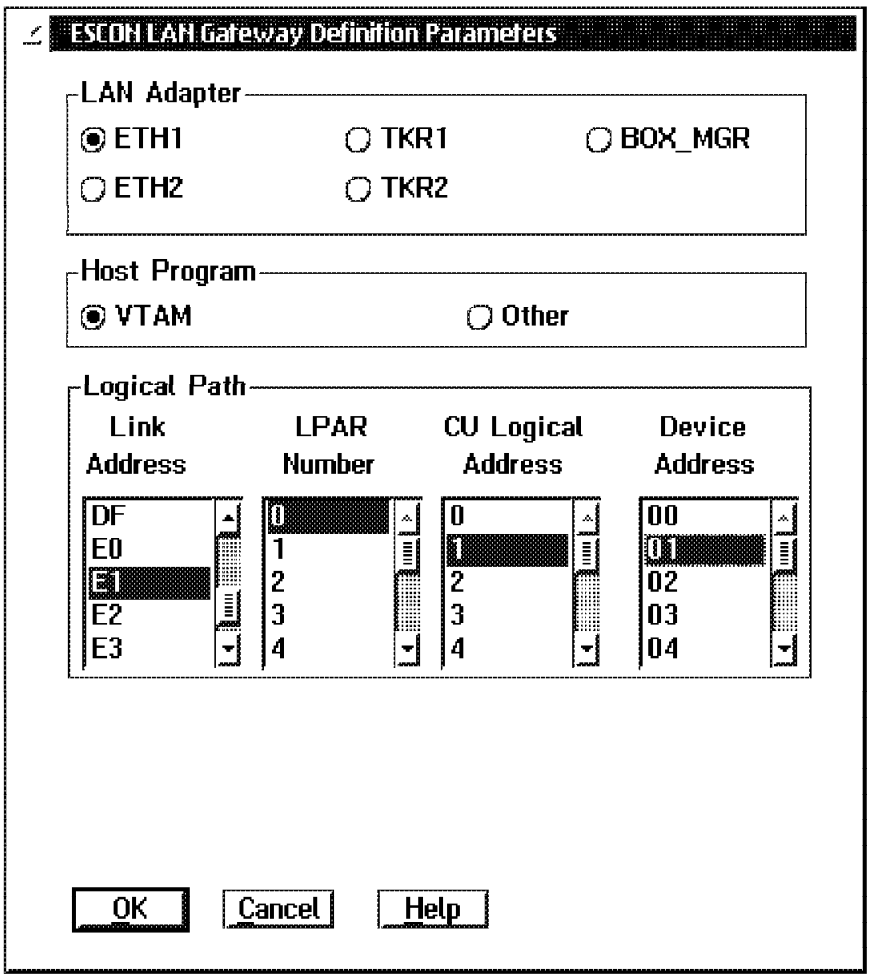


Figure 66. 3172 Ethernet Function

When the Ethernet connection is made from MVS to RS600028, VTAM uses a switched major node based on the CPNAME sent in to represent the PU and LUs for RS600028. Figure 67 shows the switched major node definitions for RS600028 in this scenario.

```
RA6RS28 VBUILD MAXGRP=10,                                          * X
               MAXNO=18,                                           * X
               TYPE=SWNET             REQUIRED
* USED FOR RS600028 Connection to VTAM
RAI60028 PU    ADDR=13,                COULD BE ANYTHING (NOT USED *  X
               CPNAME=R6028CP,         This def chosen for CP R6028CP X
               MODETAB=AMODETAB,                                   * X
               MAXPATH=2,                                          * X
               MAXDATA=265,                                          *
               MAXOUT=7,                                             *
               PACING=7,                                             *
               ANS=CONTINUE,                                         *
               PASSLIM=7,                                            *
               PUTYPE=2,                                             *
               DISCNT=(NO),                                          *
               ISTATUS=ACTIVE,                                       *
               VPACING=8
```

Figure 67. Switched Major Node for RS600028

4.2.3.2 SDLC Connection from RS60007 to MVS18

The SDLC connection between RS60007 and MVS18 is described in 4.1.2.1, “SDLC Connection between RS60007 and MVS18” on page 30.

4.2.4 Start and Test Scenario 2

The same procedures as described in 4.1.3, “Start and Test Scenario 1” on page 33 were used to start and test this scenario. After starting SNA, AnyNet, and the link stations on both RS/6000 systems, we checked the connectivity from the MVS host side. First we displayed both CPs to make sure there were CP-CP sessions. You can see in the following two figures that each RS/6000 CP is in session with the MVS CP, RAI.

```
C RAIAN    DISPLAY NET,ID=R6028CP,SCOPE=ALL
  RAIAN    IST097I  DISPLAY  ACCEPTED
' RAIAN
IST075I  NAME = USIBMRA.R6028CP  , TYPE = ADJACENT CP
IST486I  STATUS= ACT/S----Y, DESIRED STATE= ACTIV
IST1447I  REGISTRATION TYPE = NO
IST977I  MDLTAB=***NA*** ASLTAB=***NA***
IST1333I  ADJLIST = ***NA***
IST861I  MODETAB=***NA*** USSTAB=***NA*** LOGTAB=***NA***
IST934I  DLOGMOD=CPSVCMG  USS LANGTAB=***NA***
IST597I  CAPABILITY-PLU ENABLED  ,SLU ENABLED  ,SESSION LIMIT NONE
IST231I  CDRSC    MAJOR NODE = ISTCDRDY
IST1184I  CPNAME = USIBMRA.R6028CP   - NETSRVR = ***NA***
IST1044I  ALSLIST = ISTAPNPU
IST082I  DEVTYPE = INDEPENDENT LU / CDRSC
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I  STATE TRACE = OFF
IST171I  ACTIVE SESSIONS = 0000000002, SESSION REQUESTS = 0000000000
IST206I  SESSIONS:
IST1081I  ADJACENT LINK STATION = RAI60028
IST634I  NAME     STATUS         SID          SEND RECV VR TP NETID
IST635I  RAI      ACTIV/CP-S C49765393AA88BFF 0029 0001       USIBMRA
IST635I  RAI      ACTIV/CP-P F86FE1644F7A2AB8 0001 002E  0  0 USIBMRA
```

Figure 68. MVS VTAM Display of R6028CP

```
DISPLAY NET,ID=R6007CP,SCOPE=ALL
IST097I  DISPLAY  ACCEPTED
IST075I  NAME = USIBMRA.R6007CP  , TYPE = ADJACENT CP
IST486I  STATUS= ACT/S----Y, DESIRED STATE= ACTIV
IST1447I  REGISTRATION TYPE = NO
IST977I  MDLTAB=***NA*** ASLTAB=***NA***
IST1333I  ADJLIST = ***NA***
IST861I  MODETAB=***NA*** USSTAB=***NA*** LOGTAB=***NA***
IST934I  DLOGMOD=CPSVCMG  USS LANGTAB=***NA***
IST597I  CAPABILITY-PLU ENABLED  ,SLU ENABLED  ,SESSION LIMIT NONE
IST231I  CDRSC    MAJOR NODE = ISTCDRDY
IST1184I  CPNAME = USIBMRA.R6007CP   - NETSRVR = ***NA***
IST1044I  ALSLIST = ISTAPNPU
IST082I  DEVTYPE = INDEPENDENT LU / CDRSC
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I  STATE TRACE = OFF
IST171I  ACTIVE SESSIONS = 0000000002, SESSION REQUESTS = 0000000000
IST206I  SESSIONS:
IST1081I  ADJACENT LINK STATION = PO7175A
IST634I  NAME     STATUS         SID          SEND RECV VR TP NETID
IST635I  RAI      ACTIV/CP-S CC974C49A38D7ACE 00AB 0001  1  0 USIBMRA
IST635I  RAI      ACTIV/CP-P F86FE1644F7A29CE 0001 00B0  1  0 USIBMRA
```

Figure 69. VTAM Display of R6007CP

A VTAM topology display is a simpler way to make sure you have connectivity between the RS/6000s and the host. You can see from Figure 70 on page 64 that both links are operational.

```
CNMKWIND OUTPUT FROM  D NET,TOPO,ID=RAI,LIST=ALL            LINE 1
IST097I  DISPLAY  ACCEPTED
IST350I  DISPLAY TYPE = TOPOLOGY
IST1295I  CP NAME           NODETYPE ROUTERES CONGESTION  CP-CP WEIGHT
IST1296I  USIBMRA.RAI       NN       128      NONE        *NA*  *NA*
IST1579I                    ----------------------------------------
IST1297I                    ICN/MDH  CDSERVR  RSN         HPR
IST1298I                    YES      NO       14          RTP
IST1579I                    ----------------------------------------
IST1223I                    BN       NATIVE   TIME LEFT
IST1224I                    NO       YES      11
IST1299I  TRANSMISSION GROUPS ORIGINATING AT CP USIBMRA.RAI
IST1357I                                                 CPCP
IST1300I  DESTINATION CP    TGN      STATUS   TGTYPE      VALUE WEIGHT
IST1301I  USIBMRA.R6007CP   21       OPER     ENDPT       YES   *NA*
IST1301I  USIBMRA.R6028CP   21       OPER     ENDPT       YES   *NA*
IST314I  END
```

Figure 70. VTAM Topology Display

It is also interesting to note that since VTAM is acting as the network node server for both RS/6000s, the LUs for Anynet are automatically registered in VTAM.

```
C RAIAN    DISPLAY NET,ID=RAL0000D,SCOPE=ALL
  RAIAN    IST097I  DISPLAY  ACCEPTED
' RAIAN
IST075I  NAME = USIBMRA.RAL0000D , TYPE = DIRECTORY ENTRY
IST1186I  DIRECTORY ENTRY = REGISTERED LU
IST1184I  CPNAME = USIBMRA.R6028CP   - NETSRVR = USIBMRA.RAI
IST314I  END
_____________________________________________________

C RAIAN    DISPLAY NET,ID=RAL0000B,SCOPE=ALL
  RAIAN    IST097I  DISPLAY  ACCEPTED
' RAIAN
IST075I  NAME = USIBMRA.RAL0000B , TYPE = DIRECTORY ENTRY
IST1186I  DIRECTORY ENTRY = REGISTERED LU
IST1184I  CPNAME = USIBMRA.R6007CP   - NETSRVR = USIBMRA.RAI
IST314I  END
```

Figure 71. VTAM Display of AnyNet LUs

A ping from one RS/6000 to the other should verify that both the physical connectivity and the routing tables are correct. The ping will cause the LU 6.2 connectivity between the two AnyNet nodes, RAL0000B and RAL0000D. The MVS host will be aware of the LU 6.2 sessions between the two.

```
DISPLAY NET,ID=RAL0000D,SCOPE=ALL
IST097I  DISPLAY  ACCEPTED
IST075I  NAME = USIBMRA.RAL0000D , TYPE = CDRSC
IST486I  STATUS= ACT/S----Y, DESIRED STATE= ACTIV
IST1447I  REGISTRATION TYPE = NO
IST977I  MDLTAB=***NA*** ASLTAB=***NA***
IST1333I  ADJLIST = ***NA***
IST861I  MODETAB=***NA*** USSTAB=***NA*** LOGTAB=***NA***
IST934I  DLOGMOD=***NA*** USS LANGTAB=***NA***
IST597I  CAPABILITY-PLU ENABLED  ,SLU ENABLED  ,SESSION LIMIT NONE
IST231I  CDRSC    MAJOR NODE = ISTCDRDY
IST479I  CDRM NAME = RAI     , VERIFY OWNER = NO
IST1184I  CPNAME = USIBMRA.R6028CP   - NETSRVR = ***NA***
IST1044I  ALSLIST = ISTAPNPU
IST082I  DEVTYPE = INDEPENDENT LU / CDRSC
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I  STATE TRACE = OFF
IST171I  ACTIVE SESSIONS = 0000000003, SESSION REQUESTS = 0000000000
IST206I  SESSIONS:
IST1081I  ADJACENT LINK STATION = RAI60028
IST634I  NAME     STATUS         SID          SEND RECV VR TP NETID
IST635I  RAL0000B ACTIV-S    C49765393AA88C01            1  0 USIBMRA
IST635I  RAL0000B ACTIV/SV-S C49765393AA88C00            1  0 USIBMRA
IST635I  RAL0000B ACTIV-P    CC974C49A38D7AD0            1  0 USIBMRA
```

Figure 72. VTAM Display of RAL0000D after Ping

No static routes were needed for this simple configuration. A display of the routing tables on both RS60007 and RS600028 show the sna0 interfaces that have been added by AnyNet. Packets destined for the 192.168.210 network will be routed over the sna0 (AnyNet) interface.

```
Destination      Gateway           Flags     Refs     Use  PMTU  Netif Expire

127.127          127.127.0.2       U           1       0     -    gw0   -
192.168.210      192.168.210.11    U           1       0     -   sna0   -
```

Figure 73. AnyNet Routes on RS60007

```
127.127          127.127.0.2       U           1       0     -    gw0   -
192.168.210      192.168.210.13    U           1       0     -   sna0   -
```

Figure 74. AnyNet Routes on RS600028

The gw0 interface is the currently unused network interface for the AnyNet Sockets over SNA gateway function.

Chapter 5. Web Access Using Sockets over SNA Gateways

This chapter includes two scenarios illustrating communication between a Web browser and a Web server using a Sockets over SNA gateway to allow communication between an SNA node and a TCP/IP node. These scenarios show how to configure the AnyNet parameters for a Sockets over SNA gateway and in addition they showcase some of the connectivity options of the platforms involved.

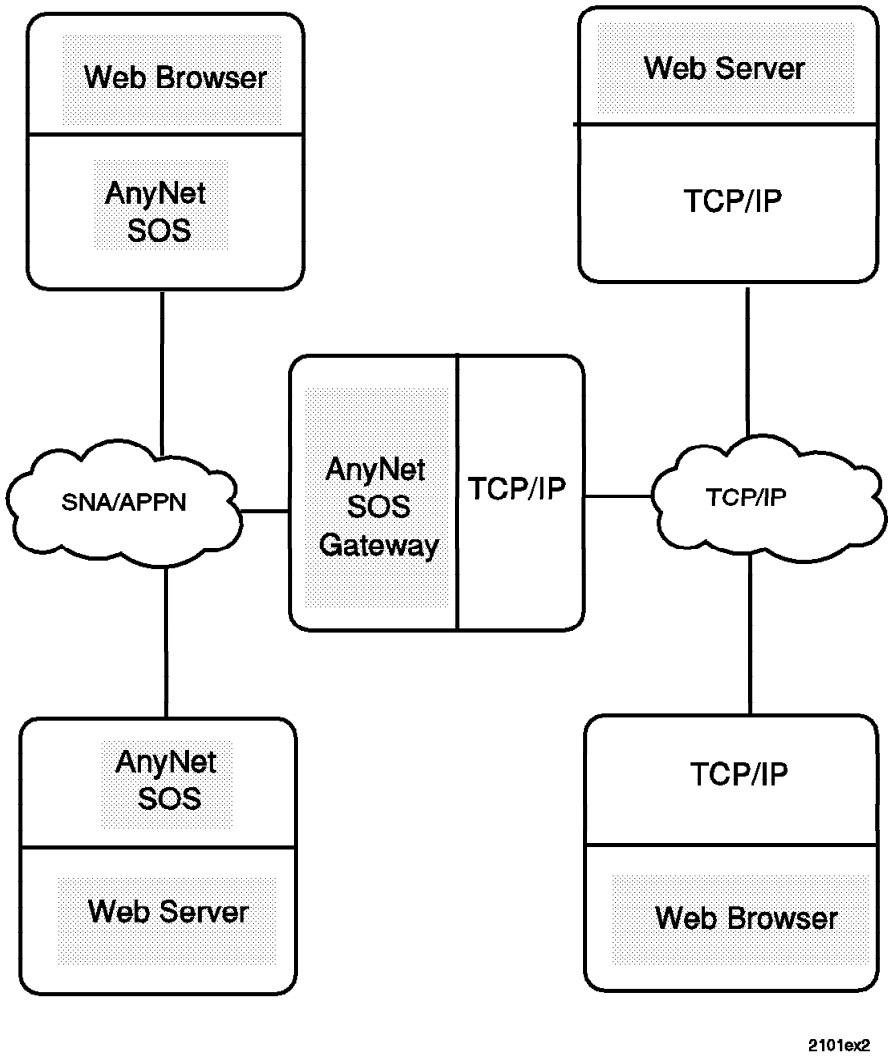


Figure 75. Scenario 3 and 4 Overview

Scenario 3 shows a Netscape browser on an SNA platform going to a Web server on a TCP/IP platform.

Topics introduced in scenario 3 include:

- AIX TCP/IP
  - IP forwarding
  - Commands for displaying routing information
- AnyNet

  - CS/AIX AnyNet Sockets over SNA gateway
- Connectivity
  - Token-ring connectivity between two CS/AIX systems
  - CS/AIX token-ring dynamic listening link stations
  - AIX TCP/IP Ethernet communication
  - MVS TCP/IP Ethernet over 3172

Scenario 4 shows a Netscape browser on a TCP/IP platform going to a Web server on an SNA platform.

Scenario 4 introduces the following topics:

- OS/2 Warp 4
  - Netscape
  - TCP/IP routing information
- CS/AIX AnyNet Sockets over SNA gateway

5.1 Scenario 3: AIX Web Browser to MVS Web Server via CS/AIX Sockets over SNA Gateway

Scenario 3 uses two AIX systems and an MVS system. It is designed to show Web communication using an AnyNet Sockets over SNA gateway. This scenario illustrates:

- Web products:
  - Netscape on AIX
  - OS/390 Internet Connection Secure Server
- Network products:
  - CS/AIX Sockets over SNA
  - CS/AIX Sockets over SNA Gateway
  - AIX TCP/IP
  - MVS TCP/IP
- Network connectivity:
  - AnyNet algorithmic mapping
  - AIX SNA over token-ring
  - AIX TCP/IP over Ethernet
  - MVS TCP/IP over a 3172 Ethernet port

Figure 76 on page 69 is an overview of this scenario.

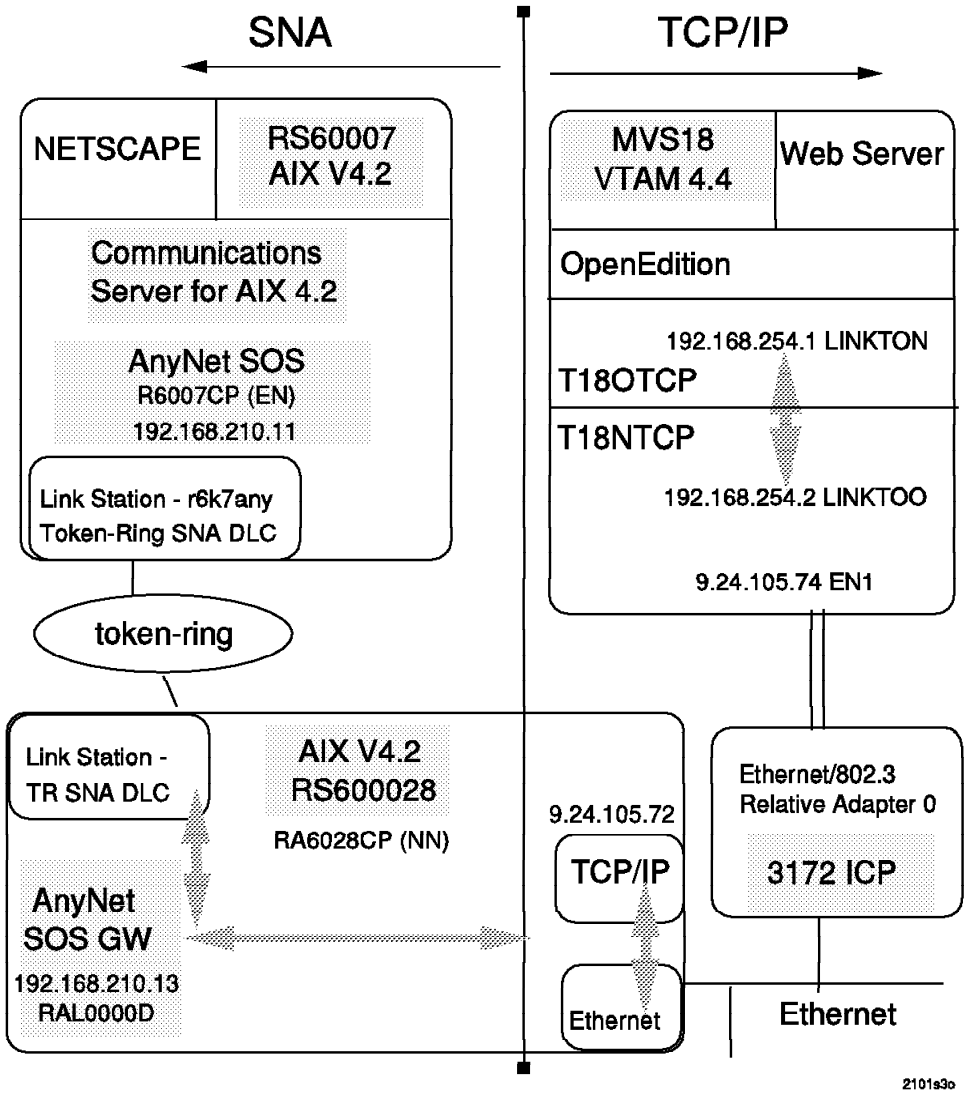


Figure 76. Scenario 3 Overview

Figure 77 on page 70 shows an overview of the IP routing tables and IP-LU mapping tables needed for this scenario.

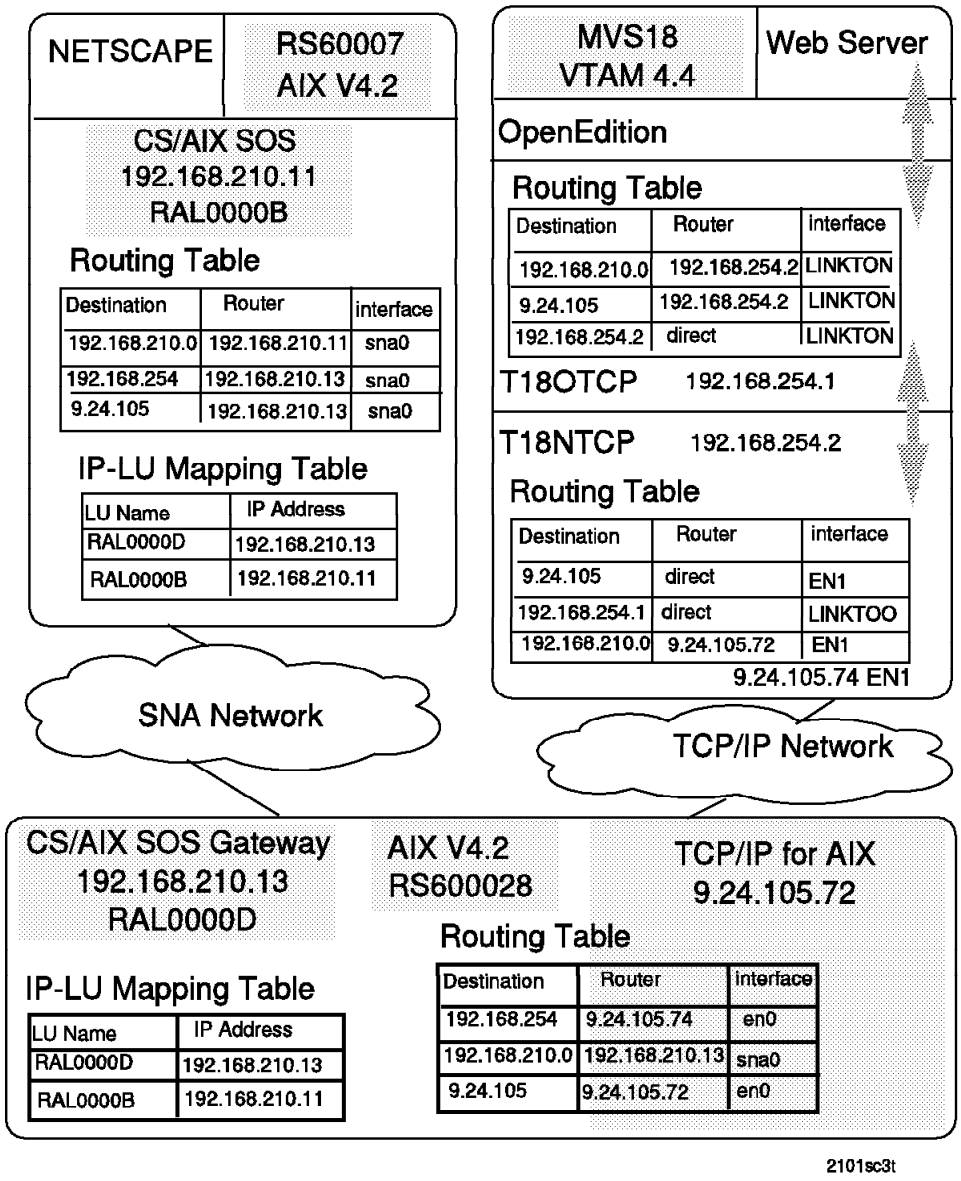


Figure 77. Scenario 3 IP Routing Overview

5.1.1 RS60007 Definitions

RS60007 is an RS/6000 running AIX 4.2 with Communication Server for AIX 4.2. In this scenario it is defined as a Sockets over SNA access node. Netscape is the Web browser on this system.

5.1.1.1 Control Point Configuration

RS60007 is an defined as an end node with a CP name of R6007CP in this scenario. The control point profile is shown in Figure 78 on page 71.

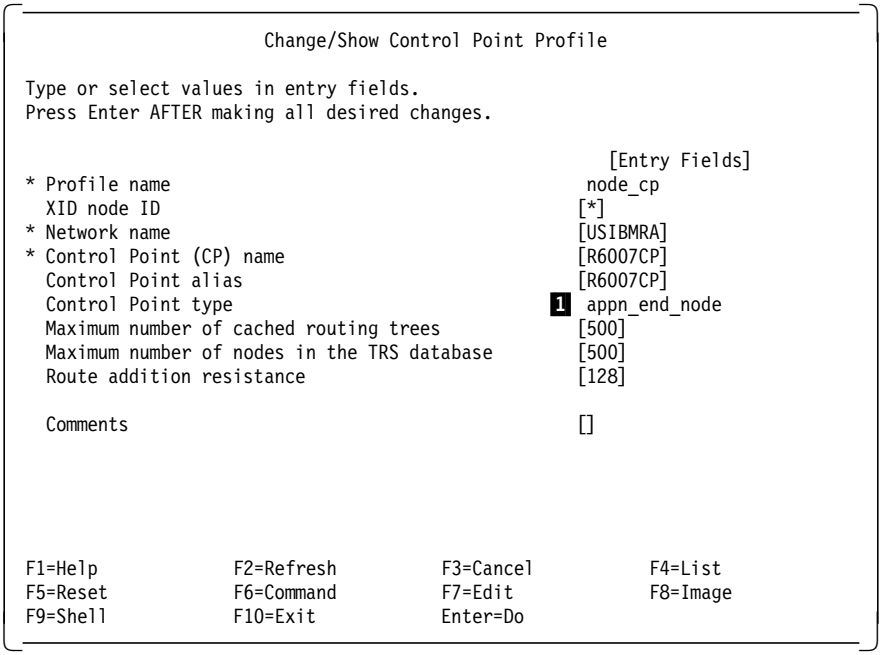


Figure 78. Control Point Profile for RS60007

RS60007 was used in scenario 1 as a network node. We switched the node type to end node (**1**) for this scenario. If you change the node type of an APPN node it is recommended that you change the control point name also. This is necessary to keep the APPN topology databases in a consistent state. Otherwise, you could get two different entries of the same control point in an APPN topology database leading to unpredictable results.

5.1.1.2 CS/AIX Token-Ring Link Configuration

Communication with RS600028 takes place over token-ring. The token-ring DLC definitions are shown in Figure 79 on page 72. The link station profile for the token-ring link is shown in Figure 80 on page 74.

```
                        Add Token Ring SNA DLC Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* Profile name                                         [tok0]
  Data link device name                                [tok0]
  Force disconnect time-out (1-600 seconds)            [120]
  User-defined maximum I-Field size?                    no
     If yes, Max. I-Field size (265-4096)              [4096]
  Max. num of active link stations (1-255)             [100]
     Number reserved for inbound activation            [0]
     Number reserved for outbound activation           [0]
  Transmit window count (1-127)                     1 [16]
  Dynamic window increment (1-127)                     [1]
  Retransmit count (1-30)                              [8]
  Receive window count (1-127)                      2 [8]
  Ring access priority                                 0
  Inactivity time-out (1-255 seconds)                  [48]
  Response time-out (1-40, 500 msec intervals)         [4]
  Acknowledge time-out (1-40, 500 msec intervals)      [1]
  Local link name                                      []
  Local SAP address (02-fa)                            [04]
  Trace base listening link station?                    no
     If yes, Trace format                               long
  Dynamic link stations supported?                      yes

  Link Recovery Parameters
     Retry interval (1-10000 seconds)                  [60]
     Retry limit (0-500 attempts)                      [0]

  Dynamic Link Activation Parameters
     Solicit SSCP sessions?                             yes
     CP-CP sessions supported?                          yes
     Partner required to support CP-CP sessions?        no
     High performance routing (HPR) supported?          yes

  Dynamic Link TG COS Characteristics
     Effective capacity                                [4300800]
     Cost per connect time                             [0]
     Cost per byte                                     [0]
     Security                                           nonsecure
     Propagation delay                                  lan
     User-defined 1                                    [128]
     User-defined 2                                    [128]
     User-defined 3                                    [128]

  Comments                                             []

F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 79. Token-ring DLC Definition on RS60007

A combination of transmit window count 16 (**1**) and receive window count 8 (**2**) gives the best performance results between two RS/6000 systems when assuming both systems use the same values.

In general the adaptation should follow the rule: the transmit window count parameter on node A should always be larger than or equal to the receive window count on Node B (for every two nodes A and B that are connected to one another). If possible use the ratio 2 : 1 for the transmit and receive window count. Refer to the *Communications Server for AIX Planning and Performance Guide*, SC31-8220-01 for a very detailed discussion of tuning transmit and receive window count values and overall network tuning guidelines.

You should also consider the different limits for these values on the different product platforms.

- Communication Server for OS/2 defaults to a transmit and receive count of 4 and 4 with a maximum of 8 and 8.
- Communication Server for NT defaults to transmit and receive counts of 32 and 16 with a maximum of 64 and 64.
- A 3172 (running ICP) token-ring or Ethernet port can have a transmit window size defined. It is not recommended that this value be set greater than 8, because doing so increases the amount of data buffered inside the 3172. The default value is 2.

```
                    Add Token Ring Link Station Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                        [Entry Fields]
* Profile name                                         [r6k7any]
  Use Control Point's XID node ID?                      yes
     If no, XID node ID                                 [*]
* SNA DLC Profile name                                 []
  Stop link station on inactivity?                      no
     If yes, Inactivity time-out (0-10 minutes)         [0]
  LU address registration?                              no
     If yes,
        LU Address Registration Profile name            []
  Trace link?                                           no
     If yes, Trace size                                 long
  High performance routing (HPR) supported?             yes

  Adjacent Node Address Parameters
     Access routing                                     link_address
     If link_name, Remote link name                     []
     If link_address,
        Remote link address                          1  [10005ab1ac7d]
        Remote link address format                      canonical
        Remote SAP address (02-fa)                      [04]

  Adjacent Node Identification Parameters
     Verify adjacent node?                              no
     Network ID of adjacent node                        []
     CP name of adjacent node                           []
     XID node ID of adjacent node (LEN node only)       [*]
     Node type of adjacent node                         learn

  Link Activation Parameters
     Solicit SSCP sessions?                             yes
     Initiate call when link station is activated?      yes
     Activate link station at SNA start up?             yes
     Activate on demand?                                no
     CP-CP sessions supported?                          yes
     If yes,
        Adjacent network node preferred server?         no
     Partner required to support CP-CP sessions?        no
     Initial TG number (0-20)                           [0]

  Restart Parameters
     Restart on activation?                             no
     Restart on normal deactivation?                    yes
     Restart on abnormal deactivation?                  yes

  Transmission Group COS Characteristics
     Effective capacity                                 [4300800]
     Cost per connect time                              [0]
     Cost per byte                                      [0]
     Security                                           nonsecure
     Propagation delay                                  lan
     User-defined 1                                     [128]
     User-defined 2                                     [128]
     User-defined 3                                     [128]

  Comments                                              []

F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 80. Token-ring Link Station Profile for RS60007

You can use either a locally administered MAC-address (LAA) or the burnt-in address of the adjacent token-ring adapter (**1**) for the remote link address as shown in in Figure 80.

Using an LAA has the advantage that the SNA configuration can remain unchanged in case of an adapter exchange. On the other hand you have to administer all the LAAs to keep them unique in the LAN. This is not a problem when burnt-in addresses are used.

5.1.1.3 AnyNet Sockets over SNA Configuration for RS60007

Define a Sockets over SNA minimum configuration profile for the RS60007. The home IP address for this AnyNet node is 192.168.210.11. Algorithmic IP-LU address mapping is used to map this address to LU name RAL0000B. An LU 6.2 profile is automatically created for RAL0000B.

```
                        Add a Minimum Configuration Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* Profile name                                         [rs7]

  Local information (required):
*    IP address                                       [192.168.210.11]
*    Subnet mask                                      [255.255.255.0]
*    Mode name                                        [SNACKETS]
     Maximum send buffer size                         [8300]
     Datagram conversation timeout                    [90]
     Connection start timeout                         [90]

  LU mapping information (required):
     LU name template                                 [RAL]
     LU mapping mask                                  [255.255.255.0]

  Comments                                            []


F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 81. AnyNet Minimum Configuration Profile for RS60007

Check for the new LU name in the local LU 6.2 profile.

```
                    Change/Show LU 6.2 Local LU Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
  Current profile name                                  anynetlu
  New profile name                                      []
* Local LU name                                         [RAL0000B]
  Local LU alias                                        [RAL0000B]
  Local LU is dependent?                                 no
     If yes,
        Local LU address (1-255)                        []
        System services control point
           (SSCP) ID (*, 0-65535)                       [*]
        Link Station Profile name                       []
  Conversation Security Access List Profile name        []
  Recovery resource manager (RRM) enabled?               no

  Comments                                              []


F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 82. LU 6.2 Local LU Profile for RS60007

5.1.1.4 IP Routing

On the RS/6000, AnyNet and TCP/IP share the routing table. Since the RS60007 configuration doesn't have direct access to the 9.24.105 and 192.168.254 networks we need additional static routes on the RS60007. See Figure 77 on page 70 for an overview of the IP routing for this scenario.

For conventional IP network interfaces this is done either by using the smit mkroute facility or by using the route add command. For a route needed by AnyNet always use the AnyNet smit menu to add a static route, not the TCP/IP commands. Routes not entered with the AnyNet facility will be lost when the system is rebooted. If you use the route add command, you have to enter the route add statement each time AnyNet is started.

Use the smit _snackgmk fastpath to get to the Add Static Route menu from the AnyNet Sockets over SNA smit facility.

```
              Add Static Route to Sockets over SNA Gateway Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       [ethernet]
  Destination type                                   [net]
  Destination address                                [9.24.105]
  Gateway address                                    [192.168.210.13]

  Comments                                           []









F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 83. Adding AnyNet Static Routes

```
              Add Static Route to Sockets over SNA Gateway Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       [mvs_to_mvs]
  Destination type                                   [net]
  Destination address                                [192.168.254]
  Gateway address                                    [192.168.210.13]

  Comments                                           []









F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 84. Adding AnyNet Static Routes

All requests to the 9.24.105 and 192.168.254 networks should be routed to 192.168.210.13, which is the AnyNet gateway (RS600028).

5.1.2 RS600028 Definitions

RS600028 is an RS/6000 running AIX 4.2 and Communication Server for AIX 4.2. In this scenario it provides the Sockets over SNA gateway function between the Web browser on the SNA network and the Web server on the TCP/IP network.

5.1.2.1 Control Point Configuration

RS600028 is defined as an APPN network node with a CP name of RA6028CP.

```
                        Change/Show Control Point Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* Profile name                                          node_cp
  XID node ID                                          [*]
* Network name                                         [USIBMRA]
* Control Point (CP) name                              [RA6028CP]
  Control Point alias                                  [RA6028CP]
  Control Point type                                    appn_network_node
  Maximum number of cached routing trees               [500]
  Maximum number of nodes in the TRS database          [500]
  Route addition resistance                            [128]

  Comments                                             []




F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 85. CP Profile for RS600028

5.1.2.2 CS/AIX Token-Ring Dynamic Listening Link Station

On the RS600028 node we made use of the dynamic listening link station @tok0.4. Dynamic listening link stations can be used in APPN networks to reduce the amount of configuration work. In our scenario we therefore didn't need to create a token-ring link station profile on RS600028.

The name of a dynamic listening link station is built by an @-sign, followed by the physical device name (tok0), a dot, and the local SAP address defined in the DLC profile (4). If more then one instance of a specific dynamic listening link station has been started, the name ends with an index between square brackets (for instance, @tok0.4[1]).

When the link station on RS60007 is started, @tok0.4 on the RS600028 answers the activation request and the link becomes active. In addition a further instance of @tok0.4 is started on the RS600028 to keep dynamic listening active for further activation requests. Figure 86 on page 79 shows the token-ring DLC definitions.

```
                        Add Token Ring SNA DLC Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       [tok0]
  Data link device name                              [tok0]
  Force disconnect time-out (1-600 seconds)          [120]
  User-defined maximum I-Field size?                  no
     If yes, Max. I-Field size (265-4096)            [4096]
  Max. num of active link stations (1-255)           [100]
     Number reserved for inbound activation          [0]
     Number reserved for outbound activation         [0]
  Transmit window count (1-127)                      [16]
  Dynamic window increment (1-127)                   [1]
  Retransmit count (1-30)                            [8]
  Receive window count (1-127)                       [8]
  Ring access priority                               0
  Inactivity time-out (1-255 seconds)                [48]
  Response time-out (1-40, 500 msec intervals)       [4]
  Acknowledge time-out (1-40, 500 msec intervals)    [1]
  Local link name                                    []
  Local SAP address (02-fa)                          [04]
  Trace base listening link station?                  no
     If yes, Trace format                             long
  Dynamic link stations supported?                   1 yes

  Link Recovery Parameters
     Retry interval (1-10000 seconds)                [60]
     Retry limit (0-500 attempts)                    [0]

  Dynamic Link Activation Parameters
     Solicit SSCP sessions?                           yes
     CP-CP sessions supported?                        yes
     Partner required to support CP-CP sessions?      no
     High performance routing (HPR) supported?        yes

  Dynamic Link TG COS Characteristics
     Effective capacity                              [4300800]
     Cost per connect time                           [0]
     Cost per byte                                   [0]
     Security                                         nonsecure
     Propagation delay                                lan
     User-defined 1                                  [128]
     User-defined 2                                  [128]
     User-defined 3                                  [128]

  Comments                                           []

F1=Help           F2=Refresh        F3=Cancel         F4=List
F5=Reset          F6=Command        F7=Edit           F8=Image
F9=Shell          F10=Exit          Enter=Do
```

Figure 86. Token-ring DLC definition for RS600028

Setting the Dynamic link stations supported field (**1**) in the token-ring DLC profile activates the dynamic listening link station @tok0.4.

5.1.2.3 AnyNet Sockets over SNA

Define a Sockets over SNA minimum configuration profile for the RS600028 as described in scenario 2, shown in Figure 44 on page 51. Algorithmic IP-LU address mapping maps the IP address of this node, 192.168.210.13 to the LU name, RAL0000D.

5.1.2.4 Define the Ethernet TCP/IP Network Interface

As a gateway between the SNA and TCP/IP networks, RS600028 must be set up for both communication protocols. The Ethernet adapter must be defined to be used by TCP/IP.

Use the Minimum Configuration & Startup panel from the smit TCP/IP menu if this is your first network interface on the system. Otherwise go to the Add a Network Interface menu and select Standard Ethernet (en0) as the network interface type. The Ethernet interface definitions for this scenario are shown in Figure 87.

```
                  Add a Standard Ethernet Network Interface

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* INTERNET ADDRESS (dotted decimal)                  [9.24.105.72]
  Network MASK (hexadecimal or dotted decimal)       [255.255.255.0]
  Network Interface                                   en0
* ACTIVATE the Interface after Creating it?          yes
  Use Address Resolution Protocol (ARP)?             yes
  BROADCAST ADDRESS (dotted decimal)                 []

F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 87. Adding a Standard Ethernet Interface

5.1.2.5 IP Routing and Forwarding

RS600028 is the AnyNet gateway in this scenario and must be configured as an IP-Router (packets should be routed from sna0 to en0 and vice versa). This is the only difference between the access node configuration and the gateway configuration.

To activate the IP-router capability from AIX enter the following command:

```
no -o ipforwarding=1
```

You can either put this command in file /etc/rc.anynet or in file /etc/rc.net to have ipforwarding activated automatically during system boot.

The file /etc/rc.anynet already contains the ipforwarding activation in a comment line. Use a standard editor and remove the # sign to uncomment this line if you want to start ipforwarding from the /etc/rc.anynet file.

```
#!/bin/bsh
# @(#)71        1.2  com/instl/misc/rc.anynet.sh, snainstl, snaserv3b, B3
/5/96 11:53:32
#
# COMPONENT_NAME: snaanynet
#
# FUNCTION: rc file for anynet
#
# ORIGINS: 27
#
# (C) COPYRIGHT International Business Machines Corp.  1990, 1994
# All Rights Reserved
# Licensed Material - Property of IBM
#
# US Government Users Restricted Rights - Use, duplication or
# disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
#-------------------------------------------------------------------------
#
# Enable Sockets over SNA Gateway function
#
# To enable forwarding of ip packets through SOS GW, uncomment line below
no -o ipforwarding=1

# Start AnyNet
#
# To have AnyNet start at IPL time, uncomment line below
/usr/bin/sna -s anynet
```

Figure 88. Enabling IP Forwarding on RS600028

In addition, we have to enter a static route on RS600028 for the 192.168.254 network that exists between the two MVS systems.

This can be done either by using the smit mkroute facility or by using the route add command. If you use the route add command for adding the static route, you should also copy the route add statement to the /etc/rc.net file to have the static route activated on every system boot.

We used smit mkroute in our scenario. All routes added with smit are added to the currently active route table and also added to the ODM, which is the device database from AIX. All route entries held in the ODM are automatically activated on every system boot.

To directly invoke the right smit panel enter `smit mkroute`.

```
                                Add Static Route

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
  Destination TYPE                                       net
* DESTINATION Address                                  [192.168.254]
  (dotted decimal or symbolic name)
* Default GATEWAY Address                              [9.24.105.74]
  (dotted decimal or symbolic name)
* METRIC (number of hops to destination gateway)       [1]
  Network MASK (hexadecimal or dotted decimal)         []

F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 89. Entering Static Route for the 192.168.254 Network

You can display all static routes stored in the ODM by issuing the command `lsattr -El inet0`. This command displays all attributes about the ODM inet0 object.

```
rs600028:/ # lsattr -El inet0
hostname      rs600028                                  Host Name   True
gateway                                                 Gateway     True
route         net,,0,9.24.104.1                         Route       True
route         net,-hopcount,1,,192.168.254,9.24.105.74
rs600028:/ #
```

Figure 90. Displaying Static Routes

5.1.3 MVS18 Definitions

Two TCP/IP stacks are running on MVS18. The first TCP/IP stack, T18NTCP, has most of the network connectivity function. The second TCP/IP stack, T18OTCP, has the connection to OpenEdition and AnyNet. IP traffic enters MVS18 over the network into T18NTCP. IP traffic destined for T18OTCP is sent over a virtual link between the two. An overview of the two TCP/IP systems in this scenario is shown in Figure 76 on page 69 and Figure 77 on page 70. The setup for both TCP/IP stacks and the connection between them is described in Chapter 10, “TCP/IP for MVS Setup for AnyNet Scenarios” on page 179.

The TCP/IP routing statements necessary for this scenario in T18NTCP are shown in Figure 91 on page 83. The LINKTOO link is the virtual link between T18NTCP and T18OTCP.

```
NetAddress        FirstHop        Link     Pkt Sz  Subnet Mask
----------        --------        ------   ------  -----------
Default           9.24.104.1      TR1      Default <none>
192.168.210.0     9.24.105.72     EN1      Default <none>
192.168.254.1     <direct>        LINKTOO  2000    HOST
```

Figure 91. Routing Definitions in T18NTCP

The TCP/IP routing statements necessary for this scenario in T18OTCP are shown in Figure 92. The LINKTON link is the other side of the virtual link between T18NTCP and T18OTCP. All traffic going out of T18OTCP goes over this link.

```
NetAddress        FirstHop        Link     Pkt Sz  Subnet Mask

----------        --------        ------   ------  -----------

Default           192.168.254.2   LINKTON  Default <none>
192.168.210.0     192.168.254.2   LINKTON  Default <none>
192.168.254.2     <direct>        LINKTON  2000    HOST
```

Figure 92. Routing Definitions in T18OTCP

5.1.3.1 Ethernet Connection between MVS18 TCP/IP and RS600028

The TCP/IP connection between RS600028 and MVS18 is over an Ethernet link. The Ethernet gateway to MVS18 is provided by a 3172 running the 3172 Interconnect Controller Program (ICP 3.4).

The TCP/IP definitions in T18NTCP for the 3172 are shown in Figure 93.

```
;
DEVICE DEVEN1  LCS           302   NETMAN
LINK   EN1     ETHEROR802.3  0     DEVEN1
;
HOME
   9.24.105.74     EN1          ; Primary   9.24.105.0 - testing on M
;
BSDROUTINGPARMS false    ;  Default max mtu size of 576 bytes is used
;                                              (point to point links)
     EN1       2000       0     255.255.255.0   0
ENDBSDROUTINGPARMS
;
START DEVEN1               ; 3172-3 ICP Ethernet
START DEVTR1               ; 3172-3 ICP T/R
```

Figure 93. TCP/IP Ethernet Link Definitions

The 3172 ICP panel in Figure 94 on page 84 shows the Ethernet adapter definitions used. The address for the port is entered in canonical format, where the most significant bit is on the right in each byte. This is as opposed to MAC bit order, where the most significant bit is on the left within each byte. The non-canonical translation of this address is 400052005006.

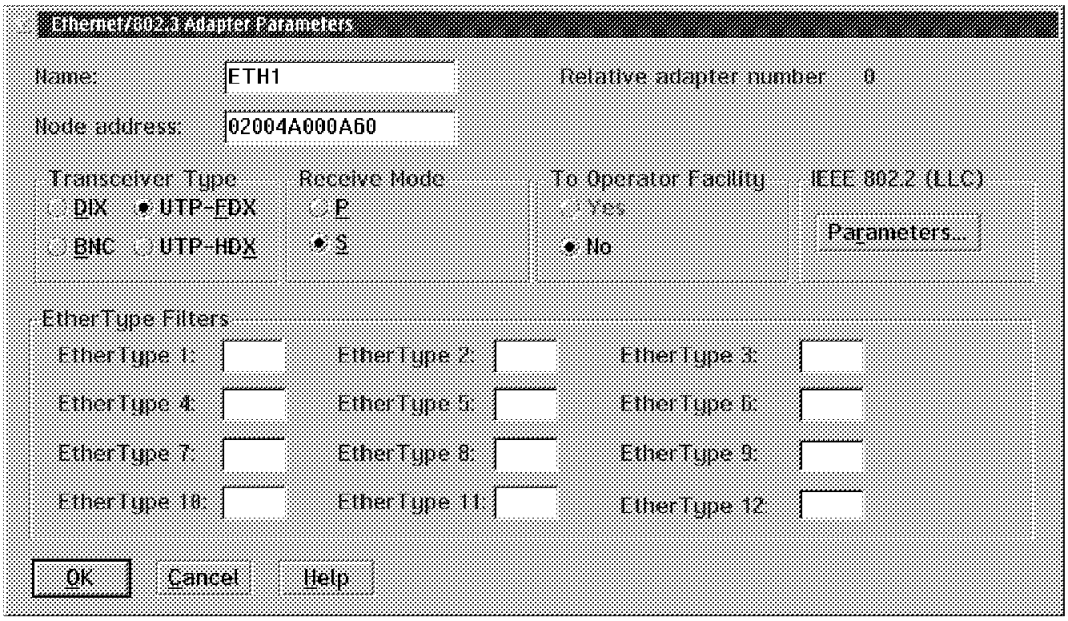


Figure 94. 3172 Ethernet Port Definition

The 3172 connects a port definition to a host subchannel address and application by function definitions. The definitions in Figure 95 on page 85 define the port known as ETH1 as a TCP/IP application (″other″ vs ″VTAM″) and using host subchannel addresses 02 and 03. The IOCP for the host system defines these addresses as 302 and 303.

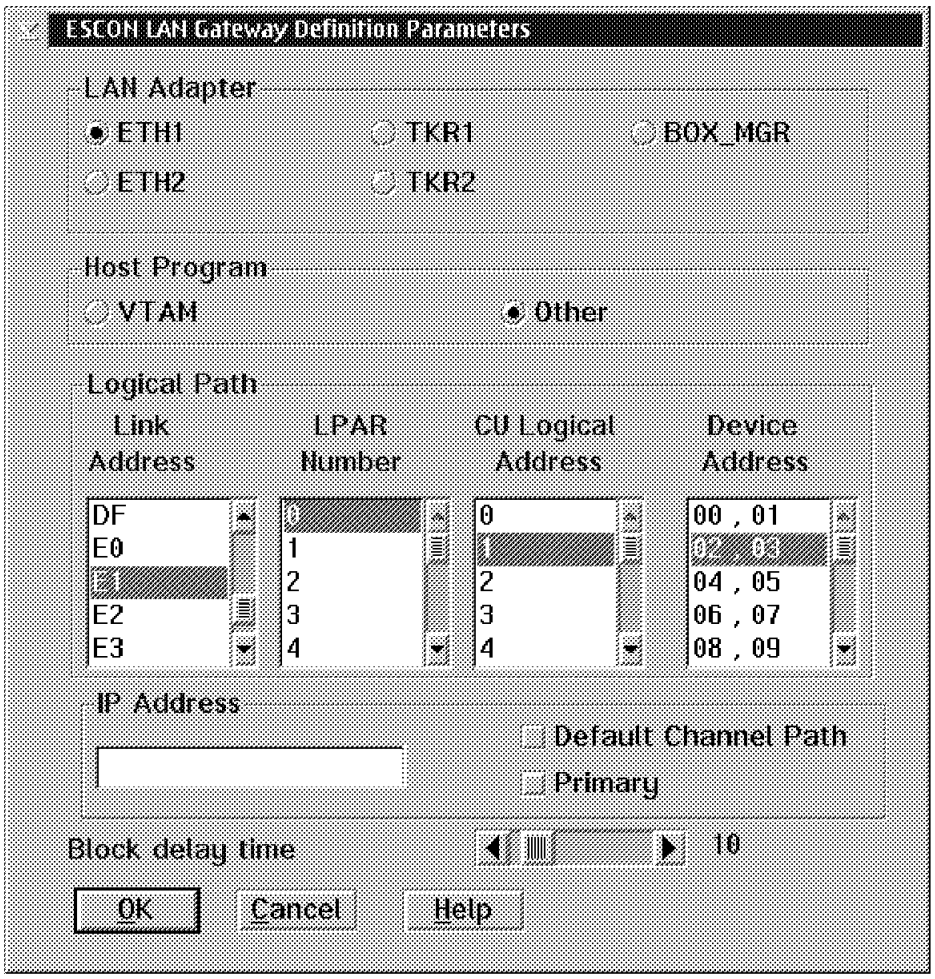


Figure 95. 3172 Ethernet Function

5.1.4 Start and Test Scenario 3

After setting up the scenario it can be tested by verifying the network connections, checking the IP routing, using ping to test the route, and finally by accessing the Web server from the Web browser.

5.1.4.1 Verify the AIX SNA Profiles and Start the Token-Ring Link

Verify the SNA configuration by issuing the `verifysna -U` command on both RS/6000 systems.

Start SNA on both AIX systems using the `sna -s` command. Check the token-ring link with the `sna -d l` command. You should see the @tok0.4 link station in the active state on RS600028 and a second instance of @tok0.4 in the starting state.

```
rs600028:/ # sna -d l
    Link           Adjacent      Node    Device            # of local  In
   station         CP name       type     name      State    sessions   use
-------------- ----------------- ----- --------- ---------- ---------- -----
@tok0.4        USIBMRA.R6007CP   EN    tok0      Active              2 Yes
@tok0.4[1]                             tok0      Starting            0 No
rs600028:/ #
```

Figure 96. Link Station Display on RS600028

5.1.4.2 Start AnyNet

Start AnyNet by issuing the `sna -s anynet` command on both AIX systems. On RS600028 activate the IP-router function, if not already done, by issuing the command `no -o ipforwarding=1`.

5.1.4.3 Check the IP Routing

The verifysna process activates the static routes that have been added to the system configuration by the AnyNet smit menus (smit_snackgmk) on the RS60007 system.

Check this on the RS60007 by issuing the command `netstat -rn`.

```
rs60007:/ # netstat -rn
Routing tables
Destination      Gateway           Flags     Refs     Use  PMTU  Netif Expire
Netmasks:
(0) 0 ff00
(0) 0 ffff
(0) 0 ffff ff00

Route Tree for Protocol Family 2:
default          9.24.104.1        UG           0       1     -    tr0   -
9.24.104         9.24.104.76       U           13     764     -    tr0   -
9.24.105         192.168.210.13    UG           0       0     -   sna0   - 1
127              127.0.0.1         U            4      14     -    lo0   -
127.127          127.127.0.2       U            1       0     -    gw0   -
192.168.210      192.168.210.11    U            1       0     -   sna0   - 2
192.168.254      192.168.210.13    UG           0       0     -   sna0   - 3
rs60007:/ #
```

Figure 97. IP Routing Table on RS60007

In Figure 97, you see the three static routes for sna0 (**1** **2** **3**). Note that the route table also shows the gateway flag (G) in the Flags column for those static routes pointing to the AnyNet gateway.

Check the route table on RS600028 by issuing the command `netstat -rn`.

```
rs600028:/ # netstat -rn
Routing tables
Destination      Gateway           Flags     Refs     Use  PMTU  Netif Expire
Netmasks:
(0) 0 ff00
(0) 0 ffff
(0) 0 ffff ff00

Route Tree for Protocol Family 2:
default          9.24.104.1        UG           3     7137     -    tr0   -
9.24.104         9.24.104.4        U           17    14482     -    tr0   -
9.24.105         9.24.105.72       U            7      402     -    en0   -
127              127.0.0.1         U            3       38     -    lo0   -
127.127          127.127.0.2       U            1      920     -    gw0   -
192.168.210      192.168.210.13    U            3        0     -   sna0   -
192.168.254      9.24.105.74       UG           0        0     -    en0   - 1
rs600028:/ #
```

Figure 98. IP Routing Table on RS600028

The route for 192.168.254 on RS600028 (**1**) has been added with the smit mkroute panel. To check if RS600028 is now an active IP-router enter the command `no -o ipforwarding`. If no value is added to this command, it displays the status of the specified network option.

```
rs600028:/ # no -o ipforwarding
ipforwarding = 1
rs600028:/ #
```

Figure 99. The ipforwarding Command

If you receive an output as shown above then IP-routing is active. Otherwise the variable would return the value 0.

Alternatively you can enter the command `no -a` which shows all "no" (network options).

5.1.4.4 Test AIX Sockets over SNA Connectivity

We tested the connectivity in this scenario with the Netscape browser on RS60007. Entering a URL of `http://192.168.254.1` gave us the Web site on MVS18.

To see AnyNet information on the RS600028 Sockets over SNA gateway node while Netscape was using the AnyNet gateway, we did a display of active AnyNet connections by entering `sna -d anynet -o long` from the command line.

```
rs600028:/ # sna -d anynet -o long
************************************************
Sockets over SNA          4 connection(s)
************************************************
       1>AnyNet ID                              11
         State                                  Registered
         Local IP address                       192.168.210.13 0
         Remote IP address
         Local LU name
         Partner LU name
         Sending CGID                           0
         Receiving CGID                         0
         Mode
         Gateway Connection                     No
         Correlator

       2>AnyNet ID                              7908
         State                                  Connected
         Local IP address                       192.168.254.1 80
         Remote IP address                      192.168.210.11 1135
         Local LU name                          USIBMRA.RAL0000D
         Partner LU name                        USIBMRA.RAL0000B
         Sending CGID                           13
         Receiving CGID                         12
         Mode                                   SNACKETS
         Gateway Connection                     Yes
         Correlator                             0f5796ec0038

       3>AnyNet ID                              7909
         State                                  Connected
         Local IP address                       192.168.254.1 80
         Remote IP address                      192.168.210.11 1136
         Local LU name                          USIBMRA.RAL0000D
         Partner LU name                        USIBMRA.RAL0000B
         Sending CGID                           11
         Receiving CGID                         10
         Mode                                   SNACKETS
         Gateway Connection                     Yes
         Correlator                             0f5797190039

       4>AnyNet ID                              7910
         State                                  Connected
         Local IP address                       192.168.254.1 80
         Remote IP address                      192.168.210.11 1137
         Local LU name                          USIBMRA.RAL0000D
         Partner LU name                        USIBMRA.RAL0000B
         Sending CGID                           9
         Receiving CGID                         8
         Mode                                   SNACKETS
         Gateway Connection                     Yes
         Correlator                             0f579783003a

rs600028:/ #
```

Figure 100. AnyNet Display on RS600028

You can see 3 open AnyNet connections between 192.168.254.1 (MVS OE) and 192.168.210.11 (RS60007) using port 80 (www port). The Gateway Connection information field indicates these are gateway connections.

5.2 Scenario 4: OS/2 Web Browser to MVS Web Server via AIX Sockets over SNA Gateway

Scenario 4 involves an AIX system, an OS/2 system and an MVS system. This scenario illustrates:

- Web products:
  - Netscape on OS/2
  - OS/390 Internet Connection Secure Server
- Network products:
  - MVS VTAM Sockets over SNA
  - CS/AIX Sockets over SNA gateway
  - AIX TCP/IP
  - OS/2 TCP/IP
- Network connectivity:
  - AnyNet algorithmic mapping
  - MVS to AIX SNA over 3745 SDLC link
  - AIX TCP/IP over token-ring

Figure 101 shows an overview of scenario 4.

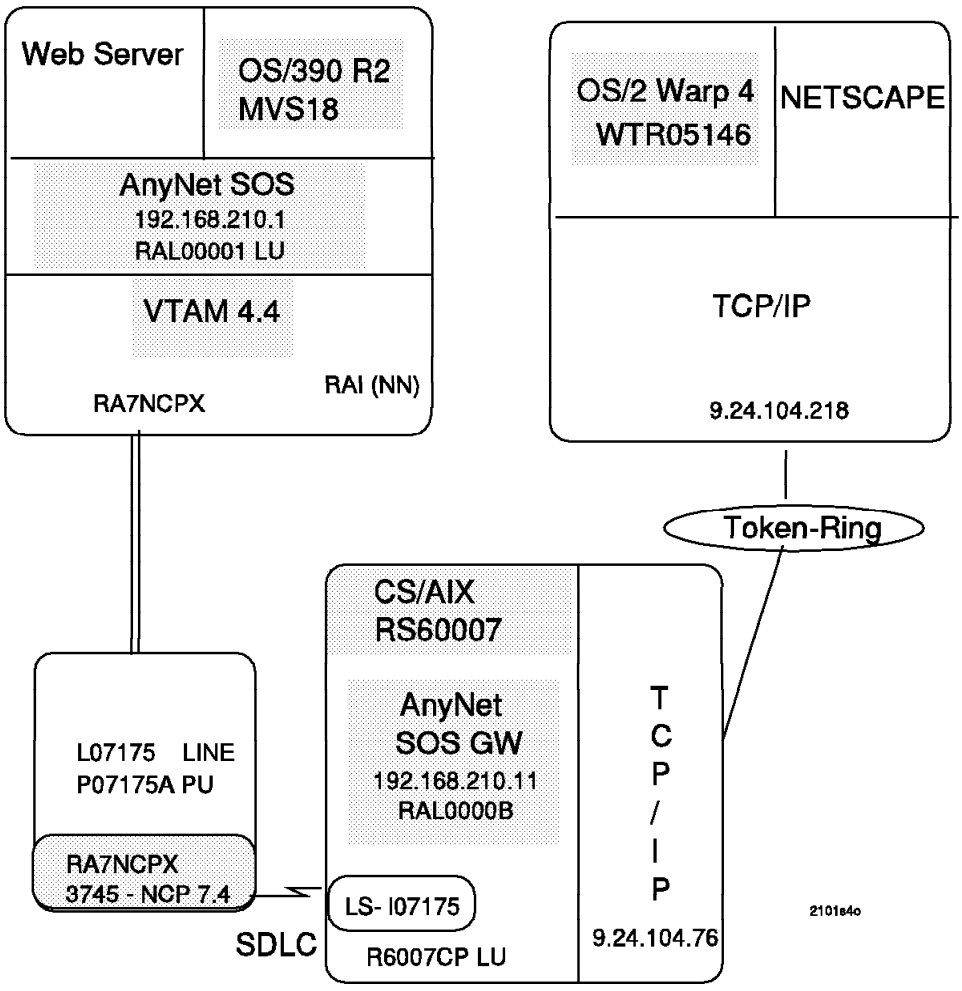


Figure 101. Scenario 4 Overview

Figure 101 shows an overview of the IP routing tables and IP-LU mapping for scenario 4.

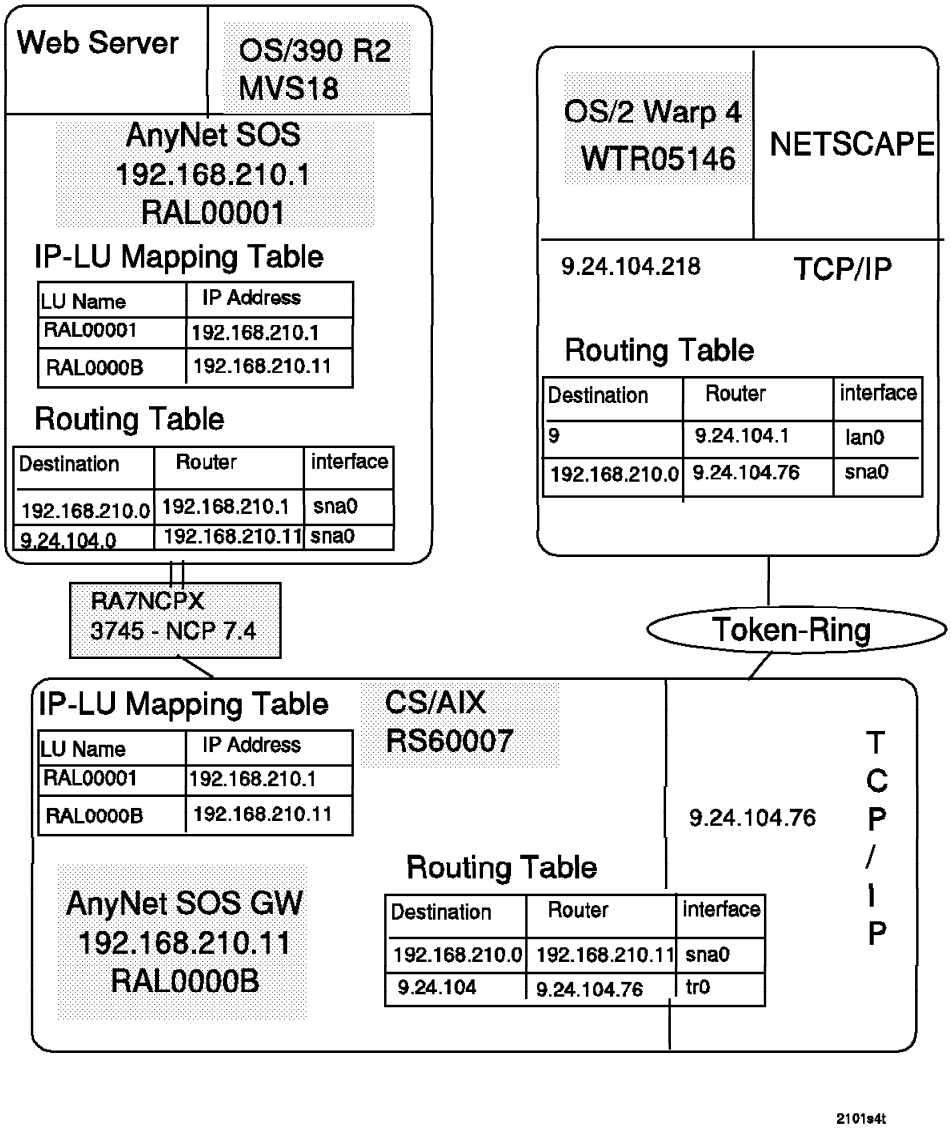


Figure 102. Scenario 4 Routing Overview

5.2.1 OS/2 Definitions

On the OS/2 system we had to define the TCP/IP network interface and an additional static route for the 192.168.210 network. Figure 103 on page 91 shows the TCP/IP configuration network interface definition. The IP address for the OS/2 machine is set to 9.24.104.218.

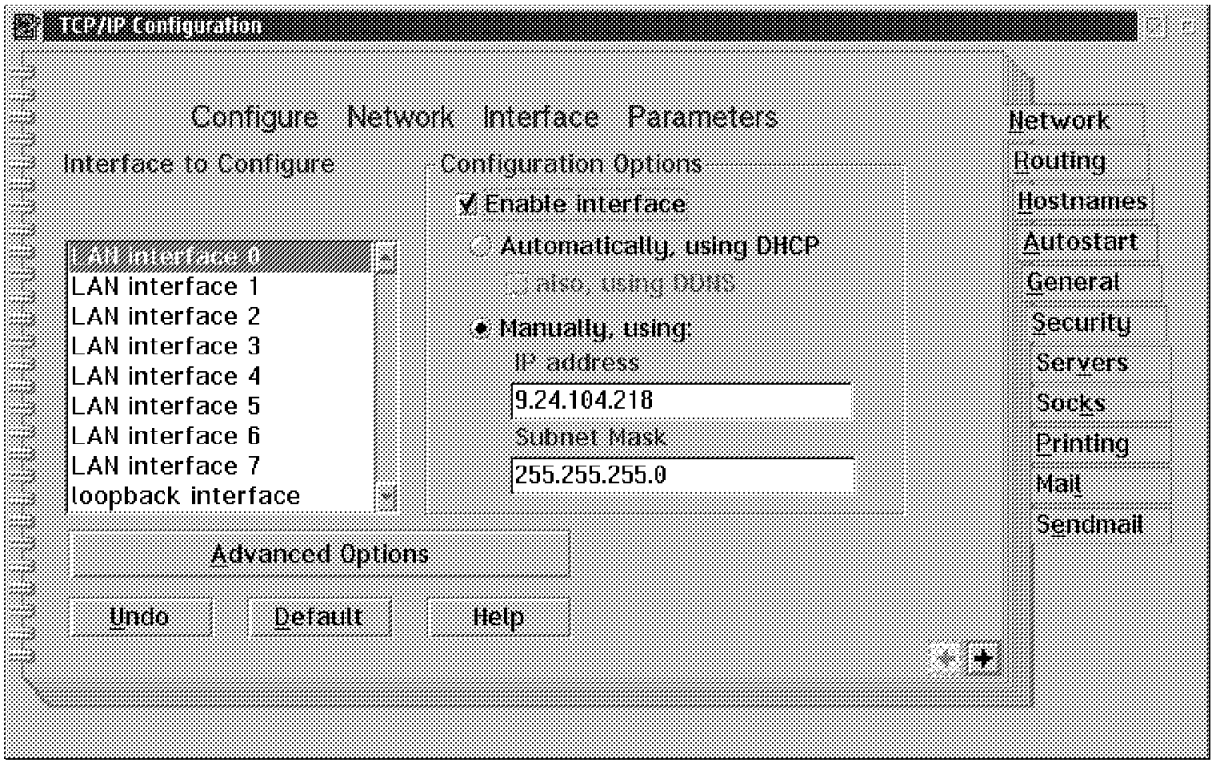


Figure 103. OS/2 TCP/IP Network Interface Definition

Figure 104 shows the TCP/IP configuration routing information. For this scenario we added the route to send all traffic to the 192.168.210 network to TCP/IP on RS60007 at 9.24.104.76.

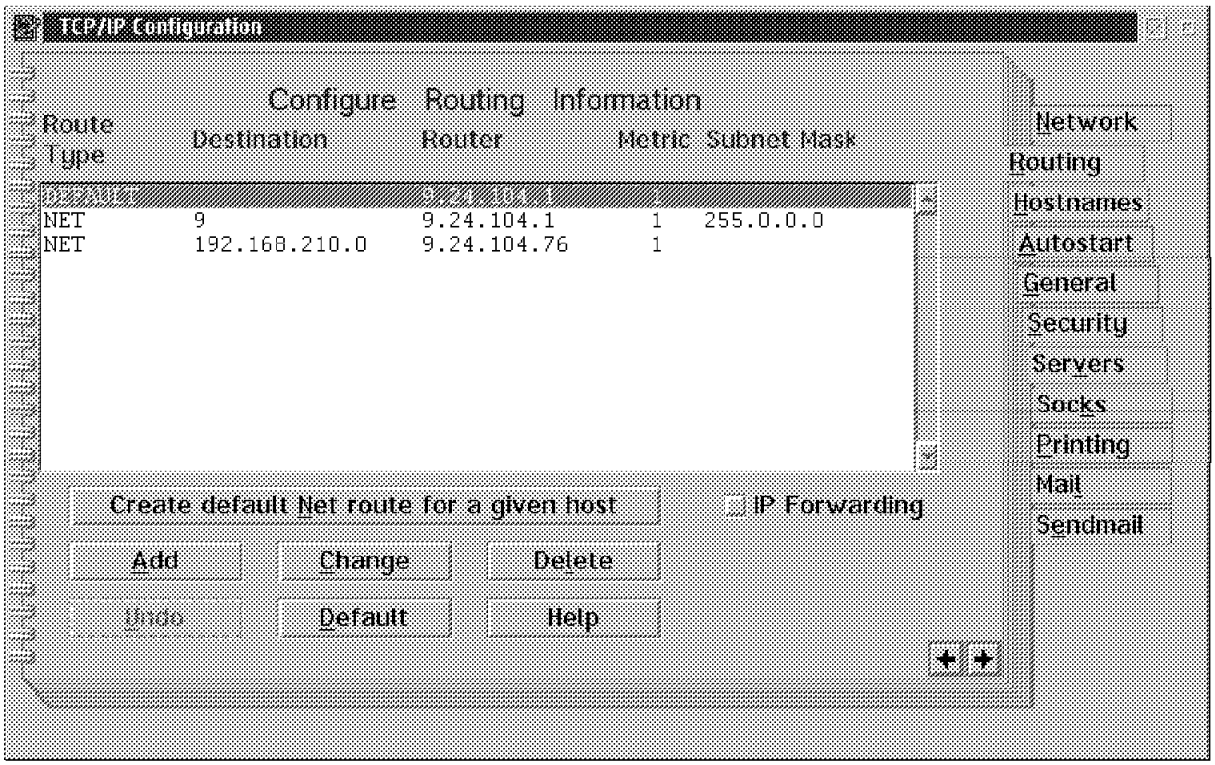


Figure 104. OS/2 TCP/IP Routing Table

5.2.2 RS60007 Definitions

RS60007 is an RS/6000 running AIX 4.2 with Communication Server for AIX 4.2. In this scenario it is defined as a Sockets over SNA gateway with the Web browser on the TCP/IP network and the Web server on the SNA network.

5.2.2.1 Control Point Configuration

For this scenario RS60007 is defined as an APPN end node. The CP name is R6007CP. Note that the AnyNet gateway can run on an APPN end node. This may affect performance since the gateway will be establishing LU 6.2 sessions with other nodes and will have to go to a network node for this session setup.

```
                        Change/Show Control Point Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                          [Entry Fields]
* Profile name                                           node_cp
  XID node ID                                           [*]
* Network name                                          [USIBMRA]
* Control Point (CP) name                               [R6007CP]
  Control Point alias                                   [R6007CP]
  Control Point type                                    appn_end_node
  Maximum number of cached routing trees                [500]
  Maximum number of nodes in the TRS database           [500]
  Route addition resistance                             [128]

  Comments                                              []




F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 105. Control Point Profile for RS60007 in Scenario 4

5.2.2.2 CS/AIX SDLC Link Configuration

The SNA SDLC DLC profile and linkstation profile to connect RS60007 and MVS18 were defined as in 4.1.1.2, “CS/AIX SDLC Link Configuration” on page 23.

5.2.2.3 CS/AIX AnyNet Configuration

Figure 106 on page 93 shows the sockets over SNA minimum configuration profile for this scenario. We used algorithmic IP-LU address translation. The AnyNet internal algorithm will translate the IP address for RS60007, 192.168.210.11 to the LU name RAL0000B. The IP address for MVS, 192.168.210.1 is translated to RAL00001.

```
                        Add a Minimum Configuration Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Field
* Profile name                                         [rs7]

  Local information (required):
*    IP address                                       [192.168.210.11]
*    Subnet mask                                      [255.255.255.0]
*    Mode name                                        [SNACKETS]
     Maximum send buffer size                         [8300]
     Datagram conversation timeout                    [90]
     Connection start timeout                         [90]

  LU mapping information (required):
     LU name template                                 [RAL]
     LU mapping mask                                  [255.255.255.0]

  Comments                                            []


F1=Help            F2=Refresh          F3=Cancel           F4=List
F5=Reset           F6=Command          F7=Edit             F8=Image
F9=Shell           F10=Exit            Enter=Do
```

Figure 106. AnyNet Minimum Configuration Profile for RS60007

An LU 6.2 profile for RAL0000B will be automatically created as a result of this configuration. You may see this profile by entering `smit_snalocalu6ch`. This is the same as for scenario 3. The local LU 6.2 profile can be seen in Figure 82 on page 76.

We modified the SNACKETS logmodes for VTAM and CS/AIX to use #INTER for the class of service. #INTER is geared toward interactive sessions. We also changed the SNACKETS logmode to set the number of sessions to 100, with a minimum of 50 contention winners. This is the number of sessions allowed between the local and remote LUs on a given logmode name (SNACKETS). This is discussed in 4.1.4.2, “AnyNet Session Allocation for Netscape” on page 41. The CS/AIX logmode can be seen in Figure 14 on page 28 In MVS these session limits are set in the VTAM ACB for AnyNet. The ACB for RAL00001 is shown in Figure 110 on page 95.

5.2.2.4 Define the Token-Ring TCP/IP Network Interface

The Minimum Configuration & Startup panel from the smit TCP/IP menu is used to add a network interface if this is the first network interface on the system. Otherwise you would use the Add a Network Interface menu and select token-ring (tr0) as network interface type.

```
                        Minimum Configuration & Startup

 To Delete existing configuration data, please use Further Configuration

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* HOSTNAME                                             [rs60007]
* Internet ADDRESS (dotted decimal)                    [9.24.104.76]
  Network MASK (dotted decimal)                        [255.255.255.0]
* Network INTERFACE                                     tr0
  NAMESERVER
           Internet ADDRESS (dotted decimal)           [9.24.104.108]
           DOMAIN Name                                 [itso.ral.ibm.com]
  Default GATEWAY Address                              [9.24.104.1]
  (dotted decimal or symbolic name)
  RING Speed                                           [4]
  START Now                                             no



F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 107. TCP/IP Minimum Configuration for RS60007

5.2.2.5 TCP/IP routing

Activate the IP-router function with the command `no -o ipforwarding=1` (see 5.1.2.5, “IP Routing and Forwarding” on page 80). An overview of the IP routing for this scenario can be seen in Figure 102 on page 90.

5.2.3 MVS Definitions

The SDLC connection to RS60007 is described in 4.1.2.1, “SDLC Connection between RS60007 and MVS18” on page 30.

The MVS AnyNet environment for these scenarios is discussed in detail in Chapter 9, “AnyNet MVS Setup for AnyNet Scenarios” on page 165. The AnyNet setup commands for MVS18 are shown in Figure 108.

```
/*********************************************************************/
/* Algorithmic mapping of IP addresses to LU 6.2 names               */
/*********************************************************************/
istskmap flush
istskmap add 192.168.210.0 255.255.255.0 USIBMRA RAL
istskmap get
/*********************************************************************/
/*                                                                   */
/* We add IP address 192.168.210.1 as the HOME IP address of         */
/* the AnyNet SNA0 interface.                                        */
/*                                                                   */
/*********************************************************************/
istskifc sna0 192.168.210.1
/*********************************************************************/
istskrte add net 9.24.104 192.168.210.11 2
/*********************************************************************/
```

Figure 108. MVS AnyNet Setup Commands

We used algorithmic mapping in AnyNet for this scenario. With the templates we used, the IP address used for MVS18, 192.168.210.1, is represented by the LU 6.2

name RAL00001. A route was added with the ISTSKRTE command to route traffic destined for the 9.24.104 network over the sna0 interface to the gateway at RS60007. Figure 109 on page 95 shows the results of the ISTSKRTE commands.

```
   destination            gateway     refcnt        use  flags    intrf

    9.24.104.0     192.168.210.11       0            0    U      sna0
 192.168.210.0      192.168.210.1       0            0    U      sna0
```

Figure 109. ISTSKNST -r Output - AnyNet Routing Table on MVS18

The MVS ACB representing the AnyNet interface is shown in Figure 110.

```
         VBUILD TYPE=APPL
RAL00001 APPL  ACBNAME=RAL00001,                                    *
               APPC=YES,                                            *
               PARSESS=YES,                                         *
               DSESLIM=100,                                         *
               DMINWNL=50,                                          *
               DMINWNR=0,                                           *
               AUTOSES=0,                                           *
               AUTH=(ACQ,PASS),                                     *
               OPERCNOS=ALLOW,                                      *
               ATNLOSS=ALL,                                         *
               MODETAB=ISTINCLM
```

Figure 110. MVS AnyNet LU

5.2.4 Start and Test Scenario 4

After setting up the scenario it can be tested by verifying the network connections, checking the IP routing, using ping to test the route, and finally by accessing the Web server from the Web browser.

5.2.4.1 RS60007

Verify the SNA configuration and start SNA as described in scenario 1 (4.1.3.1, “Verify AIX SNA Profiles and Start Link Station on RS60007” on page 33).

Start Anynet by issuing the `sna -s anynet` command. Activate IP forwarding by entering `no -o ipforwarding=1`.

5.2.4.2 OS/2

Ping and Netscape on the OS/2 system were used to test the AnyNet link. If ping does not work, it indicates a problem in the routing tables on one or more systems. By entering the remote system URL from Netscape on OS/2, 192.168.210.1, we accessed the MVS Web site.

5.2.4.3 MVS

Figure 111 on page 96 shows a display of the AnyNet LU. You can see that there are sessions active with the gateway on RS60007.

```
IST075I  NAME = USIBMRA.RAL00001 , TYPE = APPL
IST486I  STATUS= ACT/S     , DESIRED STATE= ACTIV
IST1447I  REGISTRATION TYPE = CDSERVR
IST977I  MDLTAB=***NA*** ASLTAB=***NA***
IST861I  MODETAB=ISTINCLM USSTAB=***NA*** LOGTAB=***NA***
IST934I  DLOGMOD=***NA*** USS LANGTAB=***NA***
IST1632I  VPACING =  7
IST597I  CAPABILITY-PLU ENABLED  ,SLU ENABLED  ,SESSION LIMIT NONE
IST231I  APPL     MAJOR NODE = RAIANYAX
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I  STATE TRACE = OFF
IST271I  JOBNAME = RAISOCK , STEPNAME = RAISOCK , DSPNAME = ISTOB711
IST1050I  MAXIMUM COMPRESSION LEVEL - INPUT = 0   , OUTPUT = 0
IST1633I  ASRCVLM =  1000000
IST1634I  DATA SPACE USAGE: CURRENT =          0 MAXIMUM  =        768
IST171I  ACTIVE SESSIONS = 0000000007, SESSION REQUESTS = 0000000000
IST206I  SESSIONS:
IST634I  NAME     STATUS         SID          SEND RECV VR TP NETID
IST635I  RAL0000B ACTIV-S    F86FE1644B6281FC 0009 0000  0  0 USIBMRA
IST635I  RAL0000B ACTIV-S    F86FE1644B6281FB 0004 0000  0  0 USIBMRA
IST635I  RAL0000B ACTIV-S    F86FE1644B6281FA 0008 0000  0  0 USIBMRA
IST635I  RAL0000B ACTIV-S    F86FE1644B6281F4 000B 0000  0  0 USIBMRA
IST635I  RAL0000B ACTIV-P    CC974C49A365F8E4 0000 0005  0  0 USIBMRA
IST635I  RAL0000B ACTIV-P    CC974C49A365F8E3 0000 0012  0  0 USIBMRA
IST635I  RAL0000B ACTIV/SV-P CC974C49A365F8E2 0001 0001  0  0 USIBMRA
IST314I  END
```

Figure 111. MVS VTAM Display of RAL00001

Chapter 6. Web Access Using Cascaded Sockets over SNA Gateways

This chapter includes two scenarios illustrating communication between a Web browser and a Web server using cascaded Sockets over SNA gateways to allow communication between two TCP/IP nodes and between two SNA nodes. These scenarios show how to configure the AnyNet parameters for a Sockets over SNA gateway and in addition they showcase some of the connectivity options of the platforms involved.

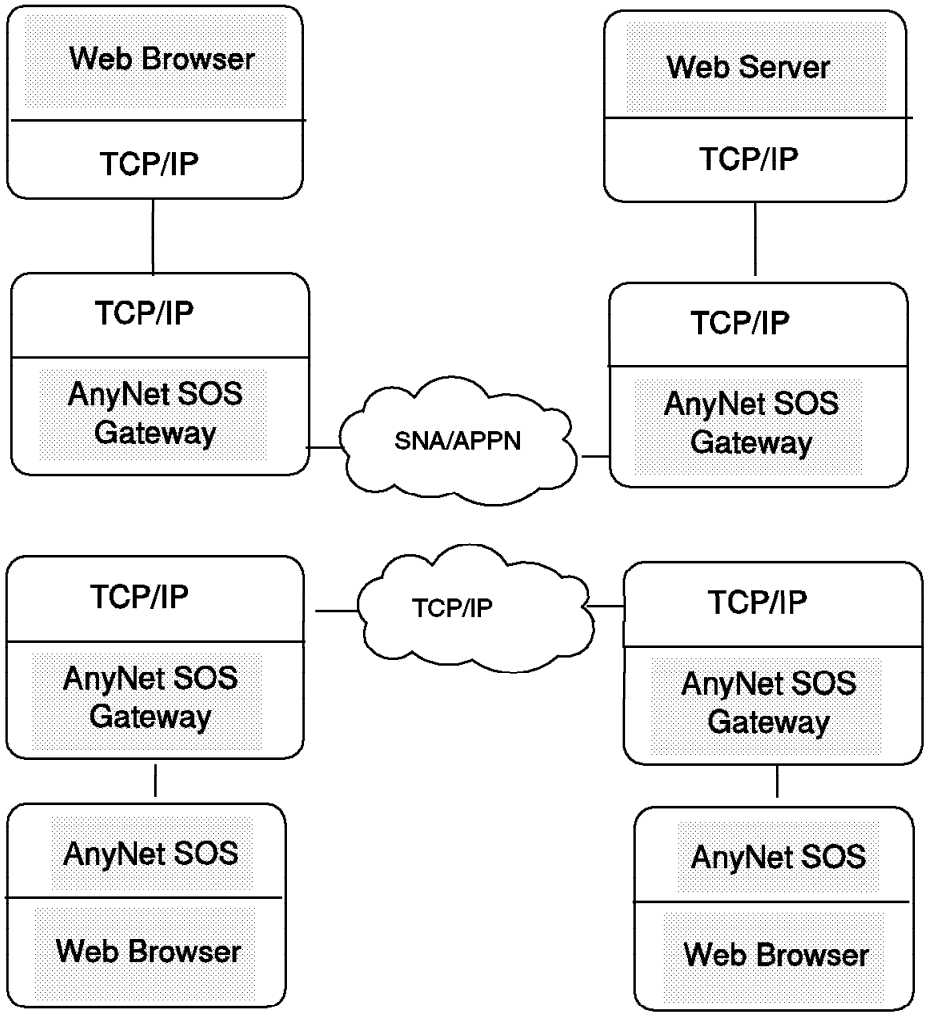


Figure 112. Scenario 5 and 6 Overview

Scenario 5 shows a network where the Web server and browser reside on TCP/IP platforms but are separated by an SNA network.

Topics introduced in scenario 5 include:

- OS/2
  - OS/2 Lotus Notes Domino server
- Communication Server for AIX (CS/AIX)
  - Using the same token-ring port for both SNA and TCP/IP
- AnyNet

  - Cascaded Sockets over SNA gatways with an SNA network between
  - Internet communications with a firewall on the same AIX machine as a CS/AIX AnyNet gateway node.

Scenario 6 shows a network where the Web server and browser reside on SNA platforms but are separated by a TCP/IP network. The following topics are new:

- AnyNet
  - Cascaded Sockets over SNA gatways with a TCP/IP network between
  - Communication Server for OS/2 (CS/OS/2) Sockets over SNA access node
- Connectivity
  - SNA MPC ESCON channel communication between CS/AIX and MVS VTAM

6.1 Scenario 5: OS/2 Web Browser to OS/2 Domino Web Server via AIX Sockets over SNA Gateways

Scenario 5 uses two AIX systems running CS/AIX Sockets over SNA gateways communicating with each other over an SNA network. The end nodes are a Netscape Web browser on an OS/2 platform and a Notes Domino Web server on an OS/2 platform.

- Web products:
  - Netscape on OS/2
  - OS/2 Lotus Notes Domino Server
- Network products:
  - CS/AIX Sockets over SNA gateway
  - AIX TCP/IP
  - OS/2 TCP/IP
  - AIX Firewall
- Network connectivity:
  - AnyNet algorithmic mapping
  - AIX SNA over token-ring
  - AIX TCP/IP over token-ring
  - OS/2 TCP/IP over token-ring

Figure 113 on page 99 is an overview of this scenario.

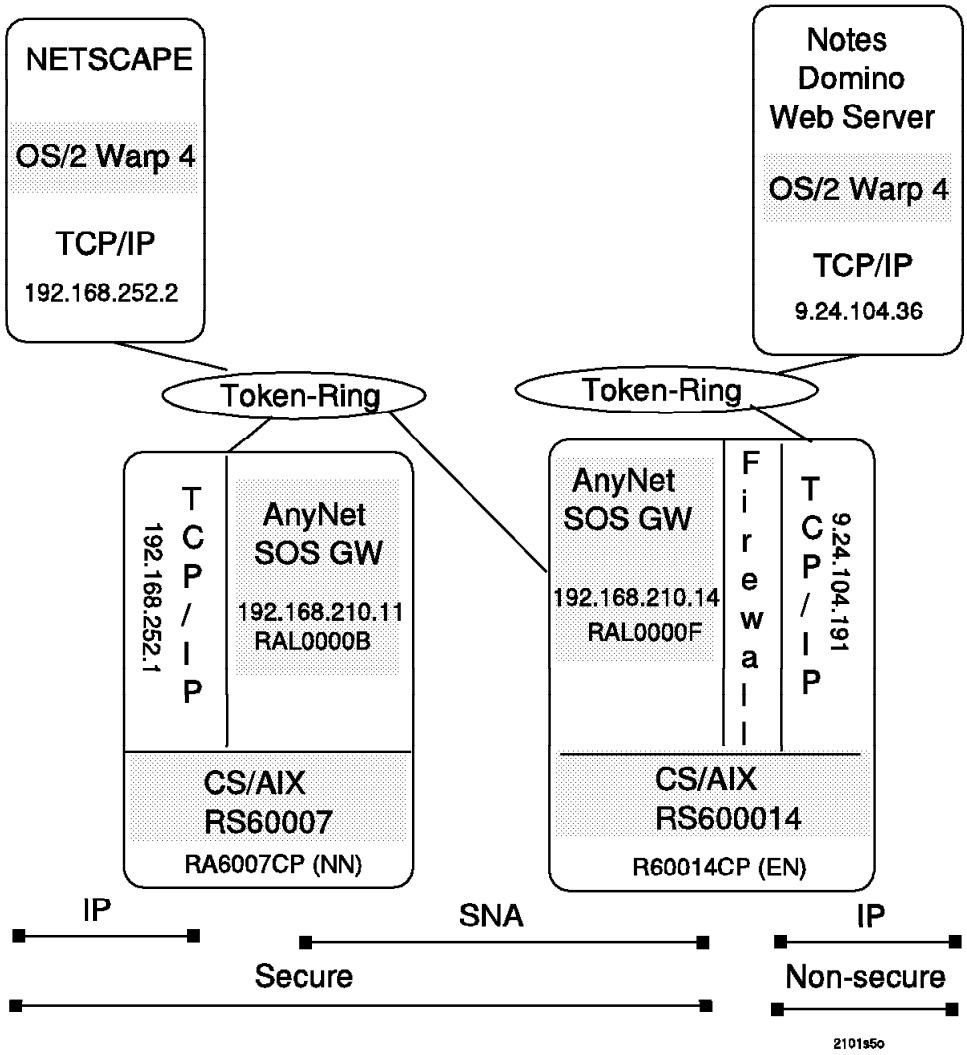


Figure 113. Scenario 5 Overview

Figure 114 on page 100 is an overview of the IP-LU mapping tables and the additional routes (other than those automatically created based on network interfaces) that are required for this scenario.

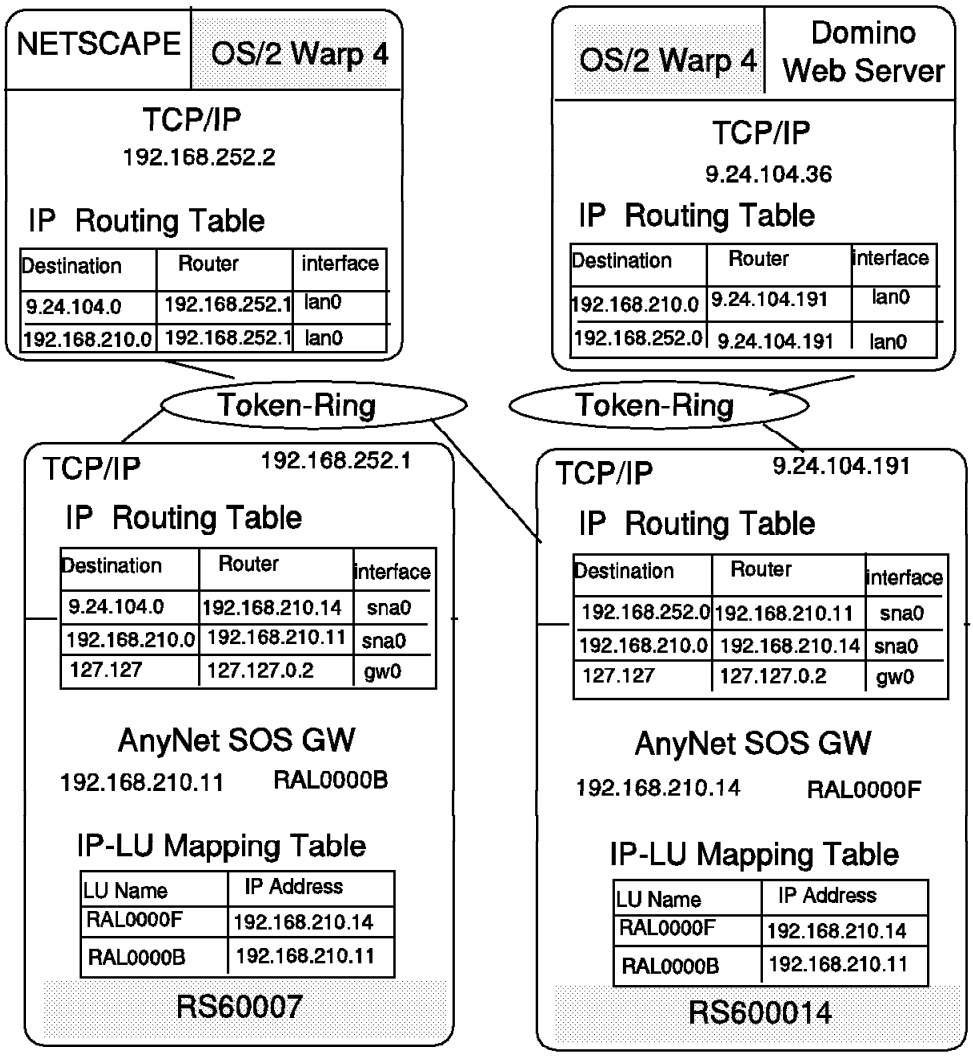


Figure 114. Scenario 5 IP Overview

6.1.1 OS/2 Client Definitions

The OS/2 client is running Netscape and TCP/IP on OS/2 Warp V4. The OS/2 TCP/IP network interface for this scenario is defined with IP address 192.168.252.2 and netmask 255.255.255.0

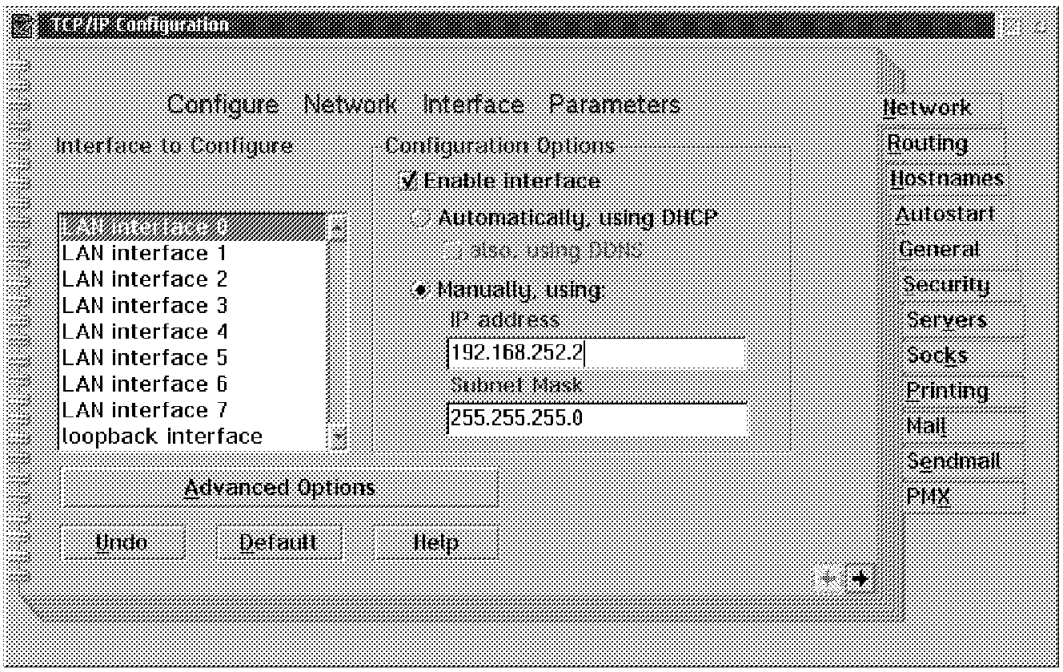


Figure 115. OS/2 TCP/IP Network Interface

Static routes for networks 192.168.210 and 9.24.104 pointing to the first AnyNet gateway at address 192.168.252.1 are defined by using the OS/2 TCP/IP configuration panels.

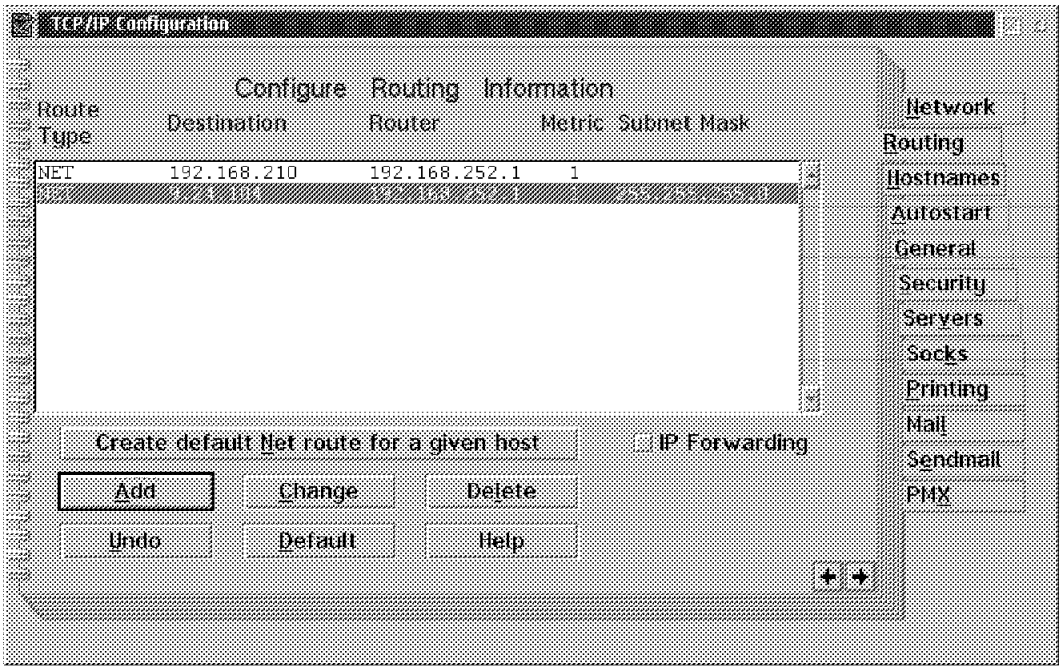


Figure 116. OS/2 TCP/IP IP Routes

6.1.2 RS60007 Definitions

RS60007 serves as a Sockets over SNA gateway in this scenario. It receives and transmits the Web browser traffic over the TCP/IP token-ring connection. It communicates over the same token-ring port using SNA to the Sockets over SNA gateway in RS600014.

6.1.2.1 Control Point Configuration

For this scenario we define the RS60007 as an APPN network node. Since the gateway will be establishing LU 6.2 sessions this should give us better performance than if it were an end node.

```
                        Change/Show Control Point Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* Profile name                                          node_cp
  XID node ID                                          [*]
* Network name                                         [USIBMRA]
* Control Point (CP) name                              [RA6007CP]
  Control Point alias                                  [RA6007CP]
  Control Point type                                   appn_network_node
  Maximum number of cached routing trees               [500]
  Maximum number of nodes in the TRS database          [500]
  Route addition resistance                            [128]

  Comments                                             []




F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 117. CS/AIX Control Point Profile for RS60007

6.1.2.2 CS/AIX Token-Ring Link Configuration

The token-ring connection on RS60007 was defined using a dynamic listening link station. The method to do this is discussed in an earlier scenario. See 5.1.2.2, “CS/AIX Token-Ring Dynamic Listening Link Station” on page 78 for more information.

6.1.2.3 CS/AIX AnyNet Configuration

The Sockets over SNA minimum configuration profile for RS60007 in this scenario is shown in Figure 118 on page 103.

```
                        Add a Minimum Configuration Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Field
* Profile name                                         [rs7]

  Local information (required):
*    IP address                                       [192.168.210.11]
*    Subnet mask                                      [255.255.255.0]
*    Mode name                                        [SNACKETS]
     Maximum send buffer size                         [8300]
     Datagram conversation timeout                    [90]
     Connection start timeout                         [90]

  LU mapping information (required):
     LU name template                                 [RAL]
     LU mapping mask                                  [255.255.255.0]

  Comments                                            []


F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 118. AnyNet Minimum Configuration Profile for RS60007

We again used algorithmic IP-LU address translation. The IP address for this node, 192.168.210.11, translates into the LU name RAL0000B.

A local LU 6.2 profile for RAL0000B is automatically created and can be seen by entering the command `smit_snalocalu6ch`. An example of the local LU 6.2 profile can be seen in Figure 82 on page 76.

6.1.2.4 Define the Token-Ring TCP/IP Network Interface

A token-ring TCP/IP network interface is defined by using the Minimum Configuration & Startup smit panel if this is the first native TCP/IP network interface on the system. Otherwise, the Add a Network Interface menu is used to add the token-ring network interface tr0.

```
                    Add a Token-Ring Network Interface

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* INTERNET ADDRESS (dotted decimal)                  [192.168.210.1]
  Network MASK (hexadecimal or dotted decimal)       [255.255.255.0]
  Network Interface                                   tr0
* ACTIVATE the Interface after Creating it?          yes
  Use Address Resolution Protocol (ARP)?             yes
  Enable Hardware LOOPBACK Mode?                     no
  BROADCAST ADDRESS (dotted decimal)                 []
  Confine BROADCAST to LOCAL Token-Ring?             no

F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 119. TCP/IP Token-Ring Network Interface on RS60007

Note that on RS60007 the tok0 token-ring adapter is used for both network interfaces sna0 and tr0. This is possible because the protocol is SNA for AnyNet sna0 and TCP/IP for tr0. You can run different types of protocols over a single LAN adapter simultaneously. RS60007 acts as a protocol converter in this scenario. It converts the headers of the data packets flowing on the same physical token-ring from TCP/IP to MPTN/SNA and vice versa.

6.1.2.5 TCP/IP Routing

The IP-router function is activated with the command `no -o ipforwarding=1`. An additional static route for the 9.24.104 network needs to be defined.

```
              Add Static Route to Sockets over SNA Gateway Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       [net104]
  Destination type                                   [net]
  Destination address                                [9.24.104]
  Gateway address                                    [192.168.210.14]

  Comments                                           []

F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 120. Static Routes for RS60007

6.1.3 RS600014 Definitions

RS600014 is an RS/6000 running AIX 4.2 and Communication Server for AIX 4.2. In this scenario it provides one of the Sockets over SNA gateways in a cascaded gateway configuration. It is also configured as a firewall with the Web server on the non-secure side and the Web browser on the secure side.

6.1.3.1 Control Point Configuration

In this scenario we defined RS600014 as APPN end node. We did this only to show it could be done. It makes no difference whether the RS/6000 is an end node or network node. It would be better if any node that establishes many LU 6.2 sessions be defined as a network node. This would reduce the amount of time and network traffic needed to set up the LU 6.2 sessions.

```
                    Change/Show Control Point Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       node_cp
  XID node ID                                       [*]
* Network name                                      [USIBMRA]
* Control Point (CP) name                           [R60014CP]
  Control Point alias                               [R60041CP]
  Control Point type                                 appn_end_node
  Maximum number of cached routing trees            [500]
  Maximum number of nodes in the TRS database       [500]
  Route addition resistance                         [128]

  Comments                                          []




F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Reset         F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 121. CS/AIX Control Point Profile for RS600014.

6.1.3.2 SNA Link Configuration

We defined a token-ring DLC and link station profile for the adapter used by CS/AIX for gateway communication. RS600014 had three token-ring adapters installed. We used tok0 for the non-secure TCP/IP network interface and tok2 for the secure sna0 AnyNet network interface.

6.1.3.3 CS/AIX AnyNet Configuration

The Sockets over SNA minimum configuration profile for this RS600014 is shown in Figure 122 on page 106.

```
                    Add a Minimum Configuration Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Field
* Profile name                                         [rs14]

  Local information (required):
*    IP address                                       [192.168.210.14]
*    Subnet mask                                      [255.255.255.0]
*    Mode name                                        [SNACKETS]
     Maximum send buffer size                         [8300]
     Datagram conversation timeout                    [90]
     Connection start timeout                         [90]

  LU mapping information (required):
     LU name template                                 [RAL]
     LU mapping mask                                  [255.255.255.0]

  Comments                                            []


F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 122. AnyNet Minimum Configuration Profile for RS600014

The AnyNet nodes in this scenario use algorithmic IP-LU address translation. The IP address for this node, 192.168.210.14, translates into the LU name RAL0000F.

A local LU 6.2 profile for RAL0000F is automatically created and can be seen by entering the command `smit_snalocalu6ch`.

6.1.3.4 Define the Token-Ring TCP/IP Network Interface

A token-ring TCP/IP network interface is defined by using the Minimum Configuration & Startup smit panel if this is the first native TCP/IP network interface on the system. Otherwise, the Add a Network Interface menu is used to add the token-ring network interface tr0. In this case the token-ring interface is defined with IP-address 9.24.104.191 and network mask 255.255.255.0.

6.1.3.5 TCP/IP Routing

The IP-router function must be activated with the command `no -o ipforwarding=1`. An additional static route must be defined for the 192.168.252 network.

```
              Add Static Route to Sockets over SNA Gateway Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       [net252]
  Destination type                                   [net]
  Destination address                                [192.168.252]
  Gateway address                                    [192.168.210.11]

  Comments                                           []









F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 123. Static Routes for RS600014

6.1.3.6 Firewall Configuration

The IBM Firewall V3R1 for AIX was installed on RS600014. Firewalls are used to protect networks. The firewall acts as a door between a non-secure interface (for example, the Internet) and a secure network (your company's Intranet).

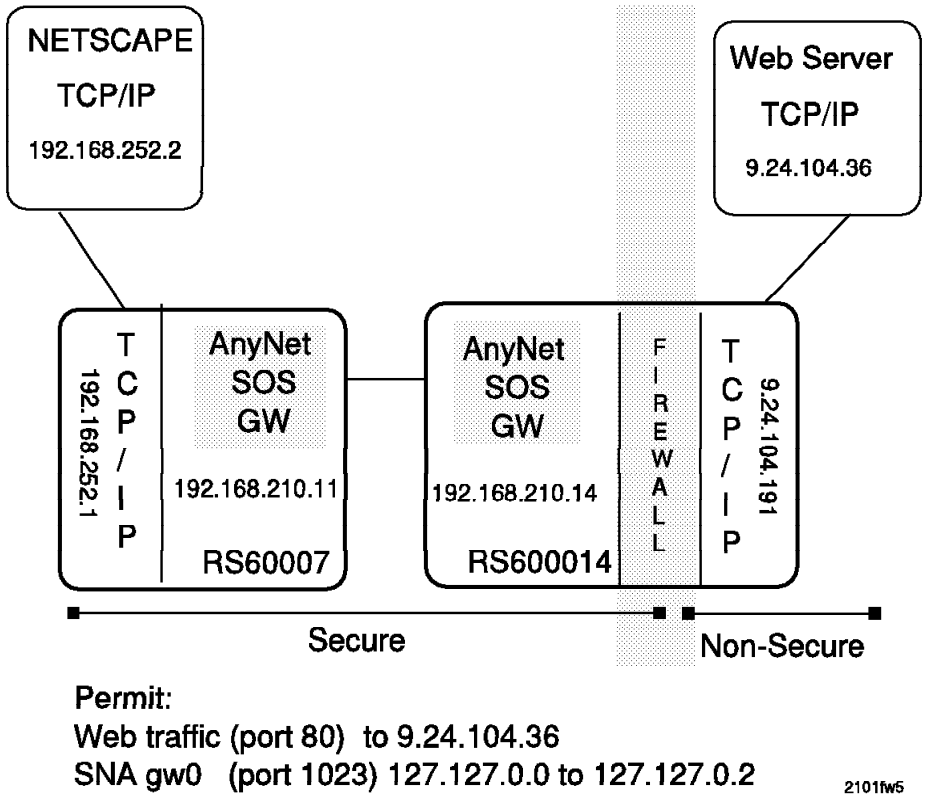


Figure 124. Firewall Overview for Scenario 5

The firewall installed in RS600014 has three network interfaces relevant to this scenario. The firewall protects the secure network containing the Web browsers and the non-secure network containing the Web servers. One of the things that makes this scenario interesting is the fact that have installed a Sockets over SNA gateway in the same machine as the firewall.

- Secure interfaces:
  - 192.168.210.14 (Sockets over SNA)
  - 127.127.0.2 (Sockets over SNA gateway internal IP address)
- Non-Secure interface:
  - 9.24.104.191 (the native TCP/IP on RS600014)

Scenario 5 and 6 both contain firewalls. The details of how to set up a firewall are beyond the scope of this book. A good place to see more would be *Building a Firewall with the IBM Internet Connection Secure Network Gateway*, SG24-2577. The firewall definitions from scenario 6 are listed in Appendix C, “Firewall Definitions” on page 209. These definitions are similar to those used in this scenario.

The one thing you should keep in mind when setting up a firewall with CS/AIX Sockets over SNA gateway is that the gateway uses an IP address internally for communication. This IP address, 127.127.0.2, must be included in your filter definitions. The active filters for RS600014 for this interface are shown in the next figure.

```
Rule 1:
  Rule action                : permit
  Source Address             : 127.127.0.0
  Source Mask                : 255.255.0.0
  Destination Address        : 127.127.0.2
  Destination Mask           : 255.255.255.255
  Protocol                   : tcp
  Source Port/ICMP/OSPF Type :eq  1234
  Destination Port/ICMP Code :gt  1023
  Interface                  : specific
  Routing                    : both
  Direction                  : inbound
  Logging control            :yes
  Fragment control           :yes
  Tunnel ID number           : 0
  Authenticate algorithm     : none
  Encryption algorithm       : none
Rule 2:
  Rule action                : permit
  Source Address             : 127.127.0.2
  Source Mask                : 255.255.255.255
  Destination Address        : 127.127.0.0
  Destination Mask           : 255.255.0.0
  Protocol                   : tcp/ack
  Source Port/ICMP/OSPF Type :gt  1023
  Destination Port/ICMP Code :eq  1234
  Interface                  : specific
  Routing                    : both
  Direction                  : outbound
  Logging control            :yes
  Fragment control           :yes
  Tunnel ID number           : 0
  Authenticate algorithm     : none
  Encryption algorithm       : none
```

6.1.4 OS/2 Lotus Notes Domino Server Definitions

The Domino server is Lotus Notes Domino V4.5 running on an OS/2 platform. Communication with the network is over a token-ring TCP/IP interface. The IP address of the Domino server is 9.24.104.36. The TCP/IP configuration is the same as for other OS/2 systems. The TCP/IP network interface parameters are shown in Figure 125 on page 110.

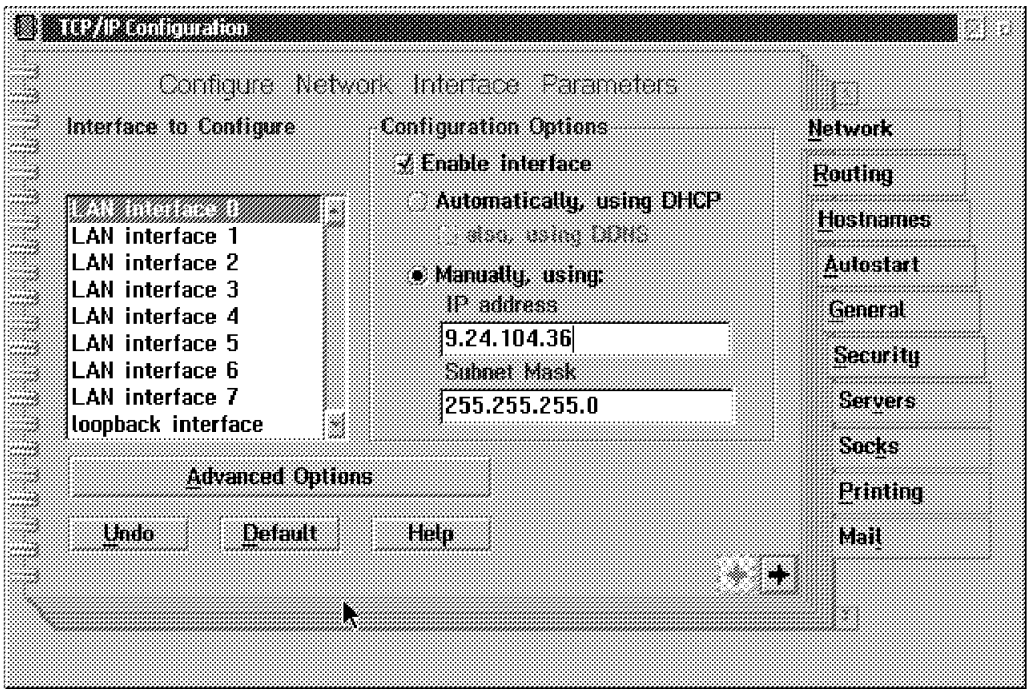


Figure 125. TCP/IP Network Interface on Notes Domino Server

The TCP/IP routing information defined for this scenario are shown in Figure 126.

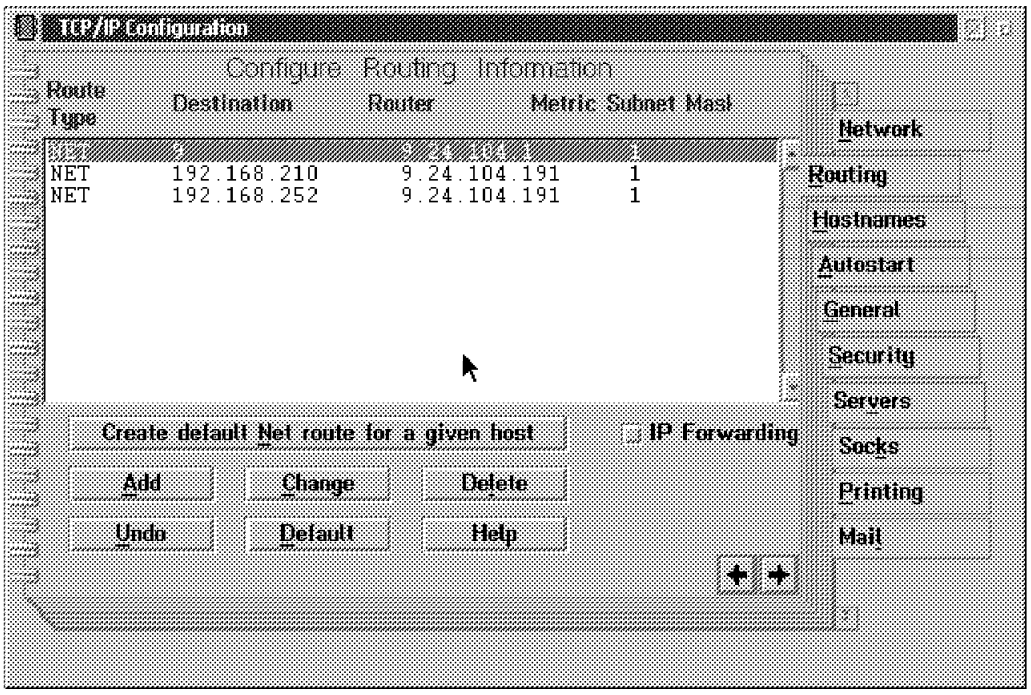


Figure 126. TCP/IP Routing Information on Notes Domino Server

6.1.5 Start and Test Scenario 5

After setting up the scenario it can be tested by verifying the network connections, checking the IP routing, using ping to test the route, and finally by accessing the Web server from the Web browser.

6.1.5.1 RS60007 and RS600014

1. Verify SNA configuration and start the SNA subsystem.
   - `verifysna -U`
   - `sna -s`
2. Check that the token-ring link stations are either active or starting on the RS/6000 systems.
   - `sna -d l`
3. Start AnyNet on both RS/6000s
   - `sna -s anynet`
4. Use ping from both endpoints to make sure the routing tables are correct. Keep in mind that ping uses a different protocol (ICMP) from the Web traffic (TCP). If ping is successful but you can not successfully communicate between the Web server and browser, check the firewall filters to ensure they are set up correctly for both types of traffic.

6.1.5.2 Check the Route Tables on All Systems

Correct IP routing tables are the key to success in an AnyNet environment. The IP table displays for each platform are shown in the figures below.

```
OS2 C:\>netstat -r

  destination         router          netmask   refcnt   use  flags  snmp intrf
                                                                      metric
     9.24.104.0   192.168.252.1   255.255.255.0    0        0  UG       0  lan0
  192.168.210.0   192.168.252.1   255.255.255.0    0        0  UG       0  lan0
  192.168.252.0   192.168.252.2   255.255.255.0    0        0  U        0  lan0

OS2 C:\>
```

Figure 127. TCP/IP Routing Tables on the OS/2 Client

```
rs60007:/ # netstat -rn
Routing tables
Destination      Gateway           Flags     Refs     Use  PMTU  Netif Expire
Netmasks:
(0) 0 ff00
(0) 0 ffff
(0) 0 ffff ff00

Route Tree for Protocol Family 2:
192.168.252      192.168.252.1     U          44    66853     -    tr0   -
127              127.0.0.1         U           4      134     -    lo0   -
127.127          127.127.0.2       U           1      244     -    gw0   -
192.168.210      192.168.210.11    U           1      214     -   sna0   -
9.24.104         192.168.210.14    UG          0     2343     -   sna0   -
rs60007:/ #
```

Figure 128. Routing Tables on RS60007

```
rs600014:/# netstat -rn
Routing tables
Destination      Gateway           Flags     Refs     Use  PMTU  Netif Expire
Netmasks:
(0) 0 ff00
(0) 0 ffff
(0) 0 ffff ff00

Route Tree for Protocol Family 2:
default          9.24.104.1        UG          0       35     -    tr0   -
9.24.104         9.24.104.191      U           7     7075     -    tr0   -
127              127.0.0.1         U           3      844     -    lo0   -
127.127          127.127.0.2       U           1      116     -    gw0   -
192.168.210      192.168.210.14    U           2       82     -   sna0   -
192.168.252      192.168.210.11    UG          1      108     -   sna0   -
rs600014:/
```

Figure 129. Routing Tables on RS600014

```
OS2 C:\>netstat -r

    destination          router   refcnt       use   flags   snmp   intrf
                                                             metric
  192.168.252.0    9.24.104.191       0      2239    U       -1   lan0
  192.168.210.0    9.24.104.191       0       105    U       -1   lan0
        9.0.0.0     9.24.104.1        0     45079    U       -1   lan0
        default     9.24.104.1        0     31666    U       -1   lan0
     9.24.104.0     9.24.104.36       1     93883    U       -1   lan0
```

Figure 130. Routing Tables on Notes Domino Server

6.1.5.3 Test Cascaded Gateways

If the firewall has been set up to allow pings, you should now be able to ping every TCP/IP address from every system. The Web server in the non-secure network should be reachable from the Web browser in the secure network.

6.2 Scenario 6: OS/2 Web Browser to MVS Web Server via AIX Sockets over SNA Gateways and Firewall

Scenario 6 illustrates Internet access across back-to-back Sockets over SNA gateways with a TCP/IP network between the two. In addition to the gateway configuration this scenario introduces ESCON MPC channel connectivity for CS/AIX and Sockets over SNA configuration in the OS/2 Access Feature. This scenario includes the following products and connectivity:

- Web products:
  - Netscape on OS/2
  - OS/390 Internet Connection Secure Server
- Network products:
  - OS/2 Access Feature Sockets over SNA
  - CS/AIX Sockets over SNA gateway
  - MVS Sockets over SNA
  - AIX firewall
- Network connectivity:
  - AnyNet algorithmic mapping
  - CS/AIX SNA over MPC ESCON channel to host
  - CS/AIX SNA over token-ring
  - AIX TCP/IP over token-ring
  - OS/2 SNA over token-ring

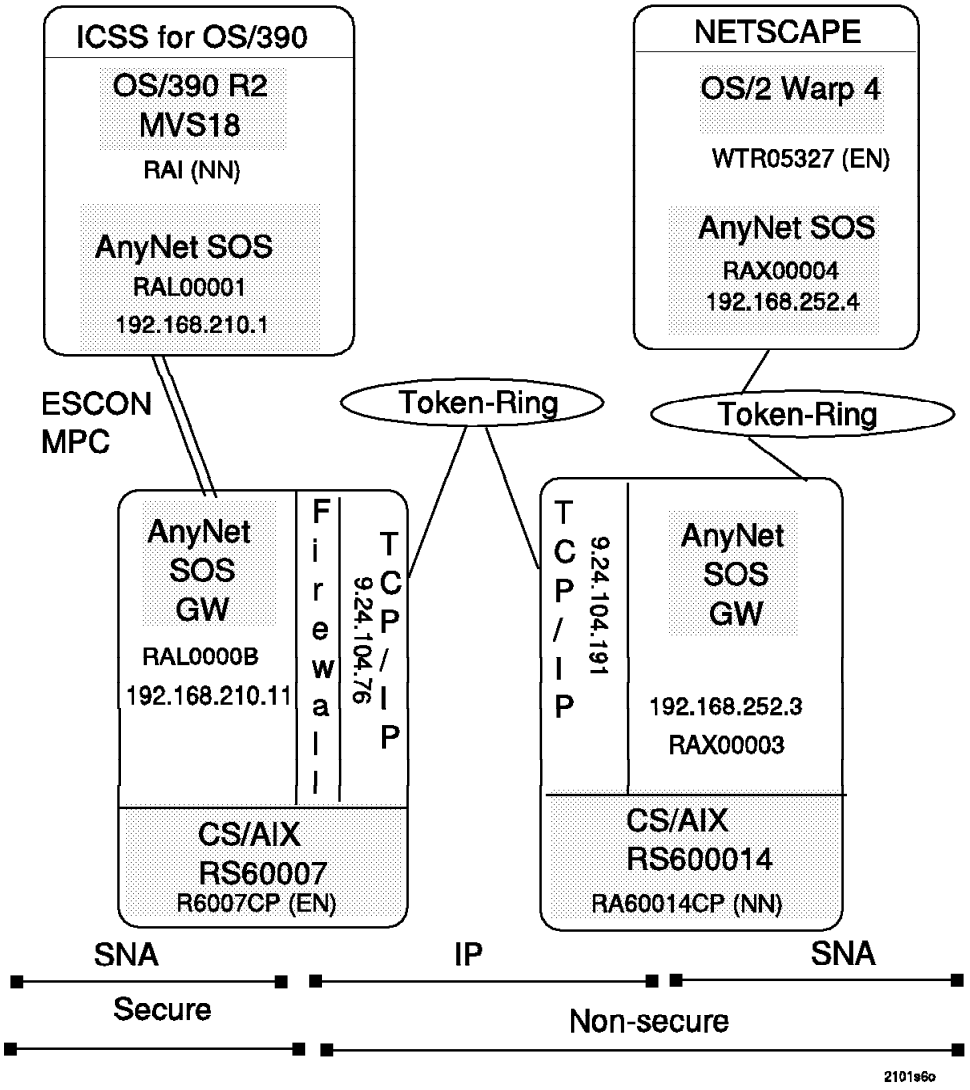


Figure 131. Scenario 6

Figure 132 on page 115 shows the overview of the IP-LU mapping and IP routing for this scenario. The algorithmic IP-LU mapping used in this scenario maps addresses in the 192.168.210 network to LU names beginning with ″RAL″. The addresses in the 192.168.252 network map to LU names beginning with ″RAX″.

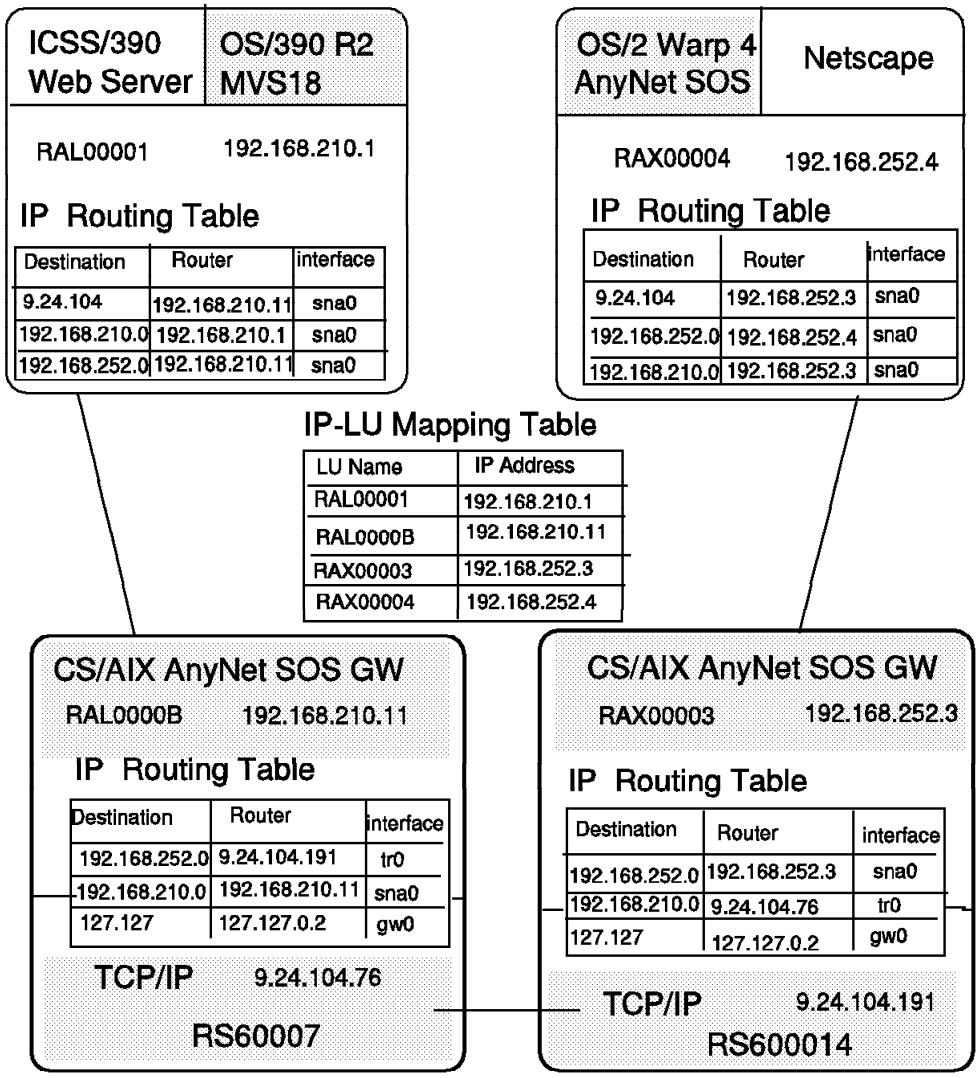


Figure 132. Scenario 6 IP Overview

6.2.1 OS/2 Definitions

The OS/2 Access Feature provides the AnyNet Sockets over SNA access node function for the OS/2 platform. OS/2 Access Feature is shipped as a component of Communication Server for OS/2 and with Personal Communication/3270 (PCOMM/3270). In addition, Communication Server for OS/2 can also function as a Sockets over SNA gateway. In this scenario, the OS/2 system is running PCOMM/3270 with the OS/2 Access Feature. The AnyNet access node is the only Sockets over SNA function available, since Communication Server for OS/2 is not installed.

The following figures illustrate how to configure OS/2 Access Feature as an AnyNet access node.

Entering `CMSETUP` from an OS/2 window will open the Communication Server configuration dialog. After clicking the **Setup** option and choosing to edit or create a configuration, you will see the panel in Figure 133 on page 116. The

Sockets option at the top is the first thing to choose to configure an AnyNet node.

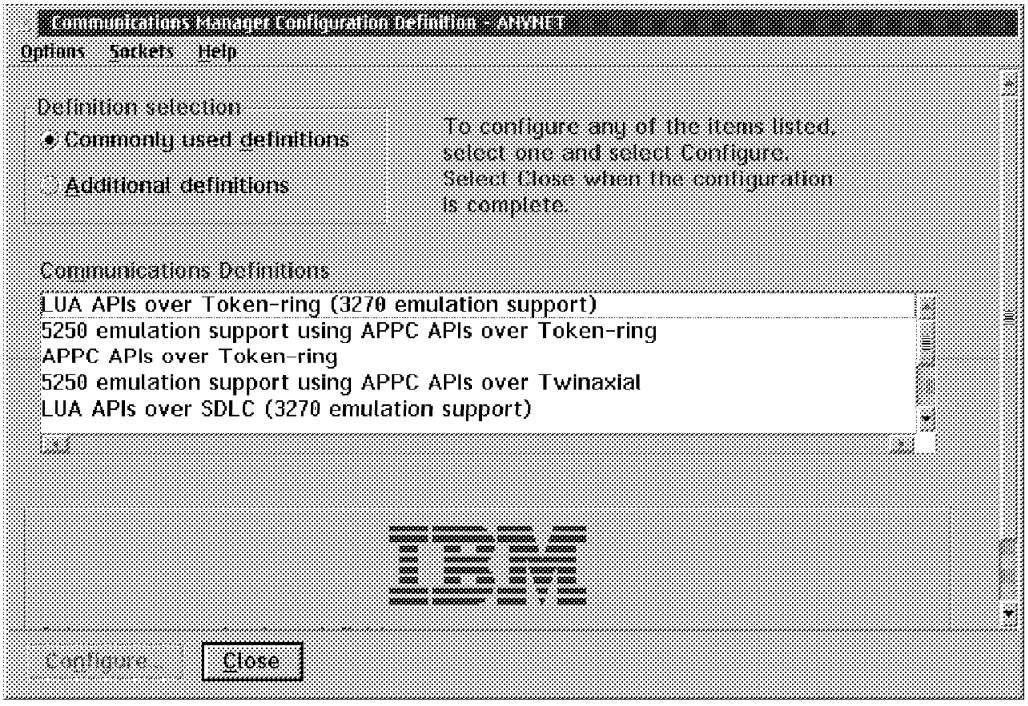


Figure 133. Communication Server for OS/2 Initial Configuration Panel

Clicking on **Sockets** and then **Configure** at the top of the screen takes you to the next panel. This is a where you define the basic information for this AnyNet node. Our home IP address for this scenario is 192.168.252.4.

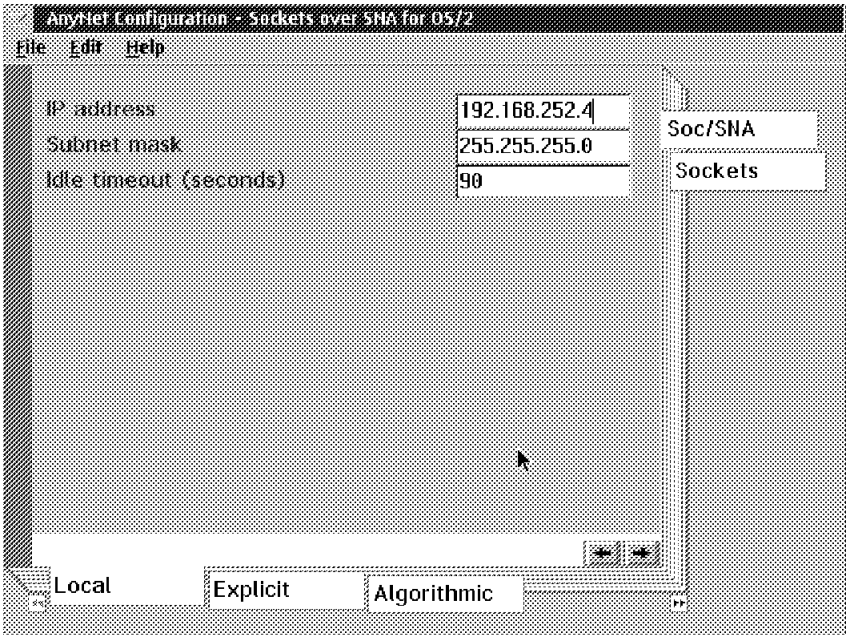


Figure 134. Sockets Local Parameters

The next required profile is the IP address to LU mappings. We chose to use algorithmic mappings. The LU names for addresses in the 192.168.252 network will be created by an internal AnyNet algorithm combined with the prefix ″RAX″.

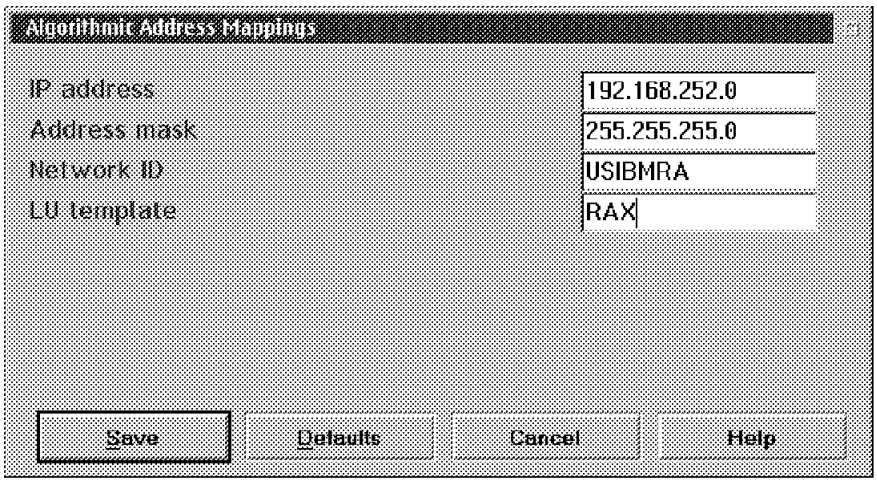


Figure 135. IP Address to LU Mapping

In addition to the required profiles, we needed to define a static route to the 192.168.210 network to make this scenario work. This can be seen in Figure 136.

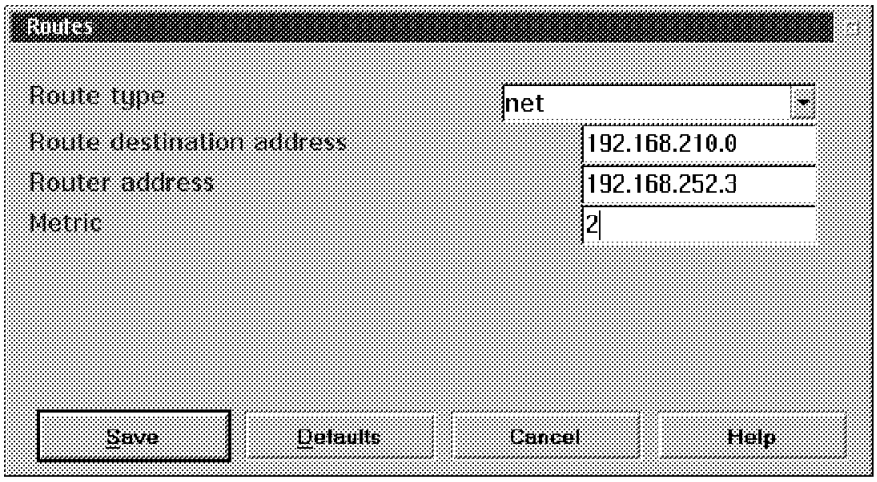


Figure 136. Sockets over SNA Routes

To define the local LU we went back to the initial Communication Server configuration screen (Figure 133 on page 116) and chose the **APPC API over Token-Ring Configuration** option.

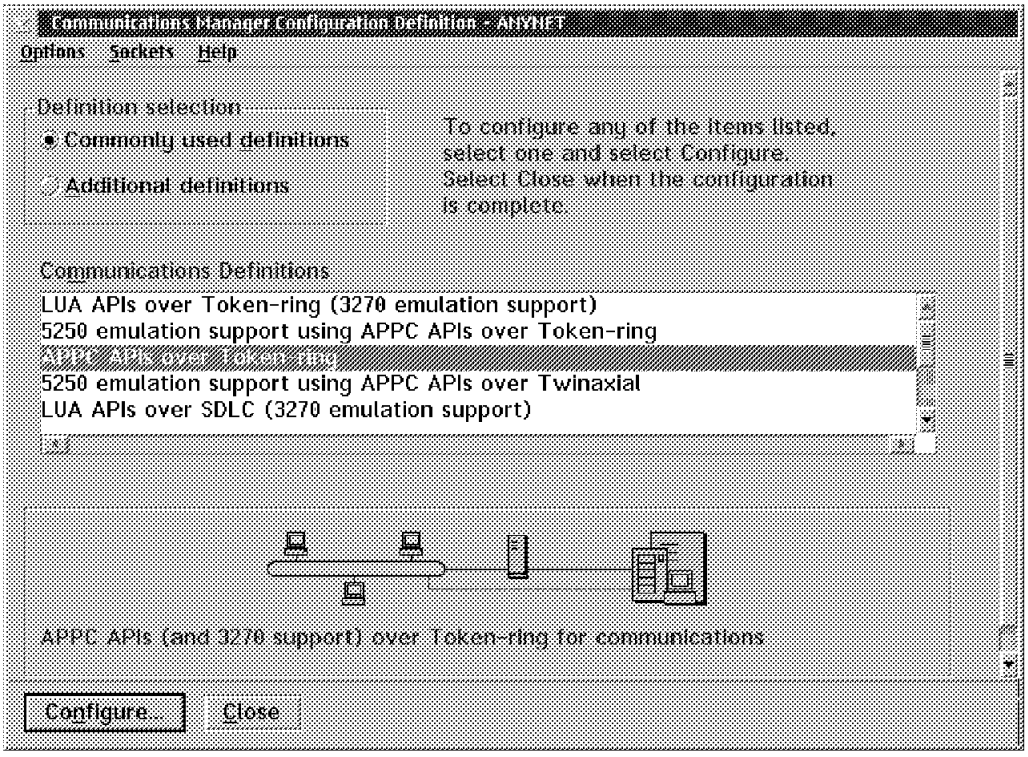


Figure 137. Communication Manager Initial Panel

This is where we define the local CP name, the APPN node type (end node in this case), and the network address of the network node server for this end node.

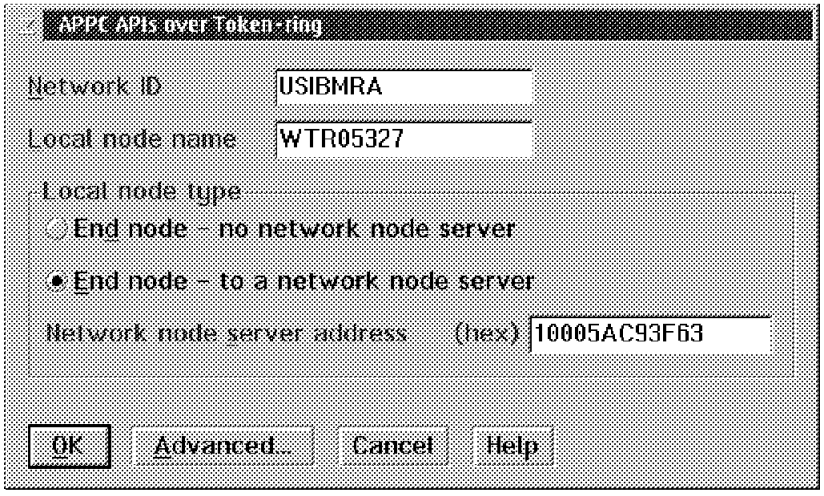


Figure 138. Communication Server APPC API over Token-Ring Configuration

The network node server address we specified is the burnt-in address of the token-ring adapter on RS600014. When this profile is started, OS/2 Access Feature will initiate a CP-CP session with RS600014 over this link.

Communication Server for OS/2 also gives you the ability to define logmodes and to change the logmodes associated with this LU. By clicking on the **Advanced** button you can create or change SNA features including modes.

We named our OS/2 AnyNet profile ANYNET6. Entering CMSTART ANYNET6 from an OS/2 window will start this profile. You will notice that a new window called SX.EXE will open.

OS/2 Access Feature provides an administration folder that provides several options for displaying information about SNA. By selecting the **Subsystem Management** option and clicking on **Details** you you can display LU 6.2 sessions. After starting the AnyNet profile you should see the CP-CP session with RS600014 active.

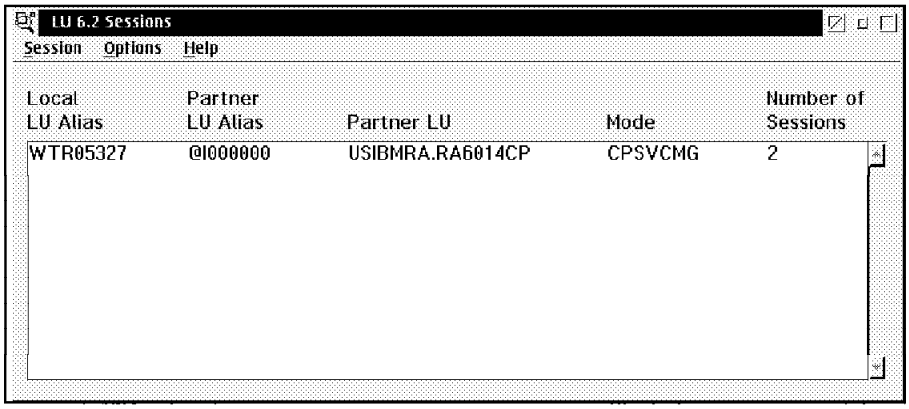


Figure 139. OS/2 LU 6.2 CP-CP Sessions

6.2.2 RS600014 Definitions

RS600014 provides the AnyNet Sockets over SNA gateway function.

6.2.2.1 Control Point Configuration

In this scenario we defined RS600014 as an APPN network node with a CP name of RA6014CP. It will be providing the network node functions for the OS/2 end node.

```
                    Change/Show Control Point Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                        node_cp
  XID node ID                                        [*]
* Network name                                       [USIBMRA]
* Control Point (CP) name                            [RA6014CP]
  Control Point alias                                [RA6014CP]
  Control Point type                                 appn_network_node
  Maximum number of cached routing trees             [500]
  Maximum number of nodes in the TRS database        [500]
  Route addition resistance                          [128]

  Comments                                           []




F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 140. CS/AIX Control Point Profile for RS600014

6.2.2.2 SNA Link Configuration

The token-ring DLC and dynamic listening link station were defined as described in 5.1.2.2, “CS/AIX Token-Ring Dynamic Listening Link Station” on page 78. The dynamic listening link station is called @tok2.4 because we used the tok2 token-ring device.

6.2.2.3 CS/AIX AnyNet Configuration

The Sockets over SNA minimum configuration profile for RS600014 is shown in Figure 141 on page 121. Algorithmic IP-LU address mapping is used. The address for this node is 192.168.252.3 and maps to LU name RAX00003.

```
                        Add a Minimum Configuration Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                          [Entry Field
* Profile name                                          [rs14]

  Local information (required):
*    IP address                                        [192.168.252.3]
*    Subnet mask                                       [255.255.255.0]
*    Mode name                                         [SNACKETS]
     Maximum send buffer size                          [8300]
     Datagram conversation timeout                     [90]
     Connection start timeout                          [90]

  LU mapping information (required):
     LU name template                                  [RAX]
     LU mapping mask                                   [255.255.255.0]

  Comments                                             []


F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 141. AnyNet Minimum Configuration Profile for RS600014

If you wish to change the logmode name you can do this here. You may want to keep the name but change the characteristics. See 4.1.1.3, “CS/AIX AnyNet Configuration” on page 26 for more discussion on this.

The Local LU 6.2 profile will be defined automatically for RAX00003. You may see this profile by using the `smit_snalocalu6ch` command.

6.2.2.4 Define the Token-Ring TCP/IP Network Interface

A token-ring TCP/IP network interface is defined by using the Minimum Configuration & Startup smit panel if this is the first native TCP/IP network interface on the system. Otherwise, the TCP/IP communication Add a Network Interface menu is used to add the token-ring network interface tr0.

```
                        Minimum Configuration & Startup

 To Delete existing configuration data, please use Further Configuration

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* HOSTNAME                                             [rs600014]
* Internet ADDRESS (dotted decimal)                    [9.24.104.191]
  Network MASK (dotted decimal)                        [255.255.255.0]
* Network INTERFACE                                     tr0
  NAMESERVER
           Internet ADDRESS (dotted decimal)           []
           DOMAIN Name                                 []
  Default GATEWAY Address                              []
  (dotted decimal or symbolic name)
  RING Speed                                           [4]
  START Now                                             no



F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 142. TCP/IP Token-Ring Network Interface for RS600014

6.2.2.5 TCP/IP Routing

The IP-router function is started with the command `no -o ipforwarding=1` to enable the gateway function.

We added a static route for the 192.168.210 network so traffic destined for it would be sent to the gateway (9.24.104.76). To do this we used the following command:

```
route add -net 192.168.210 9.24.104.76
```

6.2.3 RS60007 Definitions

RS60007 also provided AnyNet Sockets over SNA gateway functions and an Internet firewall.

6.2.3.1 Control Point Configuration

In this case we defined RS60007 as APPN end node. The MVS node will be providing the network node functions. The CP name is R6007CP.

```
                    Change/Show Control Point Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                        node_cp
  XID node ID                                        [*]
* Network name                                       [USIBMRA]
* Control Point (CP) name                            [R6007CP]
  Control Point alias                                [R6007CP]
  Control Point type                                  appn_end_node
  Maximum number of cached routing trees             [500]
  Maximum number of nodes in the TRS database        [500]
  Route addition resistance                          [128]

  Comments                                           []



F1=Help           F2=Refresh        F3=Cancel         F4=List
F5=Reset          F6=Command        F7=Edit           F8=Image
F9=Shell          F10=Exit          Enter=Do
```

Figure 143. CS/AIX Control Point Profile for RS60007

6.2.3.2 SNA MPC Channel Link Configuration

Communication Server for AIX 4.2 supports multipath channel (MPC) connectivity to the host over ESCON channels. MPC uses separate subchannels for reading and writing data and is not limited by IOBUF size. Frames are 4KB and may be blocked together. This gives a significant performance improvement over CDLC channel connections. Figure 144 shows the MPC configuration used for this scenario.

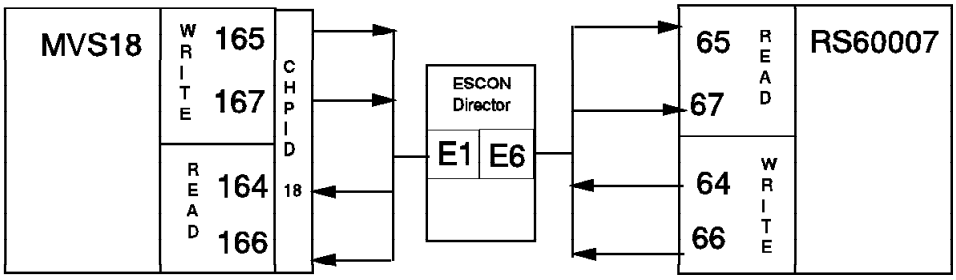


Figure 144. Scenario 6 MPC Channel Connection Overview

The ESCON channel definition panels can be reached by using the fastpath command `smit esca`.

Subchannel definitions must be added for each subchannel address used by the MPC link.

```
                                Add a Subchannel

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Subchannel Set Name                                 1 [mpc164]
* Address (local)                                     2 [064]
  Description (max 30 chars)                          []
* Address (remote)                                    3 [064]
  Number of addresses in the group                    [1]
  Path through the Fiber
     Host CHPID ESCD Port                             4 [E1]
     Virtual Control Unit (CUADD)                     5 [1]
  Perform a device-end on startup?                    6 [no]
  Local Name (Workstation)                            []
  Remote Name (390 Host)                              7 [RA6KMPC]
* Type of emulation                                   8 [MPC]



F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 145. ESCON Subchannel Definitions on RS60007

1 Later, when the MPC group is defined the subchannel profile name will be used to specify which addresses to use for read and write.

2 The subchannel addresses we are using are 64, 65, 66, and 67. Since we did not use contiguous numbers for the read and for the write subchannels (that is, the read subchannels are 65 and 67) we needed separate profiles for each address.

3 The host subchannel address is also 64. The host subchannels are defined in the IOCP with the UNITADD parameter. In our case we have a range of 32 subchannel addresses available starting with subchannel address 60 (Figure 155 on page 132).

4 E1 is the 9032 port of the ESCON connection to the host.

5 The CUADD parameter must match the CUADD parameter in the host IOCP (Figure 155 on page 132).

6 For SNA you must specify ″no″ in this field.

7 This does not need to match the PU name defined in VTAM. We only did this for convenience.

8 Set this field to ″MPC″.

Repeat the subchannel definition for subchannels 65, 66 and 67.

After adding the subchannels with the previous panel, view the subchannel table by choosing the **Show Subchannel Status** option.

```
                              COMMAND STATUS

Command: OK            stdout: yes           stderr: no

Before command completion, additional instructions may appear below.

Subchannel        System Name     Address             Path
Set Name        Local    Remote   Lc Rm Gr Type      Port-Vcu
----------------------------------------------------------------
mpc164                   RA6KMPC  64 64 1  MPC        E1 - 1
mpc165                   RA6KMPC  65 65 1  MPC        E1 - 1
mpc166                   RA6KMPC  66 66 1  MPC        E1 - 1
mpc167                   RA6KMPC  67 67 1  MPC        E1 - 1










F1=Help            F2=Refresh          F3=Cancel           F6=Command
F8=Image           F9=Shell            F10=Exit            /=Find
n=Find Next
```

Figure 146. Subchannel Status

Next, a fiber definition profile must be added. You will have to enter the slot number of the physical ESCON adapter position in the RS/6000 system in the upcoming fiber definition profile. If you are not sure about the location number, check it first. The diagnostic and RAS functions have an option to show all the defined ESCON channel adapters. If you are not already in the ESCON channel adapter SMIT dialog you can use the `smit escals` command to get to this display.

```
                              COMMAND STATUS

Command: OK            stdout: yes           stderr: no

Before command completion, additional instructions may appear below.

ESCON Channel Adapters
------------------------------------------------------------------------
Physical                     Virtual
Name      Location Status    Name    Description
------------------------------------------------------------------------
escon0    00-05    Available esca0   ESCON Adapter(Control Unit Image)
             1









F1=Help            F2=Refresh          F3=Cancel           F6=Command
F8=Image           F9=Shell            F10=Exit            /=Find
n=Find Next
```

Figure 147. ESCON Channel Adapter Display

1 The ESCON adapter is in slot 5.

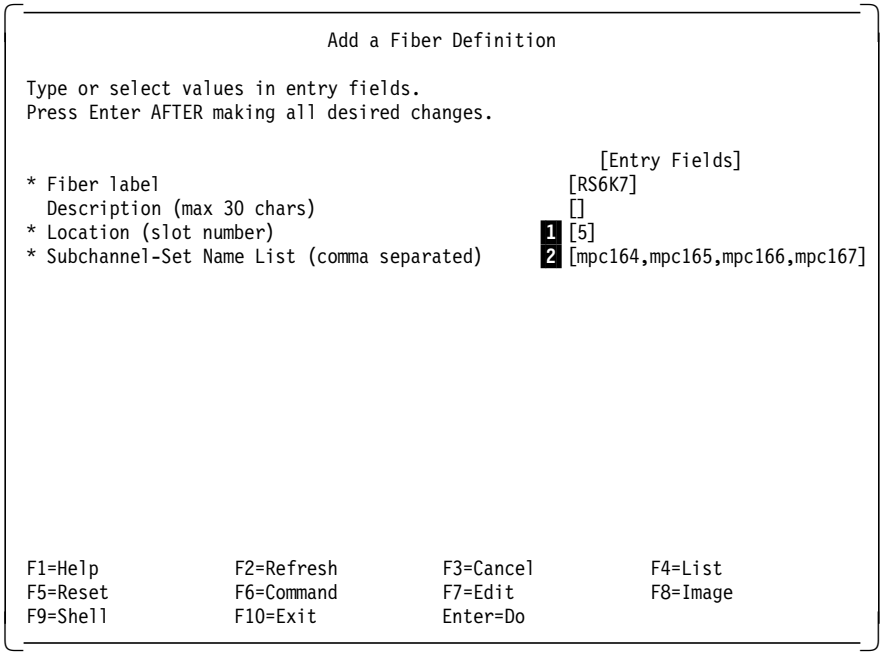


Figure 148. ESCON Fiber Definition

1 Slot 5 was found in the previous display.

2 List the subchannel profiles created in step 1.

You may see the ESCON adapter in a ″defined″ state in the ODM device configuration database. The ESCON adapter only becomes ″available″ after you have finished the subchannel definition and the system is rebooted or the configuration manager is started. Either run the command `cfgmgr`, or reboot the system.

To see if the ESCON adapter is online check the ESCON Channel Adapter RAS indicators. The fastpath to this display is `smit escalsRASescon`.

```
                                COMMAND STATUS

Command: OK            stdout: yes           stderr: no

Before command completion, additional instructions may appear below.

Adapter         microcode  ESCON      |        ESCON error counts
Name   State   type ready status      |   Crc    Light  Timeout   Bit
-------------------------------------------------------------------------
escon0 Online  func Yes   Sync               0       0       0       0


Adapter|           local node ID            |           remote node ID
Name   | type model     serial number  tag | type model     serial number  tag
-------------------------------------------------------------------------------
escon0   7013  52H IBM 26-000000001940 0005 009032 002 IBM 02-000000010776 00E6




F1=Help             F2=Refresh          F3=Cancel           F6=Command
F8=Image            F9=Shell            F10=Exit            /=Find
n=Find Next
```

Figure 149. ESCON Channel Adapter RAS Indicators

The RAS display shows the status of the channel, error counts, and the type, model, and serial number of what is connected at the other end. The remote node in this case is a 9032 ESCON director. The tag field shows the 9032 port number. The state can be either sync or a loss of light state.

Define the MPC group next.

```
                                Add an MPC Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* MPC Group Name                                     [sna]
  Description (max 30 chars)                        []
* Inbound Subchannels                              1 [mpc165 mpc167]
* Outbound Subchannels                             2 [mpc164 mpc166]









F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 150. MPC Group Definition

1 Enter the subchannel profile names for the addresses that will be the ″read″ subchannels. These must be defined for ″write″ on the host end.

2 Enter the subchannel profile names for the addresses that will be the ″write″ subchannels. These must be defined for ″read″ on the host end.

After adding, deleting, or changing an MPC Group definition, the MPC driver must be reloaded before the changes will take effect. To reload the driver, select **Reload MPC Device Driver** from the main MPC smit menu.

Once the ESCON channel is defined, a DLC and link station must be defined to CS/AIX (`smit sna`). Figure 151 shows the CS/AIX channel DLC profile.

```
                          Add Channel SNA DLC Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       [mpc0]
  Channel device type                              1  mpc
  Force disconnect time-out (1-600 seconds)          [600]
  User-defined maximum I-Field size?                  no
     If yes, Max. I-Field size (265-4096)            [4096]

  Link Recovery Parameters
     Retry interval (1-10000 seconds)                [60]
     Retry limit (0-500 attempts)                    [0]

  Comments                                           []




F1=Help             F2=Refresh          F3=Cancel           F4=List
F5=Reset            F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 151. ESCON Channel SNA DLC Profile

1 Specify the channel device type as MPC.

Figure 152 on page 129 shows the CS/AIX link station profile for the ESCON channel.

```
                        Add Channel Link Station Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                                [Entry Fields]
* Profile name                                                 [rs6kmpc]
  Use Control Point's XID node ID?                             yes
     If no, XID node ID                                        [*]
* SNA DLC Profile name                                       1 [mpc0]
* Subchannel or MPC Group name                               2 [sna]
  Stop link station on inactivity?                             no
     If yes, Inactivity time-out (0-10 minutes)                [0]
  LU address registration?                                     no
     If yes,
        LU Address Registration Profile name                   []
  Trace link?                                                  no
     If yes, Trace size                                        long
  High performance routing (HPR) supported?                    yes

  Adjacent Node Identification Parameters
     Verify adjacent node?                                     no
     Network ID of adjacent node                               []
     CP name of adjacent node                                  []
     XID node ID of adjacent node (LEN node only)              [*]
     Node type of adjacent node                                learn

  Link Activation Parameters
     Solicit SSCP sessions?                                  3 no
     Activate link station at SNA start up?                    yes
     Activate on demand?                                       no
     CP-CP sessions supported?                               3 yes
     If yes,
        Adjacent network node preferred server?                no
     Partner required to support CP-CP sessions?               no
     Initial TG number (0-20)                                  [0]

  Restart Parameters
     Restart on normal deactivation?                           yes
     Restart on abnormal deactivation?                         yes

  Transmission Group COS Characteristics
     Effective capacity                                        [39321600]
     Cost per connect time                                     [128]
     Cost per byte                                             [128]
     Security                                                  nonsecure
     Propagation delay                                         minimum
     User-defined 1                                            [128]
     User-defined 2                                            [128]
     User-defined 3                                            [128]

  Comments                                                     []

F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 152. ESCON Channel SNA Link Station Profile

1 Relate this link station profile to the DLC profile just created in Figure 151 on page 128.

2 Relate this link station profile to the MPC group defined in Figure 150 on page 127.

3 For MPC link stations only one of these fields can be set to yes. If you are supporting dependent LUs you should set the Solicit SSCP sessions field to ″yes″.

6.2.3.3 CS/AIX AnyNet Configuration

The Sockets over SNA minimum configuration profile for RS60007 is shown in Figure 153. The profile defines this node as address 192.168.210.11. Using the algorithmic mapping defined, this translates in to LU name RAL0000B.

```
                    Add a Minimum Configuration Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Field
* Profile name                                        [rs7]

  Local information (required):
*    IP address                                      [192.168.210.11]
*    Subnet mask                                     [255.255.255.0]
*    Mode name                                       [SNACKETS]
     Maximum send buffer size                        [8300]
     Datagram conversation timeout                   [90]
     Connection start timeout                        [90]

  LU mapping information (required):
     LU name template                                [RAL]
     LU mapping mask                                 [255.255.255.0]

  Comments                                           []


F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Reset         F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 153. AnyNet Minimum Configuration Profile for RS60007

If you wish to change the logmode name you can do this here. You may want to keep the name but change the characteristics. See 4.1.1.3, “CS/AIX AnyNet Configuration” on page 26 for more discussion on this.

The Local LU 6.2 profile will be defined automatically for RAL0000B. You may see this profile by using the `smit_snalocalu6ch` command.

6.2.3.4 Define the Token-Ring TCP/IP Network Interface

We defined the TCP/IP token-ring network interface in the TCP/IP communication Minimum Configuration & Startup panel. The interface was given the IP-address 9.24.104.76 and network mask 255.255.255.0.

6.2.3.5 TCP/IP Routing

For the gateway function to work we have to activate the IP-router function with the command `no -o ipforwarding=1`.

A static route for the 192.168.252 network was added with the following command:

```
route add -net 192.168.252 9.24.104.191
```

6.2.3.6 Firewall Definitions

RS60007 acts as a firewall in this scenario, separating the Web server in the secure network from the Web browsers in the non-secure network. The installation and customization of a firewall is beyond the scope of this book. A good reference is *Building a Firewall with the IBM Internet Connection Secured*

Network Gateway. The definitions for the firewall on RS60007 were captured as smit panels and can be found in Appendix C, “Firewall Definitions” on page 209.

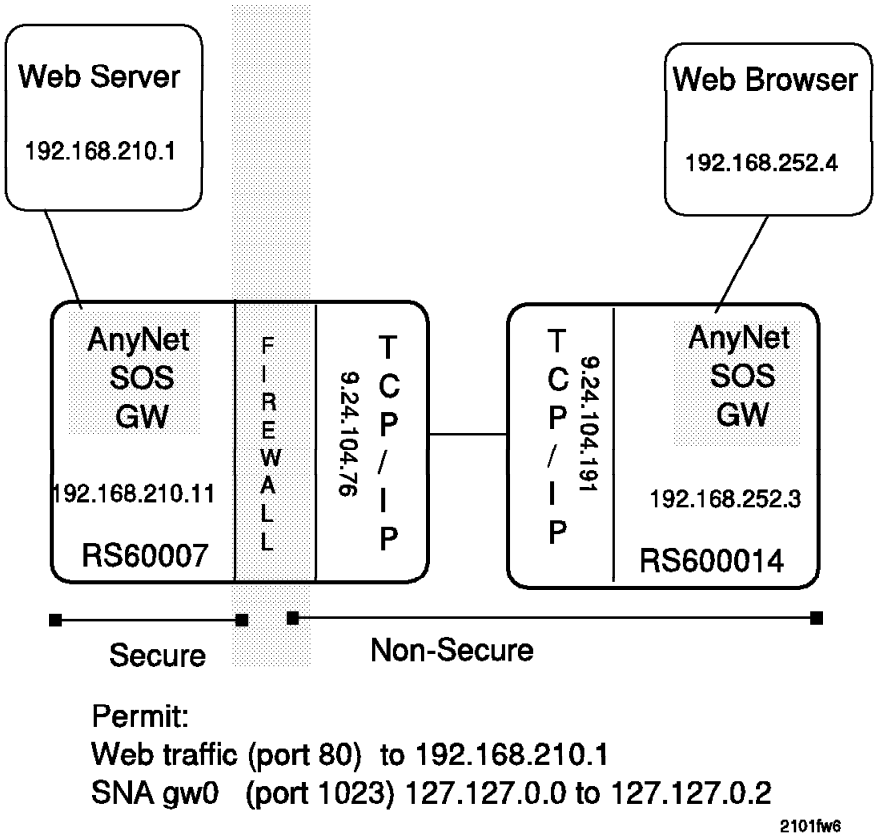


Figure 154. Firewall Overview for Scenario 6

The network interfaces for this firewall are shown in the next figure. The 127.127.0.2 definition is for the internal IP address used by the Sockets over SNA gateway.

```
127.127.0.2     Secure Interface
192.168.210.11  Secure Interface
9.24.104.76     Non-Secure Interface
```

The active filters for this configuration are shown in Appendix C, “Firewall Definitions” on page 209. In addition to the normal filters needed, a filter was needed to permit traffic for 127.127.0.2 for this configuration to work properly.

```
Rule 1:
  Rule action               : permit
  Source Address            : 127.127.0.0
  Source Mask               : 255.255.0.0
  Destination Address       : 127.127.0.2
  Destination Mask          : 255.255.255.255
  Protocol                  : tcp
  Source Port/ICMP/OSPF Type :eq  1234
  Destination Port/ICMP Code :gt  1023
  Interface                 : specific
  Routing                   : both
  Direction                 : inbound
  Logging control           :yes
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 2:
  Rule action               : permit
  Source Address            : 127.127.0.2
  Source Mask               : 255.255.255.255
  Destination Address       : 127.127.0.0
  Destination Mask          : 255.255.0.0
  Protocol                  : tcp/ack
  Source Port/ICMP/OSPF Type :gt  1023
  Destination Port/ICMP Code :eq  1234
  Interface                 : specific
  Routing                   : both
  Direction                 : outbound
  Logging control           :yes
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

6.2.4 MVS Definitions

The MVS system provided an ICSS for OS/390 Web server. The details of the MVS AnyNet setup are covered in Chapter 9, “AnyNet MVS Setup for AnyNet Scenarios” on page 165. ICSS for OS/390 is discussed in Chapter 8, “MVS Web Server Setup for AnyNet Scenarios” on page 161.

The SNA connection to RS60007 an ESCON MPC connection. Figure 155 shows the IOCP definitions used on a 9121-480 running VM with the MVS system as a guest. The host and RS6000 are connected over ESCON running through a 9032 ESCON director. Note that if you have run SNA over ESCON channels previously, this will look different from the definitions you were using. IOCP definitions for SNA connections prior to MPC used a UNIT type of 3791L. The UNIT type to specify for MPC is 3088.

```
         CHPID PATH=((18)),TYPE=CNC,SWITCH=E1
*
         CNTLUNIT CUNUMBR=160,UNIT=3088 1 ,PATH=(18) 2 ,
               CUADD=1 3 ,LINK=(E6) 4 ,UNITADD=((60,32) 5 )
DEV160   IODEVICE UNIT=3088,ADDRESS=(160,32) 6 ,CUNUMBR=(160)
*
```

Figure 155. IOCP Definitions for the ESCON MPC Channel Connection

1 UNIT=3088 is specified for MPC connections.

2 The fiber to the 9032 director is connected to host CHPID 18.

3 CUADD specifies a virtual control unit image on the AIX workstation. It must match the CUADD parameter in the AIX ESCON subchannel definitions (Figure 145 on page 124).

4 E6 is the 9032 port the fiber from the RS6000 is connected to.

5 The UNITADD parameter specifies a range of subchannel addresses defined with this definition. This CNTLUNIT entry defines 32 subchannel addresses starting with 60.

6 The device macro assigns host addresses to the subchannel range specified in the CNTLUNIT macro. This system uses address 160 for subchannel 60, 161 for subchannel 61, and so on.

In our environment we are running MVS guests under VM. The IOCP and the MVS HCD are maintained separately. Figure 156 shows the HCD definitions for the MPC ESCON channel at address 164. There are HCD device definitions for each address we use (164-167).

```
                View Device Parameter / Feature Definition
Command ===> ____________________________________________

Configuration ID . : ESCON
Device number  . . : 0164           Device type  . . . : SCTC
Generic / VM device type  . . . . : SCTC

ENTER to continue.

Parameter/  Value    Req.  Description
Feature
OFFLINE     No             Device considered online or offline at IPL
DYNAMIC     No             Device has been defined to be dynamic
LOCANY                     UCB can reside in 31 bit storage
```

Figure 156. HCD definitions for the ESCON MPC Channel Connection

An MVS missing interrupt handler entry must be added for each MPC address to prevent reads from timing out on the channel. Figure 157 shows the missing interrupt handler entries for these addresses in IECIOSxx in SYS1.PARMLIB.

```
MIH TIME=00:00,DEV=(164-165)                                    00022101
MIH TIME=00:00,DEV=(166-167)                                    00022201
```

Figure 157. MVS Missing Interrupt Handler

To run an MPC connection with VTAM, you must define a local major node and a transport resource list (TRLE) definition.

```
RAIAHHC VBUILD  TYPE=TRL
RA6K7CA [1] TRLE   LNCTL=MPC,                                  *
              READ=(164,166), [2]                              *
              WRITE=(165,167),                                 *
              MAXBFRU=9,      [3]                              *
              REPLYTO=3.0     [4]
```

Figure 158. VTAM Definitions for the ESCON MPC Channel Connection

1 This must match the TRLE name specified in the PU macro for the connection (see Figure 159).

2 Verify that the channel addresses you are reading from in VTAM are the addresses you are writing from in AIX.

3 MAXBFRU specifies the number of 4 KB buffer pages VTAM uses to receive data. The total buffer space used is:

```
MAXBFRU x 4K x number of read subchannels
```

The range for MAXBFRU is 1-16. The VTAM TNSTAT start option can be used to get statistics useful for determining how to tune this.

4 REPLYTO specifies how long VTAM waits for completion of an MPC XID I/O operation. If this timeout expires, a message is written indicating a timeout has occurred. After the XID completes, REPLYTO has no meaning.

```
RA6KLOC VBUILD TYPE=LOCAL
RA6KMPC  PU    TRLE=RA6K7CA, [1]                          * X
               XID=YES,                                   * X
               CONNTYPE=APPN,                               *
               DELAY=0.00,                                * X
               CPCP=YES
**
**
```

Figure 159. VTAM Definitions for the ESCON MPC Channel Connection

1 This must match the TRLE name in the TRL major node.

6.2.5 Start and Test Scenario 6

After setting up the scenario it can be tested by verifying the network connections, checking the IP routing, using ping to test the route, and finally by accessing the Web server from the Web browser.

6.2.5.1 RS600014 and RS60007

After changing CS/AIX you must verify the SNA configuration and start the SNA subsystem:

```
verifysna -U
sna -s
```

Checking the active link stations on both RS/6000s shows the MPC link station active on RS60007 and the @tok2.4 link station active on RS600014. If the other end of the communication links are not active yet, the links will show a starting status. They will become active once the VTAM and OS/2 links are activated. To check the active link stations enter:

```
sna -d l
```

```
rs60007:/ # sna -d l
    Link           Adjacent      Node    Device            # of local  In
   station         CP name       type     name      State    sessions   use
-------------- ----------------- ----- --------- ---------- ---------- -----
rs6kmpc        USIBMRA.RAI       NN    mpc       Active              5 Yes

rs60007:/ #
```

Figure 160. RS60007 Link Station Display

```
rs600014:/ # sna -d l
    Link           Adjacent      Node    Device            # of local  In
   station         CP name       type     name      State    sessions   use
-------------- ----------------- ----- --------- ---------- ---------- -----
@tok2.4[4]      USIBMRA.WTR05327  EN    tok2      Active        2 Yes

rs600014:/ #
```

Figure 161. RS600014 Link Station Display

AnyNet was started on both RS/6000s with the following command:

```
sna -s anynet
```

A display of the routing tables on both RS/6000 systems shows the necessary routing is in place. AnyNet has added the sna0 and gw0 interfaces.

```
rs600014:/# netstat -rn
Routing tables
Destination      Gateway           Flags     Refs     Use  PMTU  Netif Expire
Netmasks:
(0) 0 ff00
(0) 0 ffff
(0) 0 ffff ff00

Route Tree for Protocol Family 2:
9.24.104         9.24.104.191      U           6     2367     -    tr0   -
127              127.0.0.1         U           1       30     -    lo0   -
127.127          127.127.0.2       U           1        0     -    gw0   -
192.168.252      192.168.252.3     U           1       17     -   sna0   -
192.168.210      9.24.104.76       UG          0       57     -    tr0   -
rs600014:/#
```

Figure 162. Routing Table on RS600014

```
rs60007:/# netstat -rn
Routing tables
Destination      Gateway           Flags     Refs     Use  PMTU  Netif Expire
Netmasks:
(0) 0 ff00
(0) 0 ffff
(0) 0 ffff ff00

Route Tree for Protocol Family 2:
9.24.104         9.24.104.76       U           3     1628     -    tr0   -
127              127.0.0.1         U           3     1300     -    lo0   -
127.127          127.127.0.2       U           1        0     -    gw0   -
192.168.210      192.168.210.11    U           1       21     -   sna0   -
192.168.252      9.24.104.191      UG          0        0     -    tr0   -
rs60007:/#
```

Figure 163. Routing Table on RS60007

6.2.5.2 MVS18

AnyNet runs in a separate MVS address space. The setup and initialization of AnyNet for MVS is documented in Chapter 9, “AnyNet MVS Setup for AnyNet Scenarios” on page 165.

Both the VTAM LOCAL (major node RS6KMPC) and the TRLE definitions (major node RAIAHHC) must be active. The following commands activated these nodes:

```
V NET,ACT,ID=RAIAHHC,UPDATE=ALL
V NET,ACT,ID=RS6KMPC
```

A display of the TRLE shows the subchannel address status.

```
C RAIAN    DISPLAY NET,ID=RA6K7CA,SCOPE=ALL
  RAIAN    IST097I  DISPLAY  ACCEPTED
' RAIAN
IST075I  NAME = RA6K7CA          , TYPE = TRLE
IST486I  STATUS= ACTIV     , DESIRED STATE= ACTIV
IST087I  TYPE = LEASED             , CONTROL = MPC , HPDT = NO
IST1221I  WRITE DEV = 0165 STATUS = ACTIVE     STATE = ONLINE
IST1221I  WRITE DEV = 0167 STATUS = ACTIVE     STATE = ONLINE
IST1221I  READ  DEV = 0164 STATUS = ACTIVE     STATE = ONLINE
IST1221I  READ  DEV = 0166 STATUS = ACTIVE     STATE = ONLINE
IST1500I  STATE TRACE = OFF
IST314I  END
```

Figure 164. VTAM TRLE Display

Displaying the PU defined in the local major node should show the PU is active.

```
DISPLAY NET,ID=RA6KMPC,SCOPE=ALL
IST097I  DISPLAY  ACCEPTED
IST075I  NAME = RA6KMPC          , TYPE = PU_T2.1
IST486I  STATUS= ACTIV--L--, DESIRED STATE= ACTIV
IST1043I  CP NAME = R6007CP , CP NETID = USIBMRA , DYNAMIC LU = YES
IST1589I  XNETALS = YES
IST1105I  RESOURCE STATUS TGN CP-CP TG CHARACTERISTICS
IST1106I  RA6KMPC  AC/R    21 YES   988D0000000000000000014C00808080
IST1482I  HPR = ANR  - OVERRIDE = N/A - CONNECTION = YES
IST1510I  LLERP = NOTPREF  - RECEIVED = REQUIRED
IST136I  LOCAL    SNA MAJOR NODE = RS6KMPC
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I  STATE TRACE = OFF
IST1314I  TRLE = RA6K7CA   STATUS = ACTIV       CONTROL = MPC
IST355I  LOGICAL UNITS:
IST080I  RALOOOOB ACT/S----Y R6007CP  ACT/S----Y
IST314I  END
```

Figure 165. VTAM LOCAL Display

The routing tables for MVS should be checked once AnyNet is up and running to verify that the correct routes are in place.

```
destination           gateway     refcnt        use  flags    intrf

   9.24.104.0     192.168.210.11       0            20    U      sna0
192.168.210.0      192.168.210.1       0            10    U      sna0
192.168.252.0     192.168.210.11       0            24    U      sna0
```

Figure 166. Routing Table on MVS18

The MVS AnyNet version of ping was used to verify that the OS/2 workstation could be reached. The MVS AnyNet command to ping is ISTSKPNG.

6.2.5.3 OS/2 Netscape Client

Anynet is started on OS/2 by issuing a CMSTART command and specifying the name of the profile created (ANYNET6 in our scenario).

```
CMSTART ANYNET6
```

Communication Server for OS/2 and the OS/2 Access Feature provide an administration tool that can be used to show the status of SNA and its components. Using that tool to display the active sessions we see the following window.

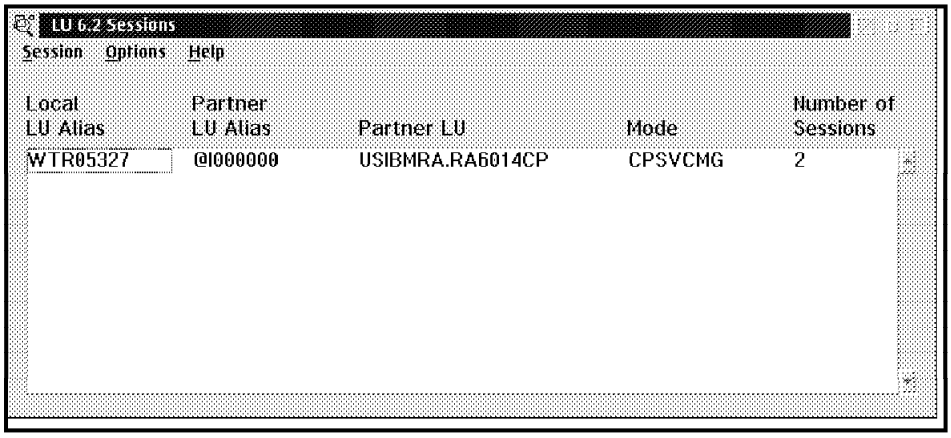


Figure 167. Session Status on OS/2

Use ping from the OS/2 machine to make sure the routing tables are correct. Keep in mind that ping uses a different protocol (ICMP) from the Web traffic (TCP, UDP). If ping is successful but you cannot successfully communicate between the Web server and browser, check the firewall filters to ensure they are set up correctly for both types of traffic.

Check the route table on the OS/2 machine to verify the routes are in place.

```
OS2 C:\>netstat -r

  destination         router          netmask   refcnt   use  flags  snmp intrf
                                                                      metric
     9.24.104.0   192.168.252.3   255.255.255.0    0      126  UG       0  sna0
  192.168.210.0   192.168.252.3   255.255.255.0    0      895  UG       0  sna0
  192.168.252.0   192.168.252.4   255.255.255.0    3       32  U        0  sna0

OS2 C:\>
```

Figure 168. OS/2 Route Table Display

6.2.5.4 Test Cascaded Gateways

We started Netscape on the OS/2 Client and entered 192.168.210.1 as the target URL. We used the OS/2 Access Feature administration tool to display the LU 6.2 sessions. This display can be seen in Figure 169 on page 138.

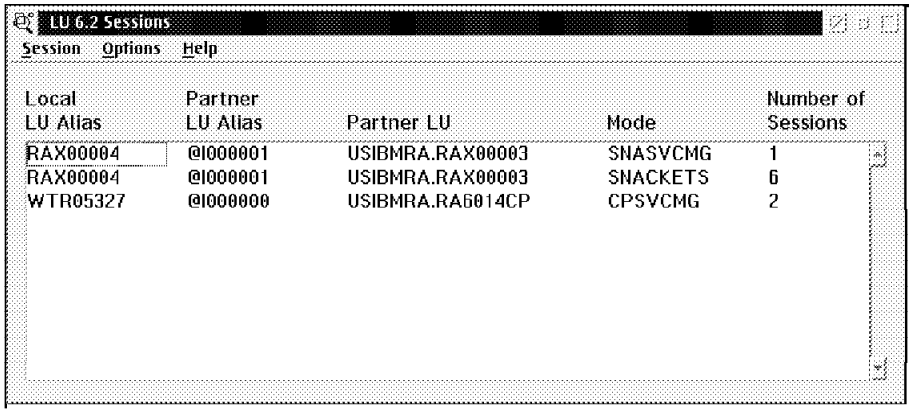


Figure 169. OS/2 Display of Active LU 6.2 Sessions

The OS/2 machine has a CP-CP connection with its network node, RA6014CP. There is also an LU 6.2 SNASVCMG session with AnyNet on RS600014 (RAX00003) and SNACKETS sessions allocated for the AnyNet traffic between the two.

The display on the host seen in Figure 170 shows the Sockets over SNA LU, RAL00001, in session with the Sockets over SNA gateway on RS60007, RAL0000B.

```
DISPLAY NET,ID=RAL00001,SCOPE=ALL
IST097I  DISPLAY  ACCEPTED
IST075I  NAME = USIBMRA.RAL00001 , TYPE = APPL
IST486I  STATUS= ACT/S     , DESIRED STATE= ACTIV
IST1447I  REGISTRATION TYPE = CDSERVR
IST977I  MDLTAB=***NA*** ASLTAB=***NA***
IST861I  MODETAB=ISTINCLM USSTAB=***NA*** LOGTAB=***NA***
IST934I  DLOGMOD=***NA*** USS LANGTAB=***NA***
IST1632I  VPACING =  7
IST597I  CAPABILITY-PLU ENABLED  ,SLU ENABLED  ,SESSION LIMIT NONE
IST231I  APPL     MAJOR NODE = RAIANYAX
IST654I  I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I  STATE TRACE = OFF
IST271I  JOBNAME = RAISOCK , STEPNAME = RAISOCK , DSPNAME = IST6ED42
IST1050I  MAXIMUM COMPRESSION LEVEL - INPUT = 0   , OUTPUT = 0
IST1633I  ASRCVLM =  1000000
IST1634I  DATA SPACE USAGE: CURRENT =          0 MAXIMUM  =        512
IST171I  ACTIVE SESSIONS = 0000000008, SESSION REQUESTS = 0000000000
IST206I  SESSIONS:
IST634I  NAME     STATUS         SID          SEND RECV VR TP NETID
IST635I  RAL0000B ACTIV-S    F86FE1644F79CCAC 000A 0000  0  0 USIBMRA
IST635I  RAL0000B ACTIV-S    F86FE1644F79CCAB 0008 0000  0  0 USIBMRA
IST635I  RAL0000B ACTIV-S    F86FE1644F79A4DD 0036 0000  0  0 USIBMRA
IST635I  RAL0000B ACTIV-P    CC974C49A37A2ECC 0000 0004  0  0 USIBMRA
IST635I  RAL0000B ACTIV-P    CC974C49A37A2ECB 0005 0001  0  0 USIBMRA
IST635I  RAL0000B ACTIV-P    CC974C49A37A2ECA 0000 0004  0  0 USIBMRA
IST635I  RAL0000B ACTIV-P    CC974C49A37A2EC9 0000 002C  0  0 USIBMRA
IST635I  RAL0000B ACTIV/SV-P CC974C49A37A2EC8 0001 0001  0  0 USIBMRA
IST314I  END
```

Figure 170. MVS VTAM Display of Active LU 6.2 Sessions

Chapter 7. IBM eNetwork Host On-Demand Examples

Host On-Demand code runs on a Web server machine with an IBM Communication Server to provide TN3270E functions. Web browsers that specify the URL of the Host On-Demand code are presented a screen that allows them to establish a host connection.

Host On-Demand functions as a standard 3270 application with a limited set of functions.

Some of the limitations are:

- A hardcoded limit of two sessions. When you open the Host On-Demand connection you have a SAME button that opens a second session. There is a limit of two sessions opened this way. However, if the Host On-Demand connection is started in a separate window, you can open more sessions by going back to the Web browser and specifying the Host On-Demand URL. This will give you a third host session, from which you can use the SAME button to get a fourth session, and so on.
- A keypad is shown at the bottom of the screens because JAVA does not yet support all the required keys.
- Restricted to fonts supported by Java. It does, however, have auto font selection.
- Support for Model 2 (25x80) only at this point in time. Future releases will support Models 3, 4 and 5.

The Host On-Demand code can be downloaded from
http://www.networking.ibm.com/eNetwork/OnDemand/hod.html.

7.1 Host On-Demand Example on Windows NT

Running Host On-Demand on Windows NT requires a Web server such as IBM′s Internet Connection Server for Windows NT, Microsoft′s Internet Information Server for Windows NT, or Lotus′ Domino. IBM Communications Server for Windows NT (hereafter referred to as ″CS/NT″) must be installed prior to starting the installation of Host On-Demand. The Web server must be running on the same machine where CS/NT and Host On-Demand are running.

7.1.1 CS/NT TN3270E Setup

Host On-Demand uses the TN3270E functions of the Communication Server to establish an LU session with the host. The following illustrates the TN3270E configuration in Communications Server for NT. The TN3270E function provides the gateway between the TCP/IP workstations and the SNA host. After opening the Communication Server configuration, a list of possible scenarios can be chosen from. In this case we want to configure the TN3270E scenario.

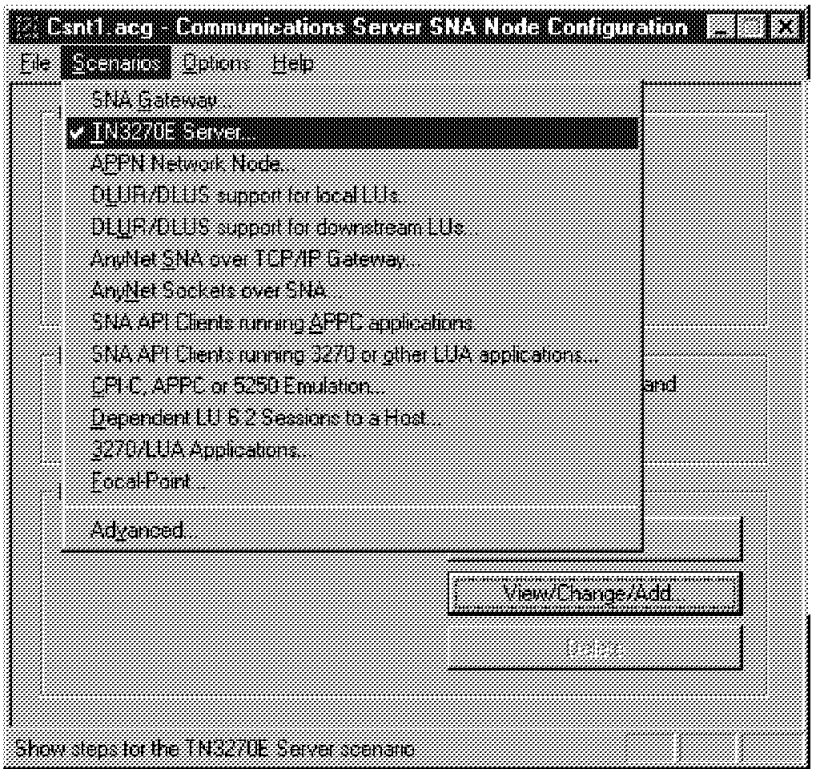


Figure 171. Communication Server for NT Initial Configuration Panel

Defining the TN3270E function requires the local node be defined, a device and link to the host, and gateway definitions.

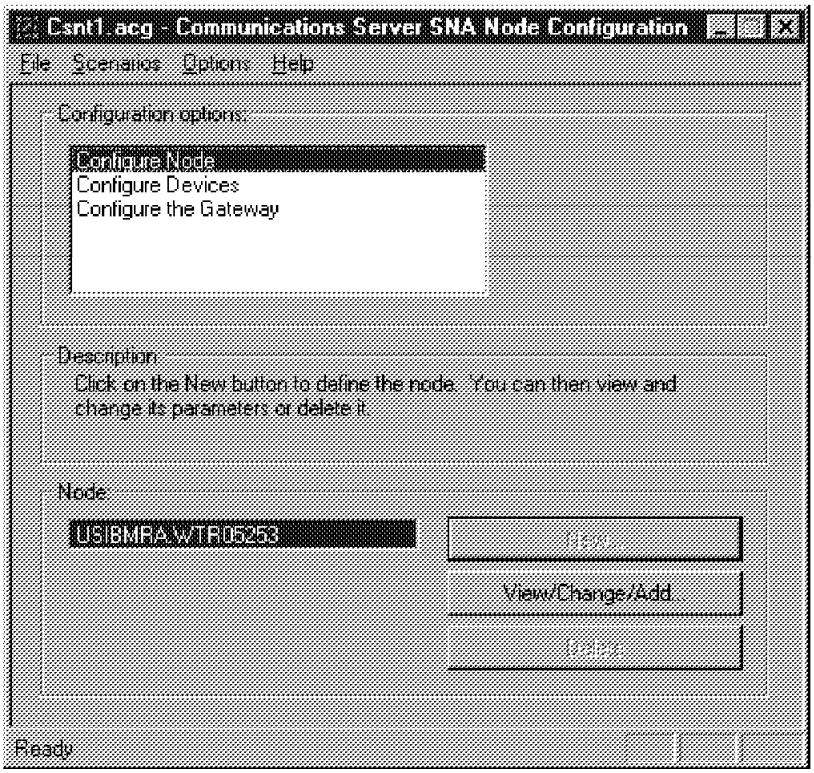


Figure 172. TN3270E Configuration

The next figure shows the node definition for this scenario. The CP name, block ID, and PU ID are sent to the host to identify the switched major node to be used for this connection (Figure 181 on page 146). In this case the CP name is used by VTAM to identify the definitions to use.

The node is defined as a network node, though it could have been an end node instead.

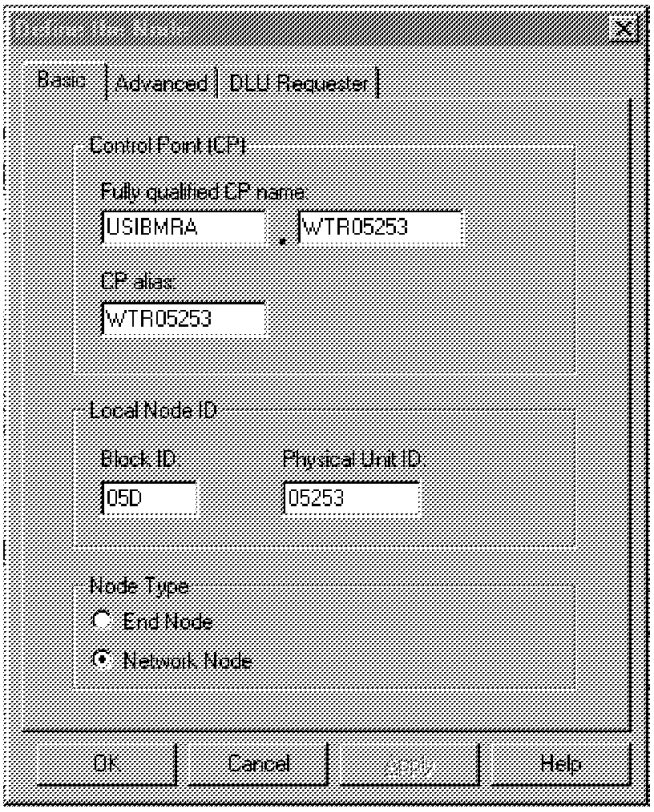


Figure 173. Node Definition

The connection to the host is over token-ring. A LAN device definition is required.

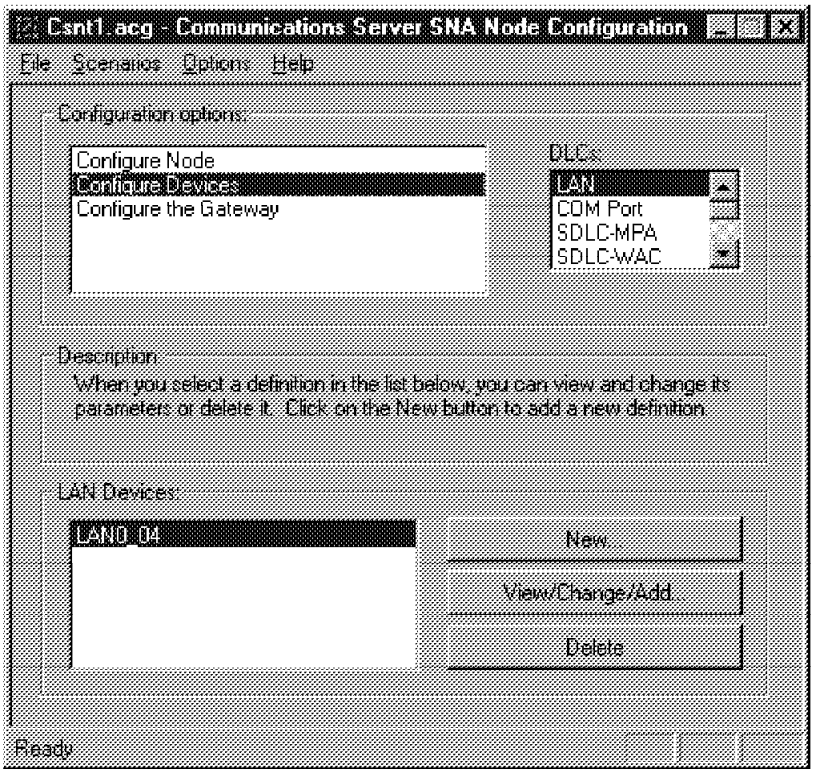


Figure 174. LAN Device Definition

The next set of definitions are the gateway definitions. Clicking on **Configure the Gateway** in Figure 172 on page 140 will give you the panel shown next. The link to the host is defined to use the LAN device defined in Figure 174.

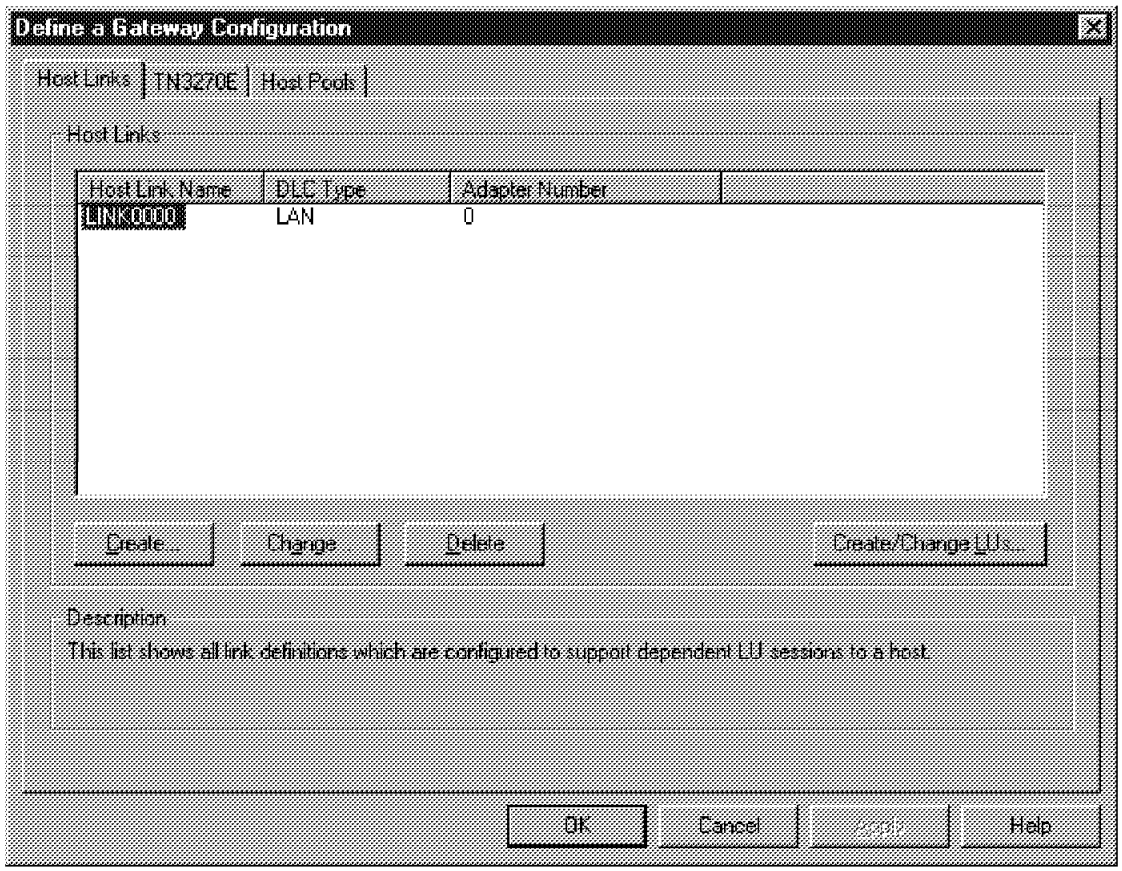


Figure 175. Gateway Definition for the Host Link

The link specifies the destination LAN address for the host. In this case the destination address is a TIC on a 3745 connected to the host.

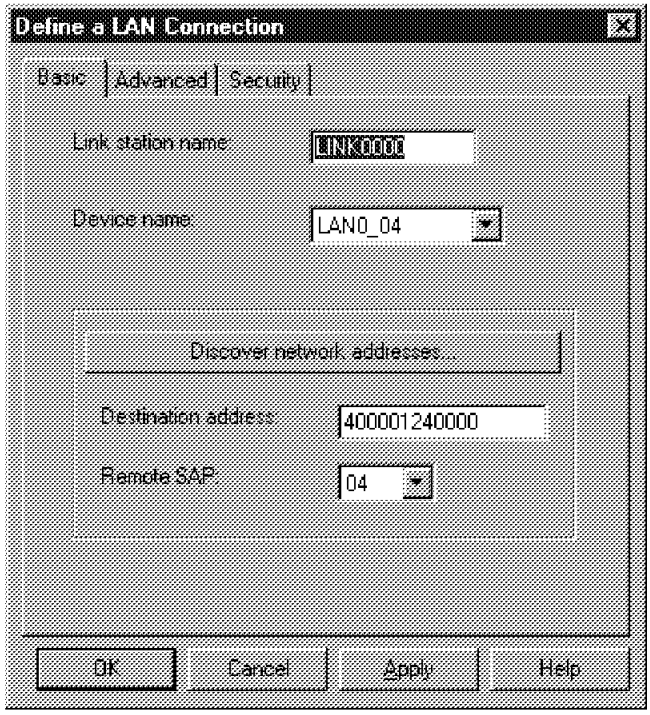


Figure 176. Link to Host

The next gateway definition panel is the TN3270E configuration. Pools of LUs to be used for the connections are defined here. The default pool is used to satisfy requests for LUs when the client does not specify a specific LU or pool name. Host On-Demand will use the default pool.

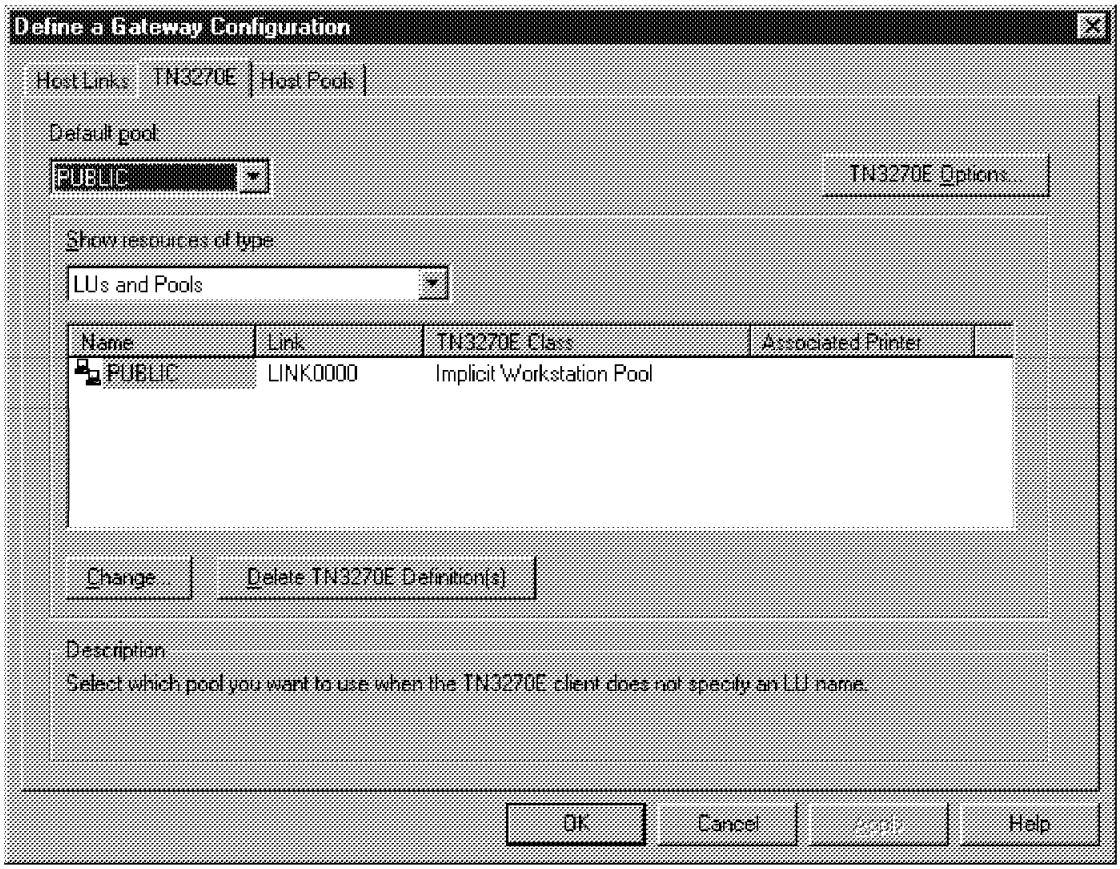


Figure 177. TN3270E Gateway Definitions

The TN3270E options allow you to specify a different port. If this port is not 23, you will need to change the Host On-Demand port to match it (Figure 182 on page 148). Other options include an automatic logoff for inactive connections and keepalive processing to detect that the TCP/IP connection has been lost.

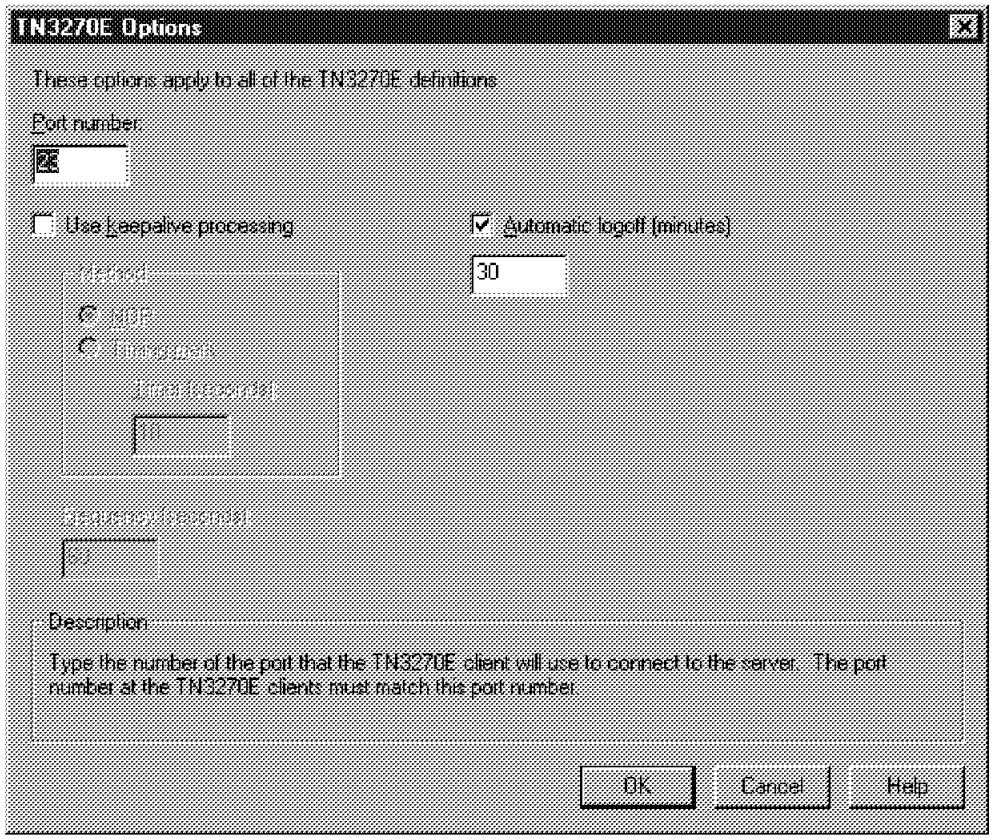


Figure 178. TN3270E Options

We defined the public pool to use implicit workstations. An implicit resource is one that does not require any definition. The first display client that comes in will get the first available implicit display LU.

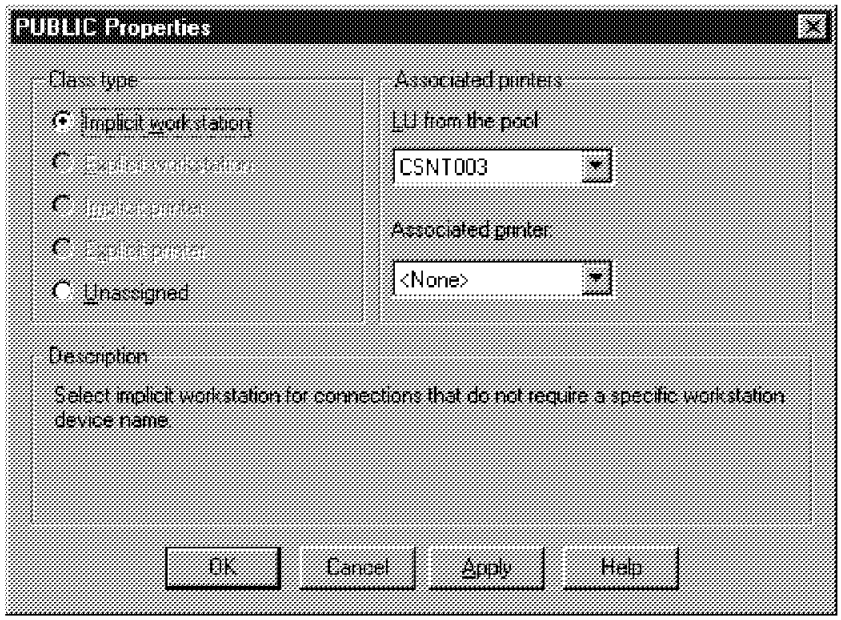


Figure 179. Public Pool Properties

The last gateway definition is the host pools.

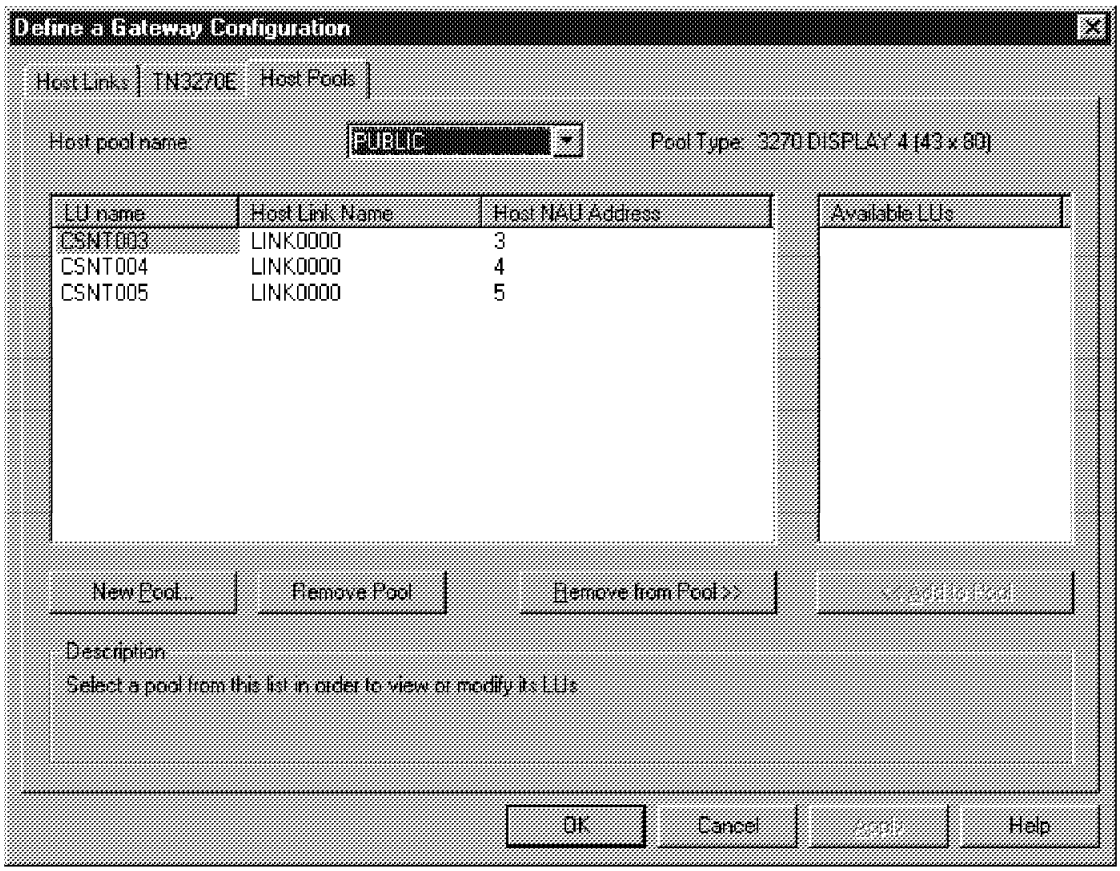


Figure 180. LUs Assigned to the Public Pool

VTAM definitions for the LUs on the host must exist. They may be dynamically defined for the PU by the VTAM configuration services exit or statically defined in VTAMLST. The LOCADDRs for the LUs must match the host NAU addresses defined in Figure 180. The LU names defined in the CS/NT pool do not have to match the host LU names. The connection is established using the LU name defined on the host.

```
SWHOD  VBUILD TYPE=SWNET,                                          X
               MAXNO=2,                                            X
               MAXGRP=2
*********************************************************************
RA05253  PU    ADDR=C1,                                            X
               CPNAME=WTR05253,                                    X
               DISCNT=NO,                                          X
               MAXDATA=1033,                                       X
               MODETAB=ISTINCLM,                                   X
               DLOGMOD=D4C32XX3,                                   X
               USSTAB=US327X,      (V) USS TABLE                   X
               PUTYPE=2
*********************************************************************
RA525302 LU    LOCADDR=2
RA525303 LU    LOCADDR=3
RA525304 LU    LOCADDR=4
RA525305 LU    LOCADDR=5
RA525306 LU    LOCADDR=6
RA525307 LU    LOCADDR=7
RA525308 LU    LOCADDR=8
RA525309 LU    LOCADDR=9
```

Figure 181. VTAM Switched Major Node Definitions

7.1.2 Host On-Demand Setup for Windows NT

By default Host On-Demand is installed in the C:\IBMCS\HD3270 and C:\IBMCS\HD3270\EN directories. These directories must be made available to the Web server.

In our scenario we used the IBM Internet Connection Server for Windows NT. We assigned the alias ″hod″ to the Host On-Demand requests and mapped these URL requests to the file locations where it was installed by adding the following line to the Internet Connection Server HTTPD.CNF file:

```
#
# Host-on-Demand
#
Pass     /hod/*           C:\IBMCS\HD3270\*
```

The main page for Host On-Demand is he3270en.htm. To use Host On-Demand the Web user specifies the URL of this page, for example, http://wtr05253/hod/he3270en.htm. The source for the page can be modified to change the default options or to change the graphics displayed. This file is in the IBMCS\HD3270 directory and can be customized.

```
<!--Copyright IBM Corporation 1996. All rights reserved.          -->
<!--U.S. Government Users Restricted Rights - Use, duplication    -->
<!--or disclosure restricted by GSA ADP Schedule Contract with    -->
<!--IBM Corp.                                                     -->
<!--                                                              -->
<!--This page may contain other proprietary notices and copyright  -->
<!--information, the terms of which must be observed and followed. -->
<html>
<head>
<title> IBM Host On-Demand </title>
</head>
<body bgcolor="#ffffff">
<center>
<img src="hemast.gif" align=middle alt="IBM Host On-Demand">
<hr>

<applet archive="he3270ap.zip" code="he3270ap.class" width=900 height=600 align=center>
  <param  name=CABBASE  value=he3270ap.cab>
  <!--                                                            -->
  <!-- Choose whether the IBM Host On-Demand will automatically    -->
  <!-- connect to the specified server, or will prompt the user to -->
  <!-- optionally override the defaults specified here. Possible   -->
  <!-- values are:                                                -->
  <!--   YES (the admin default values are used to connect)        -->
  <!--   NO  (prompt the end user for connectivity & context info) -->
  <param  name=AUTO_CONNECT        value=NO>
  <!--                                                            -->
  <!-- Choose whether IBM Host On-Demand will execute in debug or  -->
  <!-- operational mode.  Possible values are:                    -->
  <!--   YES (run in debug mode)                                  -->
  <!--   NO  (run in operational mode)                            -->
  <param  name=DEBUG               value=YES>
  <!--                                                            -->
  <!-- Choose whether IBM Host On-Demand will appear as part of    -->
  <!-- the browser window, or as a separate window. Possible values-->
  <!-- are: YES (appear as a separate window)                     -->
  <!--      NO  (appear as an extension of the invoking window)    -->
  <param  name=SEPARATE_WINDOW     value=YES>
  <!--                                                            -->
  <!-- Choose the IP port for IBM Host On-Demand to use when       -->
  <!-- connecting with the specified TN3270E server. The well known-->
  <!-- Telnet port is provided as a default.                      -->
  <param  name=TN3270E_SERVER_PORT value=23>
  <!--                                                            -->
  <!-- Choose whether IBM Host On-Demand will run with deluxe      -->
  <!-- graphics.                                                  -->
  <!--      YES (use deluxe graphics)                             -->
  <!--      NO  (run optimized for speed and memory)              -->
  <param  name=GRAPHICS            value=YES>
  <!--                                                            -->
  <!-- Choose whether IBM Host On-Demand will run with audio.      -->
  <!--      YES (use audio)                                       -->
  <!--      NO  (run optimized for speed and memory)              -->
  <param  name=AUDIO               value=NO>

<p>If you are reading this message, your client platform is
not capable of running IBM Host On-Demand.
To run IBM Host On-Demand, you must have a Java-enabled Web browser
such as Netscape Navigator or Microsoft Internet Explorer.
</applet>
<br>
<hr>
[
<a href="en/headmnen.htm">Host On-Demand administrator</a> ]
<a href="en/lcustom.htm">Help</a>
‘
</b>

</center>
</body>

</html>
```

Figure 182. Host On-Demand Initial Screen Definitions (he3270en.htm)

The following is what the user sees when he specifies the URL for he3270en.htm from a Web browser and the AUTO_CONNECT option is off. If the AUTO_CONNECT option is on, the connection is established the user is presented with the host screen directly.

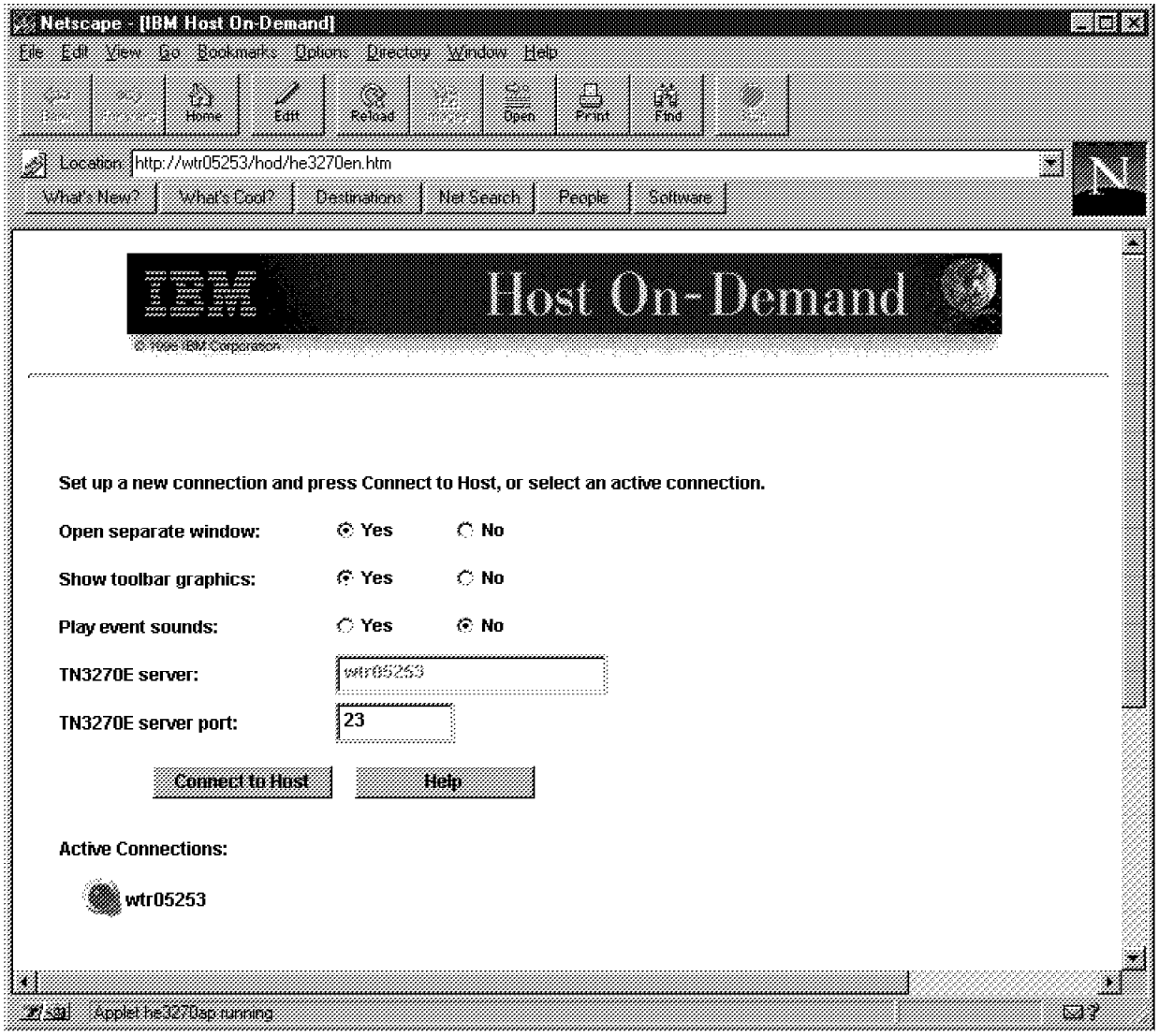


Figure 183. Host On-Demand Initial Screen

The Host On-Demand 3270 applet is also downloaded to the browser. If the browser is not Java-enabled, this is recognized by the Web server and a message is issued to the browser indicating that a Java-enabled browser is required to use Host On-Demand.

Once the user selects **Connect to Host**, this triggers the applet to contact the TN3270E server; if the TN3270E server is available and host LUs are available, the panel shown here appears, displaying the logo of the host that was reached.

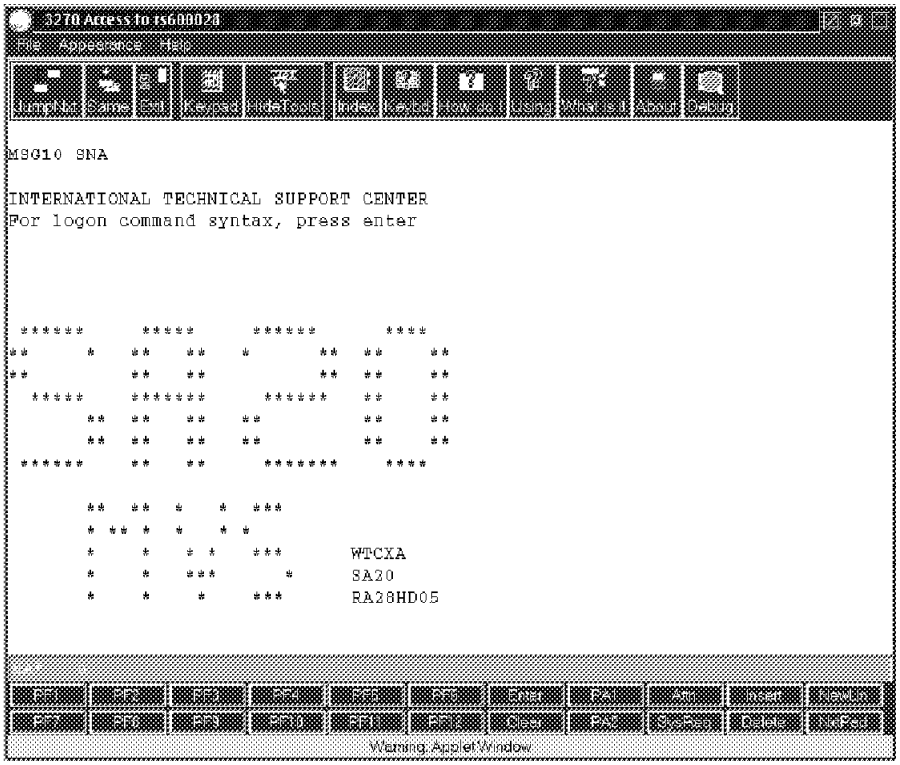


Figure 184. Host On-Demand VTAM Connection

7.1.3 Host On-Demand Debug

If there is a need to debug the applet, a click on the debug icon in the toolbar brings up a display where the user can select the items to be traced. The performance can be affected by the number of items selected. These can be selected and de-selected on an interactive basis.

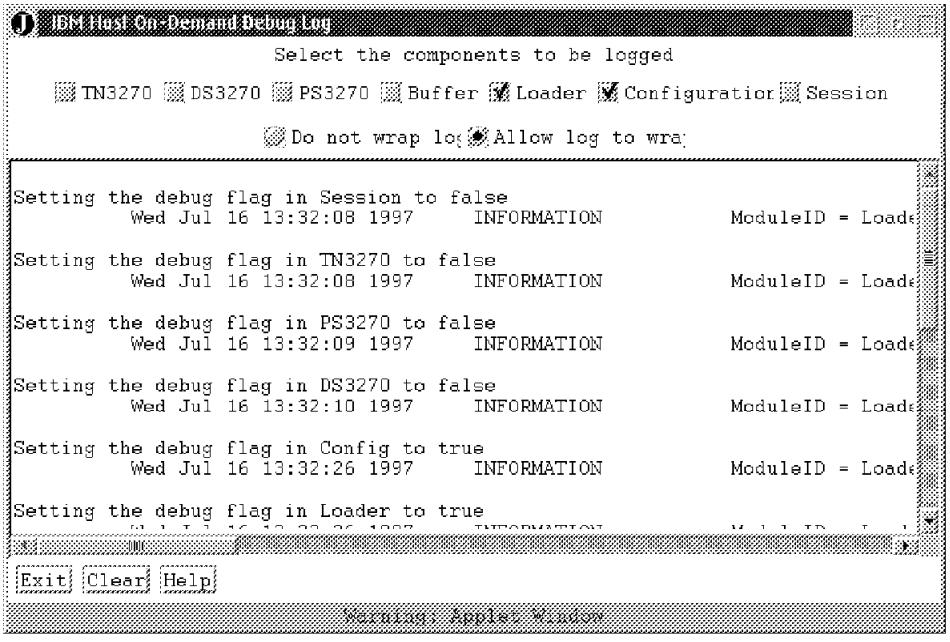


Figure 185. Host On-Demand Debug Log

7.2 Host On-Demand and Communication Server for AIX

Host On-Demand on AIX requires that you set up the SNA Client Access feature of Communication Server for AIX (hereafter referred to as ″CS/AIX″).

7.2.1 Configuring SNA Client Access

Host On-Demand uses SNA Client Access (hereafter referred to as ″SNA CA″) to listen for Telnet requests and convert them to SNA sessions. The SNA CA configuration can be reached by entering `smit snaca`.

```
                          Configure SNA Client Access

Move cursor to desired item and press Enter.

  Dependent LU Resources
  Telnet 5250 Connections

  SNA Server Configuration and Management

F1=Help             F2=Refresh          F3=Cancel           F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 186. SNA Client Access Configuration Panel

To configure SNA CA for Host On-Demand, dependent LUs must be defined. The configuration specifies information to be used to build profiles to enable a link to the host. In the following panel we have given the name rs6k28 to this configuration. This name is used for the SNA CA configuration file and for the link station profile. There will be 18 LU 2 addresses (2-19) made available.

```
                          Dependent LU Configuration

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
  Dependent LU Server name                              rs6k28
* PU name                                              [r6k28p]
  Link Station                                          token_ring
  Link address                                         [400001240000]
  Local SAP address                                    [4]
  Calling link station?                                 yes
  XID Node ID                                          [07105294*]

  Provide LU addresses (values of 1 to 255) and/or
  address ranges for any of the following LU types.
     LU 0                                              []
     LU 1                                              []
     LU 2                                              [2-19]
     LU 3                                              []


F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 187. SNA Client Access Dependent LU Configuration

As a result of this configuration, a configuration file is created and stored in /etc/aixsnaca. The file name is based on the dependent LU server name. In this case the configuration is stored in /etc/aixsnaca/rs6k28_dlu.cfg.

An SNA DLC profile is built for the link type if necessary and a token-ring link station is built based on the PU name. This link station is started automatically when you start SNA client access with this dependent LU server.

```
                Change/Show Token Ring Link Station Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[TOP]                                                  [Entry Fields]
  Current profile name                                  r6k28p
  New profile name                                     []
  Use Control Point's XID node ID?                      no
     If no, XID node ID                                [07105294]
* SNA DLC Profile name                                 [tok0]
  Stop link station on inactivity?                      no
     If yes, Inactivity time-out (0-10 minutes)        [0]
  LU address registration?                              yes
     If yes,
        LU Address Registration Profile name           [r6k28p]
  Trace link?                                           no
     If yes, Trace size                                 long
  High performance routing (HPR) supported?             yes
 Adjacent Node Address Parameters
    Access routing                                      link_address
    If link_name, Remote link name                     []
    If link_address,
       Remote link address                             [400001240000]
       Remote link address format                       canonical
       Remote SAP address (02-fa)                      [04]

 Adjacent Node Identification Parameters
    Verify adjacent node?                               no
    Network ID of adjacent node                        []
    CP name of adjacent node                           []
     XID node ID of adjacent node (LEN node only)      [*]
     Node type of adjacent node                         learn

  Link Activation Parameters
     Solicit SSCP sessions?                             yes
     Initiate call when link station is activated?      yes
     Activate link station at SNA start up?             yes
     Activate on demand?                                no
     CP-CP sessions supported?                          yes
     If yes,
        Adjacent network node preferred server?         no
     Partner required to support CP-CP sessions?        no
     Initial TG number (0-20)                          [0]

  Restart Parameters
     Restart on activation?                             no
     Restart on normal deactivation?                    no
     Restart on abnormal deactivation?                  no

  Transmission Group COS Characteristics
     Effective capacity                                [4300800]
     Cost per connect time                             [0]
     Cost per byte                                     [0]
     Security                                           nonsecure
     Propagation delay                                  lan
     User-defined 1                                    [128]
     User-defined 2                                    [128]
     User-defined 3                                    [128]

  Comments                                             []
[BOTTOM]

F1=Help            F2=Refresh         F3=Cancel          F4=List
Esc+5=Reset        F6=Command         F7=Edit            F8=Image
F9=Shell           F10=Exit           Enter=Do
```

Figure 188. Token-Ring Link Station for SNA Client Access

SNA Client Access also builds a SNA Generic LU registration profile for the LU range specified.

```
                                COMMAND STATUS

Command: OK            stdout: yes           stderr: no

Before command completion, additional instructions may appear below.


lu_reg:
        prof_name                                       = "r6k28p"
        lu_address_registered_list                      = {2,3,4,5,6,7,8,9,
10,11,12,13,14,15,16,17,18,19}
        comments                                        = ""
```

Figure 189. Generic LU Registration Profile

7.2.2 Starting SNA Client Access

To start SNA Client Access you must be in the /usr/lpp/SNA_CA/bin directory. Use the snaca command to start SNA CA with the desired configuration.

```
root@rs600028:/usr/lpp/SNA_CA/bin[362]#  /etc/aixsnaca/rs6k28_dlu.cfg

Executing command:  sna_dlu  -f /etc/aixsnaca/rs6k28_dlu.cfg

PU200001 : Initializing sna_dlu LU0 SNA Server
root@rs600028:/usr/lpp/SNA_CA/bin[363]# PU200002 : Initialization complete
```

Figure 190. Starting SNA Client Access

The snaop command can be used to give a user interface to SNA CA.

```
root@rs600028:/usr/lpp/SNA_CA/bin[363]# snaop

Attempting connection to rs600028, rs6k28-adm...
Connection opened to rs600028, rs6k28-adm

Attempting connection to rs600028, brxadmin_pu2...
Unable to connect to rs600028, brxadmin_pu2 (errno = 79)
SNA_DLU Controller
->
```

Figure 191. SNA Client Access Operator Interface

Note: Errno 79 is normal in this case. This message is generated when you start snaop and you have used the Client Access SMIT facilities to configure the dependent LU servers. The README file in /usr/lpp/SNA_CA/bin has more information.

The snaop interface gives you a command interface to SNA CA. The following screen is a display done from the snaop interface.

```
->dis
(2) dis
OP200025 : (2) Profile R6K28P - (2) Active
OP20002b : (2)     Logical Unit R6K28P02 - (3) Active/Attached
OP20002a : (2)     Logical Unit R6K28P03 - (2) Active
OP20002a : (2)     Logical Unit R6K28P04 - (2) Active
OP20002a : (2)     Logical Unit R6K28P05 - (2) Active
OP20002a : (2)     Logical Unit R6K28P06 - (2) Active
OP20002a : (2)     Logical Unit R6K28P07 - (2) Active
OP20002a : (2)     Logical Unit R6K28P08 - (2) Active
OP20002a : (2)     Logical Unit R6K28P09 - (2) Active
OP20002a : (2)     Logical Unit R6K28P0A - (2) Active
OP20002a : (2)     Logical Unit R6K28P0B - (2) Active
OP20002a : (2)     Logical Unit R6K28P0C - (2) Active
OP20002a : (2)     Logical Unit R6K28P0D - (2) Active
OP20002a : (2)     Logical Unit R6K28P0E - (2) Active
OP20002a : (2)     Logical Unit R6K28P0F - (2) Active
OP20002a : (2)     Logical Unit R6K28P10 - (2) Active
OP20002a : (2)     Logical Unit R6K28P11 - (2) Active
OP20002a : (2)     Logical Unit R6K28P12 - (2) Active
OP20002a : (2)     Logical Unit R6K28P13 - (2) Active

 Msg from rs600028, rs6k28-adm at 06/27/97 08:44:14
```

Figure 192. SNA Client Access Operator Display

The host VTAM definitions that correspond to the SNA CA configuration are shown in the next screen. The LU LOCADDR values correspond to the LU 2 addresses defined in SNA CA.

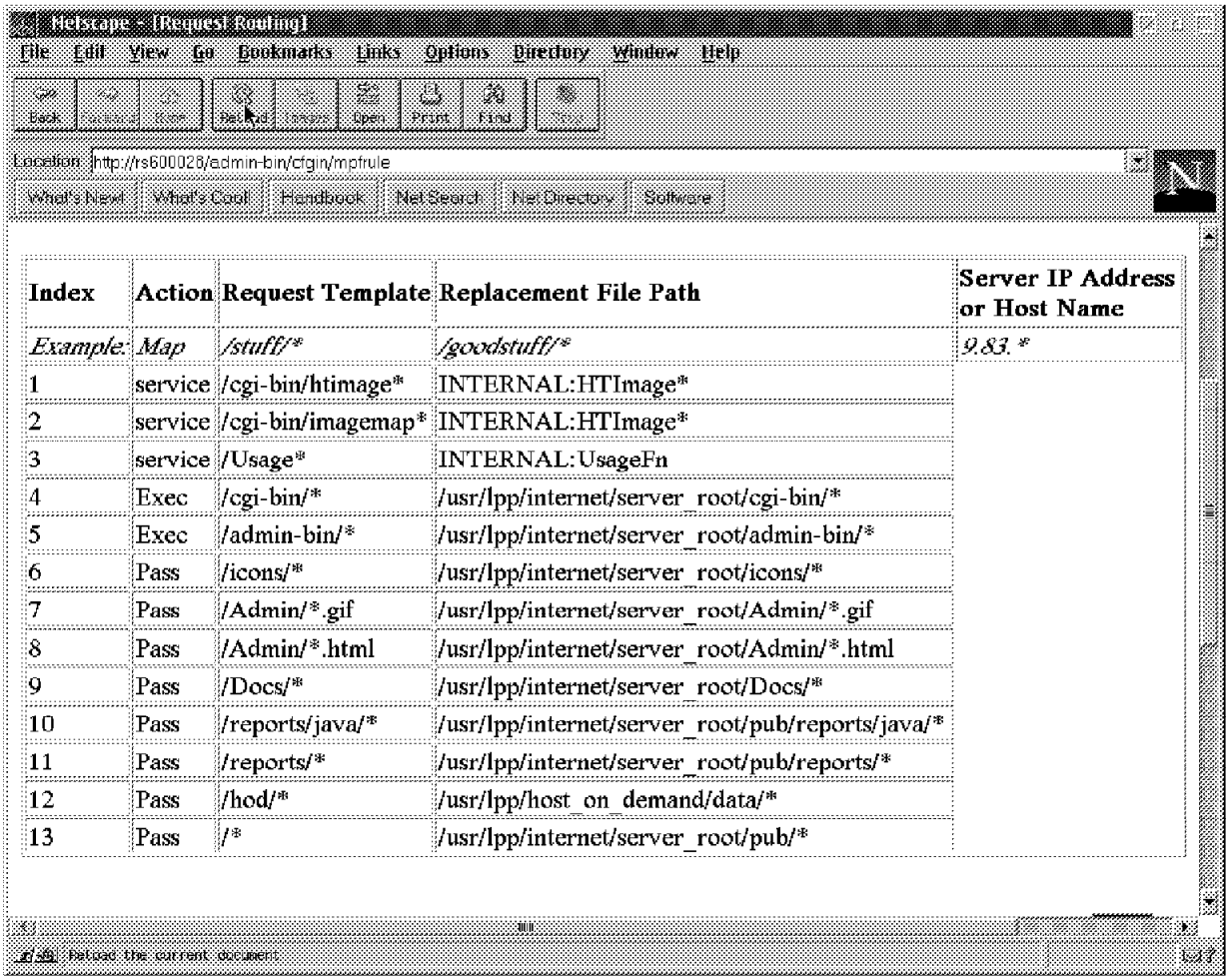
```
RA6RS07 VBUILD MAXGRP=10,                                          X
               MAXNO=18,                                           X
               TYPE=SWNET
RAK60028 PU    ADDR=13,                                            X
               IDBLK=071,                                          X
               IDNUM=05294,                                        X
               MAXPATH=2,                                          X
               MAXDATA=265,                                        *
               MAXOUT=7,                                           *
               PACING=7,                                           *
               ANS=CONTINUE,                                       *
               PASSLIM=7,                                          *
               PUTYPE=2,                                           *
               DISCNT=(NO),                                        *
               MODETAB=ISTINCLM,                                   X
               DLOGMOD=D4C32XX3,                                   X
               USSTAB=US327X,                                      X
               SSCPFM=USSSCS,                                      X
               ISTATUS=ACTIVE,                                     *
               VPACING=8
RA28HD02 LU    LOCADDR=2
RA28HD03 LU    LOCADDR=3
RA28HD04 LU    LOCADDR=4
RA28HD05 LU    LOCADDR=5
RA28HD06 LU    LOCADDR=6
RA28HD07 LU    LOCADDR=7
RA28HD08 LU    LOCADDR=8
RA28HD09 LU    LOCADDR=9
RA28HD10 LU    LOCADDR=10
RA28HD11 LU    LOCADDR=11
RA28HD12 LU    LOCADDR=12
RA28HD13 LU    LOCADDR=13
RA28HD14 LU    LOCADDR=14
RA28HD15 LU    LOCADDR=15
RA28HD16 LU    LOCADDR=16
RA28HD17 LU    LOCADDR=17
RA28HD18 LU    LOCADDR=18
RA28HD19 LU    LOCADDR=19
```

Figure 193. MVS VTAM Definitions

7.2.3 Host On-Demand Setup For AIX

When installing on AIX the Host On-Demand code will be installed in the /usr/lpp/host_on_demand directory.

To make the Host On-Demand code available to our Web server we added a routing definition by using the ICS administration Web page. The routing statement creates an alias for the Host On-Demand directory called ″hod″.



Index	Action	Request Template	Replacement File Path	Server IP Address or Host Name
Example:	*Map*	*/stuff/**	*/goodstuff/**	*9.83.**
1	service	/cgi-bin/htimage*	INTERNAL:HTImage*	
2	service	/cgi-bin/imagemap*	INTERNAL:HTImage*	
3	service	/Usage*	INTERNAL:UsageFn	
4	Exec	/cgi-bin/*	/usr/lpp/internet/server_root/cgi-bin/*	
5	Exec	/admin-bin/*	/usr/lpp/internet/server_root/admin-bin/*	
6	Pass	/icons/*	/usr/lpp/internet/server_root/icons/*	
7	Pass	/Admin/*.gif	/usr/lpp/internet/server_root/Admin/*.gif	
8	Pass	/Admin/*.html	/usr/lpp/internet/server_root/Admin/*.html	
9	Pass	/Docs/*	/usr/lpp/internet/server_root/Docs/*	
10	Pass	/reports/java/*	/usr/lpp/internet/server_root/pub/reports/java/*	
11	Pass	/reports/*	/usr/lpp/internet/server_root/pub/reports/*	
12	Pass	/hod/*	/usr/lpp/host_on_demand/data/*	
13	Pass	/*	/usr/lpp/internet/server_root/pub/*	

Figure 194. RS/6000 ICS Web Administration

A Web browser can be used to look at the readme.htm file for Host On-Demand. There will be installation information in this file. See http://rs600028/hod/readme.htm.

We customized Host On-Demand to skip the panel seen in Figure 195 on page 159 by modifying the he3270en.htm file.

```
<!--Copyright IBM Corporation 1996. All rights reserved.          -->
<!--U.S. Government Users Restricted Rights - Use, duplication    -->
<!--or disclosure restricted by GSA ADP Schedule Contract with    -->
<!--IBM Corp.                                                     -->
<!--                                                              -->
<!--This page may contain other proprietary notices and copyright  -->
<!--information, the terms of which must be observed and followed. -->
<html>
<head>
<title> RS600028 Host On-Demand </title>
</head>
<body bgcolor="#ffffff">
<center>
<img src="hemast.gif" align=middle alt="IBM Host On-Demand">
<hr>

<applet archive="he3270ap.zip" code="he3270ap.class" width=900 height=600 align=center>
  <param  name=CABBASE  value=he3270ap.cab>
  <!--                                                            -->
  <!-- Choose whether the IBM Host On-Demand will automatically    -->
  <!-- connect to the specified server, or will prompt the user to -->
  <!-- optionally override the defaults specified here. Possible   -->
  <!-- values are:                                                -->
  <!--   YES (the admin default values are used to connect)        -->
  <!--   NO  (prompt the end user for connectivity & context info) -->
  <param  name=AUTO_CONNECT        value=NO>
  <!--                                                            -->
  <!-- Choose whether IBM Host On-Demand will execute in debug or  -->
  <!-- operational mode.  Possible values are:                    -->
  <!--   YES (run in debug mode)                                  -->
  <!--   NO  (run in operational mode)                            -->
  <param  name=DEBUG               value=YES>
  <!--                                                            -->
  <!-- Choose whether IBM Host On-Demand will appear as part of    -->
  <!-- the browser window, or as a separate window. Possible values-->
  <!-- are: YES (appear as a separate window)                     -->
  <!--      NO  (appear as an extension of the invoking window)    -->
  <param  name=SEPARATE_WINDOW     value=YES>
  <!--                                                            -->
  <!-- Choose the IP port for IBM Host On-Demand to use when       -->
  <!-- connecting with the specified TN3270E server. The well known-->
  <!-- Telnet port is provided as a default.                      -->
  <param  name=TN3270E_SERVER_PORT value=5023>
  <!--                                                            -->
  <!-- Choose whether IBM Host On-Demand will run with deluxe      -->
  <!-- graphics.                                                  -->
  <!--      YES (use deluxe graphics)                             -->
  <!--      NO  (run optimized for speed and memory)              -->
  <param  name=GRAPHICS            value=YES>
  <!--                                                            -->
  <!-- Choose whether IBM Host On-Demand will run with audio.      -->
  <!--      YES (use audio)                                       -->
  <!--      NO  (run optimized for speed and memory)              -->
  <param  name=AUDIO               value=NO>

<p>If you are reading this message, your client platform is
not capable of running IBM Host On-Demand.
To run IBM Host On-Demand, you must have a Java-enabled Web browser
such as Netscape Navigator or Microsoft Internet Explorer.
</applet>
<br>
<hr>
[
<a href="en/headmnen.htm">Host On-Demand administrator</a> ]
<a href="en/lcustom.htm">Help</a>
‘
</b>
</center>
</body>
</html>
```

7.2.4 Starting a Host On-Demand Session

To start the Host On-Demand session, point the Web browser to http://myserver/hod/he3270en.htm.

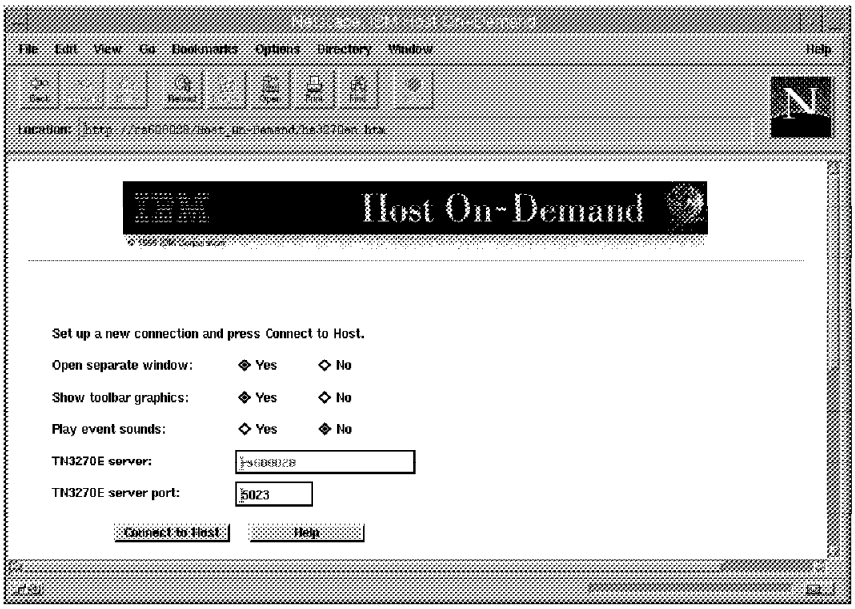


Figure 195. Host On-Demand Initial Screen

If the port default was not changed in the he3270en.htm file, change the Telnet port to 5023 (this is the port used by SNA CA) and click on **Connect to Host**. A 3270 screen will be presented. You can start another session (limit of 2) by clicking the **SAME** button at the top of the screen. If the 3270 session was started in a separate window (by choosing the **Open Separate Window** option on he3270en.htm) you can go back to NetScape and open the URL again, thus giving you a third and fourth session.

Note: If you experience the problem that you have no cursor, go to the keypad at the bottom, click on **NxtPad**, then click on **AltCr** to get the alternate cursor. Some levels of Java support have had a problem showing the cursor as a line.

Chapter 8. MVS Web Server Setup for AnyNet Scenarios

The Internet Connection Server products for MVS provide Web server facilities for the MVS/ESA and OS/390 platforms. Based on the MVS OpenEdition platform these products provide Web services using either TCP/IP or AnyNet MVS as a transport provider.

The MVS system used in the AnyNet scenarios is an OpenEdition R2 MVS with IBM Internet Connection Secure Server for OS/390 V2R1. TCP/IP V3R2 and VTAM V4R4 are both running and are defined as transport providers to OpenEdition.

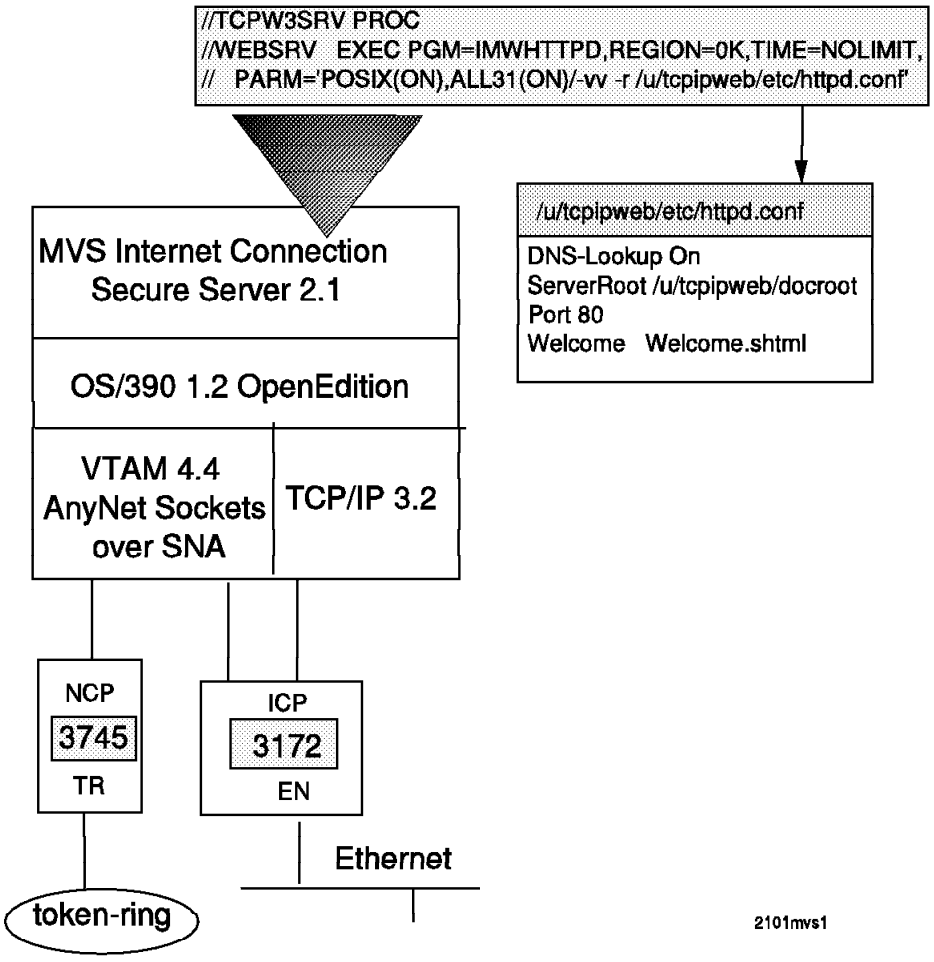


Figure 196. ICS Definitions

8.1.1 Starting ICSS

OpenEdition must be up and running before starting the Web server. The procedure to start ICSS in the test environment is TCPW3SRV.

```
//TCPW3SRV PROC
//*************************************************************************
//* PARM='LE runtime opts/WebSrv opts'
//*  LE runopts:
//*                              # current IMWHTTPD settings
//*   POSIX(ON),
//*   ALL31(ON),
//*   ENVAR("_CEE_ENVFILE=/usr/lpp/internet/envvars"), #  server environ
//*
//*                              # not set:
//*   RPTSTG(ON),                # memory usage
//*   RPTOPTS(ON),               # all runopts
//*
//*  WebSrv opts:
//*   -v                          # trace to stderr
//*   -vc                         # cache trace to stderr
//*   -vv                         # VERY VERBOSE trace to stderr
//*
//*   -version                    # show version and exit
//*   -gc_only                    # clean cache & exit (garbage collect)
//*
//*   -nodns                      # don't use DNS on client IP addr
//*
//*                               # configuration overrides:
//*   -cacheroot /tmp/websrv      # CacheRoot path
//*   -dxx                        # directory browse options
//*     n                         # DirAccess Off
//*     s                         # DirAccess Selective
//*     y                         # DirAccess On
//*      b                        # DirREADME bottom
//*      t                        # DirREADME top
//*      r                        # DirREADME off
//*   -disable   xxx              # Disable   method
//*   -enable    xxx              # Enable    method
//*                               #
//*   -gmt                        # LogTime   GMT
//*   -localtime                  # LogTime   LocalTime
//*   -nolog     xxx              # NoLog     xxx  (one per -nolog)
//*   -l         xxxx/httlog.     # AccessLog path/name
//*   -errlog    xxxx/htterr.     # ErrorLog  path/name
//*   -newlog    xxxx/httlog.     # LogFormat Common
//*   -oldlog    xxxx/httlog.     # LogFormat Old
//*                               #
//*   -h         xxx.xxx.xxx      # HostName  domain.name or IP.addr
//*   -p         nnnn             # Port      nnn (default 80)
//*                               #
//*   -r         /etc/httpd.conf  # RuleFile  path/name
//*                               #
//*   xxxxxxx                     # ServerRoot xxxxxxx; Pass /*
//*************************************************************************
//*
//WEBSRV   EXEC PGM=IMWHTTPD,REGION=OK,TIME=NOLIMIT,
//   PARM='POSIX(ON),ALL31(ON)/-vv -r /u/tcpipweb/etc/httpd.conf'
//*
//STEPLIB  DD DSN=IMW.V2R1M0.SIMWMOD1,DISP=SHR
//SYSIN    DD DUMMY
//SYSPRINT DD SYSOUT=*
//SYSERR   DD SYSOUT=*
//STDOUT   DD SYSOUT=*
//STDERR   DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//CEEDUMP  DD SYSOUT=*
```

Figure 197. MVS Started Procedure JCL for ICSS Web Server

8.1.2 ICSS Options File

The ICSS options are stored in the httpd.conf file. This HFS file is pointed to by the ICSS procedure. In our case the file is /u/tcpipweb/etc/httpd.conf. The following shows a small portion of the httpd.conf file in the MVS lab environment.

```
DNS-Lookup On
# Hostname   mvs18aa
#
#    Portion of configuration file for Web Server
#
#    Set ServerRoot to point to the directory where you installed this
#    distribution, or wherever you want your server to have its home.

  ServerRoot /u/tcpipweb/docroot

#    Default port for HTTP:  80

#    Set the server's thread concurrency level.

  MaxActiveThreads 100
  MinActiveThreads  10

#    Enabling and disabling HTTP methods

  Enable  GET
  Enable  HEAD
  Enable  POST
  Disable PUT
  Disable DELETE

#    Specify the default document to be displayed to the client
#    when only a directory name is specified in the URL.
#    The first Welcome statement has precedence.

  Welcome   Welcome.shtml

#    Indicate if the absence of a trailing slash in the URL will
#    provide a directory listing or the default welcome page.
#    Default:  On
#    Syntax:  AlwaysWelcome <on/off>

  AlwaysWelcome  Off    # allow directory listing

#    Mapping rules

# icons used by Directory List function

  Map   /httpd-internal-icons/*  /icons/*
  Pass  /icons/*                 /u/tcpipweb/docroot/icons/*

# online IMW documentation

  Pass  /Docs/*               /usr/lpp/internet/ServerRoot/Docs/*

#
# Allow exec of cgi programs in cgi-bin
#
  Exec  /cgi-bin/*            /u/tcpipweb/docroot/cgi-bin/*

# sample Document Root is ServerRoot/Samples

  Pass  /*                    /u/tcpipweb/docroot/*
```

Figure 198. Extract from ICSS Options File - httpd.conf

Chapter 9. AnyNet MVS Setup for AnyNet Scenarios

AnyNet is the perfect solution for enterprises that do not have TCP/IP for MVS installed, but want to enable access to OpenEdition socket applications through an SNA network. In the test environment for this book we have enabled AnyNet in order to access the Internet Connection Secure Server for MVS.

AnyNet MVS is defined as a transport provider for OpenEdition. You may also have TCP/IP running as a transport provider or with no connection at all to OpenEdition. The setup of TCP/IP is independent of the OpenEdition environment.

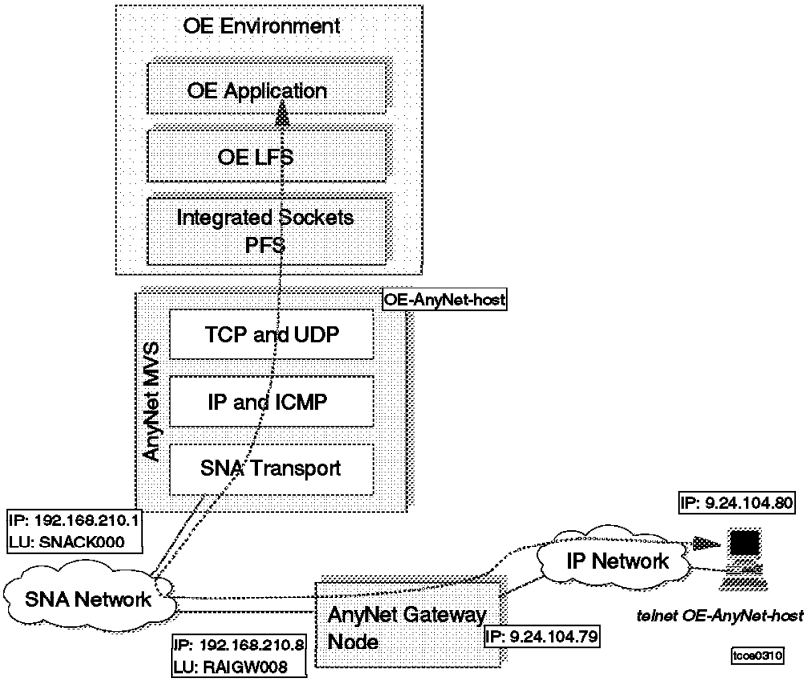


Figure 199. AnyNet MVS, Shared Stack Configuration

To use AnyNet MVS as a transport provider for OpenEdition, the following actions are required:

1. Define a RACF and OpenEdition user ID for AnyNet MVS.
2. Customize SYS1.PARMLIB(BPXPRMxx) to use sockets with AnyNet MVS.
3. Set up VTAM resource definitions for AnyNet MVS.
4. Customize the AnyNet MVS started task and configuration data sets.
5. Customize the AnyNet MVS initialization procedure.

9.1.1 RACF Definitions

The AnyNet stack used as transport provider for OpenEdition needs a RACF started task user ID with OpenEdition superuser authority, which can be achieved by either using a UID of zero or assigning the TRUSTED attribute to the AnyNet MVS started task procedure name.

In the following sample, an OpenEdition UID=0 is used for the AnyNet MVS transport provider stack.

```
listuser raisock

 USER=RAISOCK  NAME=ANYNET SA18 1
  DEFAULT-GROUP=OMVSGRP 2
  ATTRIBUTES=NONE
  REVOKE DATE=NONE   RESUME DATE=NONE
  LAST-ACCESS=96.085/11:37:31
  CLASS AUTHORIZATIONS=NONE
  NO-INSTALLATION-DATA
  NO-MODEL-NAME
  LOGON ALLOWED   (DAYS)          (TIME)
  ---------------------------------------------
  ANYDAY                          ANYTIME
   GROUP=OMVSGRP   AUTH=USE
     CONNECTS=    77  UACC=NONE     LAST-CONNECT=96.085/11:37:31
     CONNECT ATTRIBUTES=NONE
     REVOKE DATE=NONE   RESUME DATE=NONE
 SECURITY-LEVEL=NONE SPECIFIED
 CATEGORY-AUTHORIZATION
  NONE SPECIFIED
 SECURITY-LABEL=NONE SPECIFIED

 OMVS INFORMATION
 ----------------
 UID= 0000000000 3
 HOME= /
 PROGRAM= /bin/sh

rlist started raisock.* stdata

 STDATA INFORMATION
 ------------------
 USER= RAISOCK  1
 GROUP= OMVSGRP  2
 TRUSTED= NO  4
 PRIVILEGED= NO
 TRACE= NO
```

Figure 200. RACF Definitions for Integrated Sockets AnyNet MVS

1 RAISOCK is the RACF started task user ID of this AnyNet MVS stack. The started task procedure name is RAISOCK.

2 OMVSGRP is the RACF group ID of this AnyNet MVS stack.

3 This AnyNet MVS stack has an OMVS UID of 0 assigned.

4 TRUSTED=NO, as the OMVS UID of this stack is 0.

9.1.2 SYS1.PARMLIB(BPXPRMxx) Definitions

In our environment we have TCP/IP and AnyNet both defined as transport providers to OpenEdition using converged sockets (CINET). CINET definitions are in the BPXPRMxx SYS1.PARMLIB member.

9.1.2.1 Converged Sockets

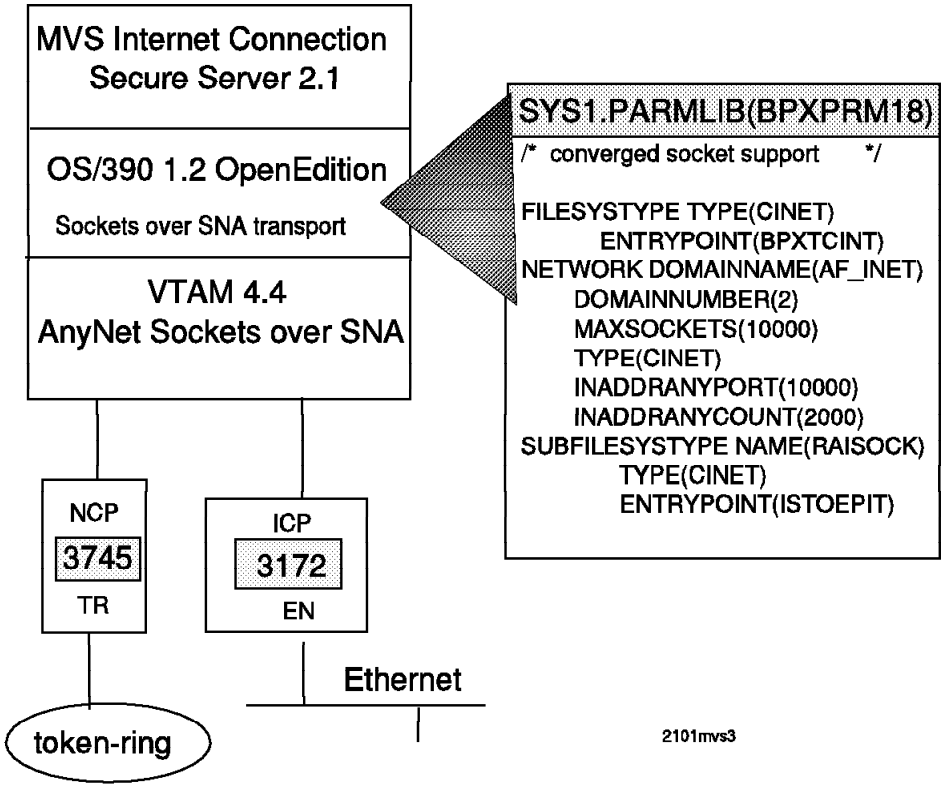


Figure 201. OpenEdition Definitions for AnyNet

TCP/IP and AnyNet provide CINET with a copy of their internal routing tables. CINET uses these tables to route socket calls to the correct transport provider.

The SUBFILESYSTYPE entry defines AnyNet as a CINET transport provider. RAISOCK is the name of the started task for AnyNet.

9.1.2.2 Integrated Sockets

If only AnyNet MVS is used as the transport provider for OpenEdition, you can use the integrated sockets physical file system.

Modify the definitions for AF_INET in SYS1.PARMLIB(BPXPRMxx) according to the following sample to use integrated sockets with AnyNet MVS:

```
/* AF_INET file system for sockets      */
/* integrated socket support - ISTOEPIT */

FILESYSTYPE TYPE(APPNSNA)  1
            ENTRYPOINT(ISTOEPIT)
NETWORK DOMAINNAME(AF_INET)  2
        DOMAINNUMBER(2)
        MAXSOCKETS(10000)  3
        TYPE(APPNSNA)  4
```

Figure 202. SYS1.PARMLIB(BPXPRMxx) for AnyNet MVS

1 TYPE(APPNSNA) and ENTRYPOINT(ISTOEPIT) specify AnyNet MVS as transport provider for OpenEdition.

2 AF_INET is the socket addressing family for this transport provider.

3 The number of MAXSOCKETS should be large enough to open new sockets for OpenEdition applications.

9.1.3 VTAM Resource Definitions for AnyNet

In order to use AnyNet MVS as a transport provider for OpenEdition, VTAM needs an application major node for the AnyNet MVS Sockets over SNA application. Before AnyNet can be started and initialized, this VTAM node must be defined and activated.

Our sample major node is called RAIANYAP. It is included in the ATCCONxx VTAMLST member to ensure it is activated during VTAM startup.

```
*
* VTAM V4.4 - AnyNet Sockets over SNA
*
         VBUILD TYPE=APPL
*
SNACK000 APPL  ACBNAME=SNACK000,  1
               APPC=YES,  2
               PARSESS=YES,
               DSESLIM=100,  3
               DMINWNL=50,
               DMINWNR=0,
               AUTOSES=2,  4
               AUTH=(ACQ,PASS),
               OPERCNOS=ALLOW,
               ATNLOSS=ALL,
               MODETAB=ISTINCLM
```

Figure 203. VTAM APPL Major Node Definition

1 ACBNAME must be equal to the LUNAME that is used for the sna0 interface. For the scenarios that used explicit mapping (see Figure 210 on page 175), the ACBNAME was SNACK000. For the scenarios that used algorithmic mapping (see Figure 212 on page 177), the ACBNAME was changed to RAL00001.

2 APPC=YES is required because Sockets over SNA operates as an LU6.2 application that uses the APPCCMD VTAM interface.

3 DSESLIM defines the maximum number of sessions allowed between the local application and a remote LU on a given mode name.

4 Allow automatic session initialization with an AnyNet partner node.

If you do not use dynamic resource definitions in your VTAM environment, or if your AnyNet MVS node may initiate LU6.2 conversations with other AnyNet nodes, you also need to define your partner AnyNet nodes. The definitions needed for the other AnyNet nodes in the scenarios are documented with the scenario.

The default logmode for AnyNet is SNACKETS. This logmode is shipped with the VTAM default logmode table, ISTINCLM.

```
ISTINCLM MODETAB
         TITLE 'SNACKETS'                                        *@Y2A*
*************************************************************************
*        LOGMODE ENTRY FOR MPTN ANYNET SOCKETS OVER SNA FEATURE       *
*************************************************************************
SNACKETS MODEENT LOGMODE=SNACKETS,FMPROF=X'13',TSPROF=X'07',     *@Y2A* *
               ENCR=B'0000',SSNDPAC=7,RUSIZES=X'F8F8',           *@Y2A* *
               SRCVPAC=7,PSNDPAC=7,APPNCOS=#INTER                *@Y2A*
```

Figure 204. MVS VTAM Logmode Definition for SNACKETS

The issue of class of service (COS) and how it is resolved during session setup is a fairly complex one, especially in a mixed subarea and APPN environment. Detailed information can be found in *VTAM Network Implementation Guide*. Using the default SNACKETS logmode as shipped by VTAM, the COS chosen in an APPN network will be #INTER. The #INTER entry in the APPN COS table shipped with VTAM is shown in Figure 205 on page 170.

In a subarea network the COS is chosen by the primary LU (PLU) based on the COS specification in the logmode entry corresponding to the logmode name sent in by the SLU. COS is not specified by the SNACKETS logmode. In this case if a COS table has been defined in VTAM with 8 blanks specified as the name the attributes of this ″unnamed″ COS entry will be used. If no unnamed entry exists VTAM will use its own defaults.

```
********************************************************************** 00050000
* MACRO NAME(S):    COSAPPN                                          * 00150000
* DESCRIPTIVE NAME: IBM-Supplied APPN Class of Service Definitions   * 00250000
********************************************************************** 01000000
#INTER   APPNCOS  PRIORITY=HIGH            transmission priority      18150000
         LINEROW  WEIGHT=30,               line row weight           *18200000
               NUMBER=1,                   line row number           *18250000
               UPARM1=(0,255),             user defined char 1       *18300000
               UPARM2=(0,255),             user defined char 2       *18350000
               UPARM3=(0,255),             user defined char 3       *18400000
               CAPACITY=(4M,MAXIMUM),      line speed                *18450000
               COSTTIME=(0,0),             cost per connect time     *18500000
               COSTBYTE=(0,0),             cost per byte transmitted *18550000
               PDELAY=(MINIMUM,NEGLIGIB),  propagation delay         *18600000
               SECURITY=(UNSECURE,MAXIMUM) security level for TG      18650000
         NODEROW  NUMBER=1,                node row number           *18700000
               WEIGHT=5,                   node row weight           *18750000
               CONGEST=(LOW,LOW),          congestion                *18800000
               ROUTERES=(0,31)             route addition resistance  18850000
         LINEROW  WEIGHT=60,               line row weight           *18900000
               NUMBER=2,                   line row number           *18950000
               UPARM1=(0,255),             user defined char 1       *19000000
               UPARM2=(0,255),             user defined char 2       *19050000
               UPARM3=(0,255),             user defined char 3       *19100000
               CAPACITY=(56000,MAXIMUM),   line speed                *19150000
               COSTTIME=(0,0),             cost per connect time     *19200000
               COSTBYTE=(0,0),             cost per byte transmitted *19250000
               PDELAY=(MINIMUM,TERRESTR),  propagation delay         *19300000
               SECURITY=(UNSECURE,MAXIMUM) security level for TG      19350000
         NODEROW  NUMBER=2,                node row number           *19400000
               WEIGHT=10,                  node row weight           *19450000
               CONGEST=(LOW,LOW),          congestion                *19500000
               ROUTERES=(0,63)             route addition resistance  19550000
         LINEROW  WEIGHT=90,               line row weight           *19600000
               NUMBER=3,                   line row number           *19650000
               UPARM1=(0,255),             user defined char 1       *19700000
               UPARM2=(0,255),             user defined char 2       *19750000
               UPARM3=(0,255),             user defined char 3       *19800000
               CAPACITY=(56000,MAXIMUM),   line speed                *19850000
               COSTTIME=(0,128),           cost per connect time     *19900000
               COSTBYTE=(0,128),           cost per byte transmitted *19950000
               PDELAY=(MINIMUM,TERRESTR),  propagation delay         *20000000
               SECURITY=(UNSECURE,MAXIMUM) security level for TG      20050000
         NODEROW  NUMBER=3,                node row number           *20100000
               WEIGHT=20,                  node row weight           *20150000
               CONGEST=(LOW,LOW),          congestion                *20200000
               ROUTERES=(0,95)             route addition resistance  20250000
         LINEROW  WEIGHT=120,              line row weight           *20300000
               NUMBER=4,                   line row number           *20350000
               UPARM1=(0,255),             user defined char 1       *20400000
               UPARM2=(0,255),             user defined char 2       *20450000
               UPARM3=(0,255),             user defined char 3       *20500000
               CAPACITY=(19200,MAXIMUM),   line speed                *20550000
               COSTTIME=(0,0),             cost per connect time     *20600000
               COSTBYTE=(0,0),             cost per byte transmitted *20650000
               PDELAY=(MINIMUM,TERRESTR),  propagation delay         *20700000
               SECURITY=(UNSECURE,MAXIMUM) security level for TG      20750000
         NODEROW  NUMBER=4,                node row number           *20800000
               WEIGHT=40,                  node row weight           *20850000
               CONGEST=(LOW,LOW),          congestion                *20900000
               ROUTERES=(0,127)            route addition resistance  20950000
         LINEROW  WEIGHT=150,              line row weight           *21000000
               NUMBER=5,                   line row number           *21050000
               UPARM1=(0,255),             user defined char 1       *21100000
               UPARM2=(0,255),             user defined char 2       *21150000
               UPARM3=(0,255),             user defined char 3       *21200000
               CAPACITY=(19200,MAXIMUM),   LINE SPEED                *21250000
               COSTTIME=(0,128),           cost per connect time     *21300000
               COSTBYTE=(0,128),           cost per byte transmitted *21350000
               PDELAY=(MINIMUM,PACKET),    propagation delay         *21400000
               SECURITY=(UNSECURE,MAXIMUM) security level for TG      21450000
```

```
         NODEROW  NUMBER=5,                 node row number            *21500000
               WEIGHT=60,                   node row weight            *21550000
               CONGEST=(LOW,LOW),           congestion                 *21600000
               ROUTERES=(0,159)             route addition resistance   21650000
         LINEROW  WEIGHT=180,               line row weight            *21700000
               NUMBER=6,                    line row number            *21750000
               UPARM1=(0,255),              user defined char 1        *21800000
               UPARM2=(0,255),              user defined char 2        *21850000
               UPARM3=(0,255),              user defined char 3        *21900000
               CAPACITY=(9600,MAXIMUM),     LINE SPEED                 *21950000
               COSTTIME=(0,0),              cost per connect time      *22000000
               COSTBYTE=(0,0),              cost per byte transmitted  *22050000
               PDELAY=(MINIMUM,PACKET),     propagation delay          *22100000
               SECURITY=(UNSECURE,MAXIMUM)  security level for TG       22150000
         NODEROW  NUMBER=6,                 node row number            *22200000
               WEIGHT=80,                   node row weight            *22250000
               CONGEST=(LOW,LOW),           congestion                 *22300000
               ROUTERES=(0,191)             route addition resistance   22350000
         LINEROW  WEIGHT=210,               line row weight            *22400000
               NUMBER=7,                    line row number            *22450000
               UPARM1=(0,255),              user defined char 1        *22500000
               UPARM2=(0,255),              user defined char 2        *22550000
               UPARM3=(0,255),              user defined char 3        *22600000
               CAPACITY=(9600,MAXIMUM),     LINE SPEED                 *22650000
               COSTTIME=(0,196),            cost per connect time      *22700000
               COSTBYTE=(0,196),            cost per byte transmitted  *22750000
               PDELAY=(MINIMUM,MAXIMUM),    propagation delay          *22800000
               SECURITY=(UNSECURE,MAXIMUM)  security level for TG       22850000
         NODEROW  NUMBER=7,                 node row number            *22900000
               WEIGHT=120,                  node row weight            *22950000
               CONGEST=(LOW,HIGH),          congestion                 *23000000
               ROUTERES=(0,223)             route addition resistance   23050000
         LINEROW  WEIGHT=240,               line row weight            *23100000
               NUMBER=8,                    line row number            *23150000
               UPARM1=(0,255),              user defined char 1        *23200000
               UPARM2=(0,255),              user defined char 2        *23250000
               UPARM3=(0,255),              user defined char 3        *23300000
               CAPACITY=(MINIMUM,MAXIMUM),  line speed                 *23350000
               COSTTIME=(0,255),            cost per connect time      *23400000
               COSTBYTE=(0,255),            cost per byte transmitted  *23450000
               PDELAY=(MINIMUM,MAXIMUM),    propagation delay          *23500000
               SECURITY=(UNSECURE,MAXIMUM)  security level for TG       23550000
         NODEROW  NUMBER=8,                 node row number            *23600000
               WEIGHT=160,                  node row weight            *23650000
               CONGEST=(LOW,HIGH),          congestion                 *23700000
               ROUTERES=(0,255)             route addition resistance   23750000
*                                                                       23800000
```

Figure 205 (Part 2 of 2). COSAPPN VTAM Table

9.1.4 AnyNet MVS Started Task and Configuration Data Sets

When the VTAM application major node for Sockets over SNA is active, AnyNet MVS Sockets over SNA may be started with the following JCL procedure:

```
//RAISOCK  PROC
//*
//* AnyNet MVS for OpenEdition use
//*
//ANYNET   EXEC PGM=ISTSKDMN,REGION=0M,TIME=1440 1
//STEPLIB  DD DSN=SYS1.VTAMLIB,DISP=SHR
//         DD DSN=CEE.V1R5M0.SCEERUN,DISP=SHR 2
//SYSUDUMP DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//CEEDUMP  DD SYSOUT=*
//ENVVAR   DD DSN=ANYNET.MVS(ENVVAR),DISP=SHR 3
//LOGMSGS  DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//*        PEND
```

Figure 206. AnyNet MVS JCL Procedure

1 Minimum recommended region size is 8 MB. By specifying zero MB (0M), we allow AnyNet MVS to use as much virtual storage as needed.

2 Language Environment or C/370 run-time library must be either in LINKLST concatenation or specified as STEPLIB.

3 ENVVAR specifies the AnyNet MVS configuration data set. If no ENVVAR data set is specified, AnyNet MVS Sockets over SNA will be started with default values.

AnyNet MVS Sockets over SNA can be started with default environment settings. We recommend, however, that you use an ENVVAR data set and explicitly specify all parameters, even if the default values are used. Thus the AnyNet MVS ENVVAR data set will always reflect your active parameter settings.

```
ADDRINFO='TCPIP.ANYNET.HOSTS.ADDRINFO'
SITEINFO='TCPIP.ANYNET.HOSTS.SITEINFO'
DNS_XLATE_TABLE='TCPIP.ANYNET.STANDARD.TCPXLBIN'
HOSTS_FILE_FORMAT=MVSTCP 1
HOSTNAME=MVS18AN 2
ETC_PROTOCOLS='TCPIP.ANYNET.ETC.PROTO'
ETC_RESOLV='TCPIP.ANYNET.RESOLVER'
ETC_SERVICES='TCPIP.ANYNET.ETC.SERVICES'
GROUP_NAME=SNACKETS
SXMODE_DEFAULT=SNACKETS 3
OPEN_EDITION=YES 4
```

Figure 207. AnyNet MVS ENVVAR Data Set

1 The AnyNet MVS resolver can use two different formats for the hosts file:

- HOSTS_FILE_FORMAT=BSD

  The AnyNet MVS resolver will access the data sets that are pointed to by the ETC_HOSTS and ETC_NETWORKS keywords and will read them according to the rules for BSD formatted hosts files.

- HOSTS_FILE_FORMAT=MVSTCP

  The AnyNet MVS resolver will access the data sets that are pointed to by the ADDRINFO and SITEINFO keywords and read them according to the rules for hosts files that have been created with the TCP/IP for MVS MAKESITE utility program.

In this sample setup, all HOSTS data sets are formatted by TCP/IP for MVS. This is usually valid if both AnyNet MVS and TCP/IP for MVS are running on the same MVS system. MVSTCP is required when you use the integrated sockets physical file system with OpenEdition. If you use the converged sockets physical file system, both formats are valid. You may have to consider this if you want to use AnyNet MVS as the single AF_INET transport provider in an environment where you do not have TCP/IP for MVS installed. In that situation you do not have TCP/IP for MVS MAKESITE utility available and cannot create the MVSTCP formatted hosts file. In that situation, you can use the converged sockets physical file system instead, but just with AnyNet MVS as a single AF_INET transport provider.

2 The HOSTNAME identifies the identity of the AnyNet MVS TCP/IP stack. Your name server should map this name to the IP address that is mapped to the AnyNet MVS LU name (see 9.1.5, “AnyNet MVS Initialization Procedure”).

3 Default DLOGMOD for AnyNet Sockets over SNA is SNACKETS on all AnyNet platforms.

4 Establish connection to OpenEdition.

The RESOLVER_CONFIG data set contains definitions for the domain name of the Sockets over SNA IP network and the IP address of the domain name server. This data set is not used by OpenEdition socket applications. It is only used by native AnyNet MVS socket applications. OpenEdition socket applications use the OpenEdition resolver configuration data set or file.

```
domain itso.ral.ibm.com
nameserver  9.24.104.108
```

Figure 208. AnyNet MVS RESOLVER.CONFIG Data Set

9.1.5 AnyNet MVS Initialization Procedure

After the AnyNet MVS Sockets over SNA address space has been started, the IP-LU mapping table must be initialized and the sna0 interface defined and set up. The AnyNet MVS utilities ISTSKMAP, ISTSKRTE, and ISTSKIFC can be used either interactively or in a batch job for these tasks.

In the following example, we use a batch TSO started task to execute the AnyNet commands to update the AnyNet MVS configuration. The started task name in our environment is RAISOCKI, as shown in Figure 209 on page 174.

```
//RAISOCKI PROC MEMBER=RAIANYI
//*********************************************************************
//*
//* Initialize AnyNet MVS on MVS18
//*
//* Initialization TSO commands are in member RAIANYI in
//* RISC.VTAMLST
//*
//*********************************************************************
//*
//ANYNETI  EXEC PGM=IKJEFT01,DYNAMNBR=20
//STEPLIB  DD DSN=SYS1.VTAMLIB,DISP=SHR
//         DD DSN=SYS1.SISTLMD1,DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSTSIN  DD DSN=RISC.VTAMLST(&MEMBER.),DISP=SHR
//SYSIN    DD DUMMY
```

Figure 209. AnyNet MVS Initialization Procedure

If you are using an operations automation package, for example, AOC/MVS Automated Operations Control from IBM, you can establish message automation based on the following message from AnyNet MVS:

```
ISU1501I SOCKETS-OVER-SNA RAISOCK INITIALIZATION COMPLETE FOR V4R4
```

When this message is received, your automation package can start the AnyNet MVS initialization job, in our sample setup, the started task RAISOCKI.

The input file to the AnyNet MVS initialization procedure is a set of TSO commands as shown in Figure 210 on page 175.

```
/*********************************************************************/
/*                                                                   */
/* RISC.VTAMLST(RAIANYI) - Applies to RAISOCK on MVS18               */
/*                                                                   */
/* This member specifies the AnyNet MVS initialization               */
/* commands.  These commands must be executed after                  */
/* AnyNet MVS has been started.                                      */
/*                                                                   */
/*********************************************************************/
/*                                                                   */
/* First we map IP addresses in the AnyNet network to SNA            */
/* LU6.2 names.                                                      */
/*                                                                   */
/*********************************************************************/
istskmap flush
istskmap add 192.168.210.1 255.255.255.255 USIBMRA SNACK000 1
istskmap add 192.168.210.9 255.255.255.255 USIBMSC WTR05140
istskmap add 192.168.210.8 255.255.255.255 USIBMSC RAIGW008
istskmap add 192.168.210.6 255.255.255.255 USIBMSC RAIGW006
istskmap add 192.168.210.2 255.255.255.255 USIBMRA SX221Q02
istskmap add 192.168.210.3 255.255.255.255 USIBMRA SX221Q03
istskmap add 192.168.210.10 255.255.255.255 USIBMRA RAG5327
istskmap add 192.168.210.11 255.255.255.255 USIBMRA RA6K7ANY
istskmap add 192.168.210.12 255.255.255.255 USIBMRA RAG5146
istskmap add 192.168.210.13 255.255.255.255 USIBMRA RA6K28AN
istskmap get
/*********************************************************************/
/*                                                                   */
/* We add IP address 192.168.210.1 as the HOME IP address of         */
/* the AnyNet SNA0 interface.                                        */
/*                                                                   */
/*********************************************************************/
istskifc sna0 192.168.210.1 2
/*********************************************************************/
/*  Add routes   to the routing table.                               */
/*********************************************************************/
istskrte add net 9.24.104 192.168.210.8 2  3
istskrte add net 192.168.221 192.168.210.3 2
/*********************************************************************/
/*                                                                   */
/* The netstat -r command displays the AnyNet MVS routing table      */
/*                                                                   */
/*********************************************************************/
istsknst -r
```

Figure 210. AnyNet MVS Initialization TSO Commands - Explicit Mapping

Some scenarios were run with explicit mapping and others with algorithmic mapping. The commands in Figure 210 define explicit mapping.

1 This command explicitly maps IP address 192.168.210.1 to LU name SNACK000. This is the definition for the AnyNet MVS host and the LU name therefore has to match the ACBNAME on the VTAM APPL major node definition.

2 This command sets the home IP address of the AnyNet MVS sna0 interface to 192.168.210.1.

3 The ISTSKRTE route update utility allows you to modify the AnyNet MVS routing table.

For a detailed description of available commands, please refer to the *VTAM AnyNet: Guide to Sockets over SNA*.

The RAISOCKI task should end with a zero return code. Using the sample above, the following messages indicate a successful completion:

```
>  flush
>  add 192.168.210.1 255.255.255.255 usibmra snack000
>  add 192.168.210.9 255.255.255.255 usibmsc wtr05140
>  add 192.168.210.8 255.255.255.255 usibmsc raigw008
>  add 192.168.210.6 255.255.255.255 usibmsc raigw006
>  add 192.168.210.2 255.255.255.255 usibmra sx221q02
>  add 192.168.210.3 255.255.255.255 usibmra sx221q03
>  add 192.168.210.10 255.255.255.255 usibmra rag5327
>  add 192.168.210.11 255.255.255.255 usibmra ra6k7any
>  add 192.168.210.12 255.255.255.255 usibmra rag5146
>  add 192.168.210.13 255.255.255.255 usibmra ra6k28an
>  get

Address         Mask            Network Name    LU Template
-------------------------------------------------------------
192.168.210.13  FFFFFFFF        USIBMRA         RA6K28AN
192.168.210.12  FFFFFFFF        USIBMRA         RAG5146
192.168.210.11  FFFFFFFF        USIBMRA         RA6K7ANY
192.168.210.10  FFFFFFFF        USIBMRA         RAG5327
192.168.210.3   FFFFFFFF        USIBMRA         SX221Q03
192.168.210.2   FFFFFFFF        USIBMRA         SX221Q02
192.168.210.6   FFFFFFFF        USIBMSC         RAIGW006
192.168.210.8   FFFFFFFF        USIBMSC         RAIGW008
192.168.210.9   FFFFFFFF        USIBMSC         WTR05140
192.168.210.1   FFFFFFFF        USIBMRA         SNACK000

add net 9.24.104: gateway 192.168.210.8
add net 192.168.221: gateway 192.168.210.3

       destination            gateway     refcnt        use  flags    intrf
        9.24.104.0      192.168.210.8       0             0    U      sna0
        9.24.104.0      192.168.210.8       0             0    U      sna0
     192.168.210.0      192.168.210.1       0             0    U      sna0
     192.168.221.0      192.168.210.3       0             0    U      sna0
     192.168.221.0      192.168.210.3       0             0    U      sna0
```

Figure 211. RAISOCKI Successful Job Completion

The scenarios that were run with algorithmic mapping used the commands shown in Figure 212 on page 177. The mapping algorithm will map 192.168.210.1 to the LU name RAL00001. The VTAM application major node ACB must match this name.

```
/*********************************************************************/
/*                                                                   */
/* RISC.VTAMLST(RAIANYI) - Applies to RAISOCK on MVS18               */
/*                                                                   */
/* This member specifies the AnyNet MVS initialization               */
/* commands.  These commands must be executed after                  */
/* AnyNet MVS has been started.                                      */
/*                                                                   */
/*********************************************************************/
/*                                                                   */
/* First we map IP addresses in the AnyNet network to SNA            */
/* LU6.2 names.                                                      */
/*                                                                   */
/*********************************************************************/
istskmap flush
istskmap add 192.168.210.0 255.255.255.0 USIBMRA RAL
istskmap get
/*********************************************************************/
/*                                                                   */
/* We add IP address 192.168.210.1 as the HOME IP address of         */
/* the AnyNet SNA0 interface.                                        */
/*                                                                   */
/*********************************************************************/
istskifc sna0 192.168.210.1
/*********************************************************************/
/*                                                                   */
/* We add a route to the 9.24.104.0 subnet via our OS/2              */
/* AnyNet gateway and another route to the 192.168.221.0 network     */
/* via a 2217 AnyNet gateway.                                        */
/*                                                                   */
/*********************************************************************/
istskrte add net 9.24.104 192.168.210.11 2
istskrte add net 192.168.252 192.168.210.11 2
/*********************************************************************/
istskrte add net 192.168.221 192.168.210.3 2
/*********************************************************************/
/*                                                                   */
/* The netstat -r command displays the AnyNet MVS routing table      */
/*                                                                   */
/*********************************************************************/
istsknst -r
```

Figure 212. AnyNet MVS Initialization TSO Commands - Algorithmic Mapping

Chapter 10. TCP/IP for MVS Setup for AnyNet Scenarios

In this configuration, two TCP/IP stacks are running on the same MVS/ESA system, but only one of them is used as AF_INET transport provider for OpenEdition applications.

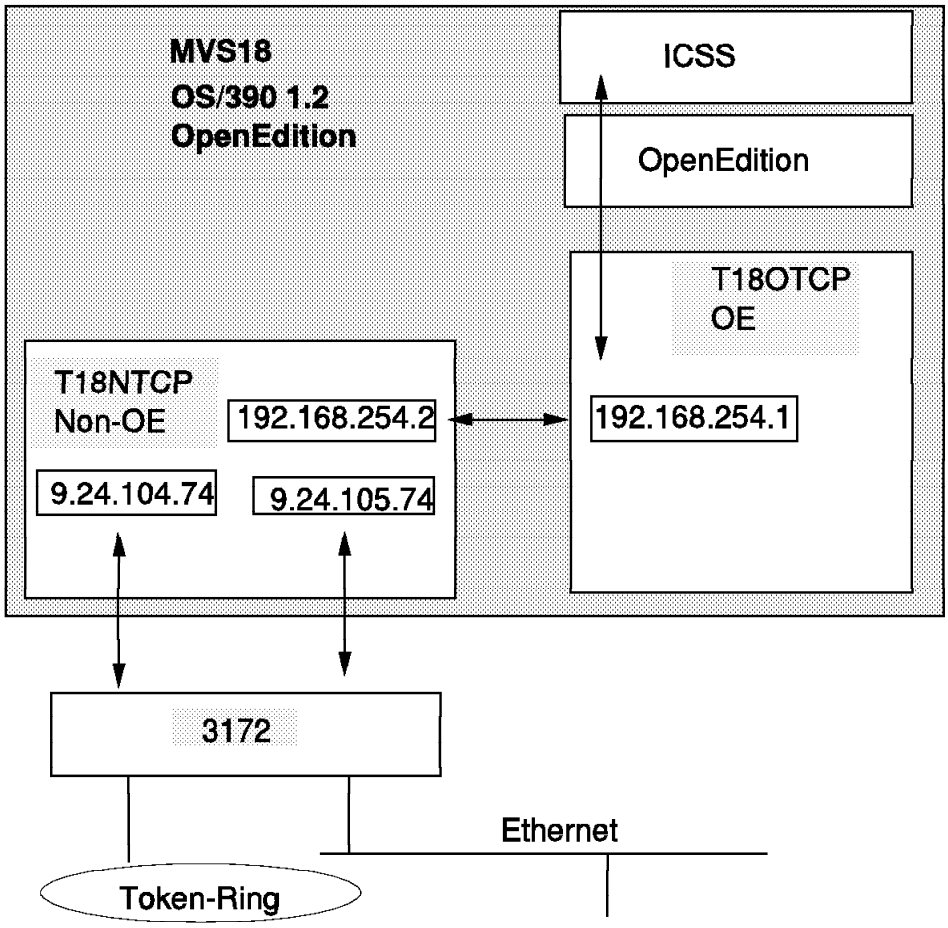


Figure 213. TCP/IP for MVS

T18NTCP is a TCP/IP for MVS stack containing all standard TCP/IP applications and servers without any connection to OpenEdition. The PROFILE data set of this TCP/IP stack includes the keyword NOOE to prevent this stack from establishing a connection to the OpenEdition integrated sockets physical file system.

T18NTCP has physical access to the IP network via an IBM 3172.

The second TCP/IP stack, T18OTCP, is an AF_INET transport provider for OpenEdition. It is connected to T18NTCP using an IUCV link and uses this link and the physical connections of the T18OTCP stack for all network accesses.

10.1 TCP/IP Definitions for the OpenEdition TCP/IP Stack

T18OTCP will be used as a transport provider for OpenEdition. To allow establishment of an OpenEdition connection and to use this TCP/IP stack as transport provider for OpenEdition sockets, the following actions are required:

1. Define a RACF user ID with an OMVS UID and assign it to the started task name of the TCP/IP for MVS system address space that is going to be used as your OpenEdition AF_INET transport provider.
2. Customize SYS1.PARMLIB(BPXPRMxx) to use the sockets physical file system.
3. Customize the TCP/IP PROFILE data sets with an IUCV link between the two TCP/IP for MVS stacks.

10.1.1.1 RACF Definitions for T18OTCP

There is no requirement for the non-OpenEdition stack to have an OMVS UID. The stack is not connecting to OpenEdition and does not use any OpenEdition services.

The stack that connects to OpenEdition must have a valid OMVS UID.

```
listuser t18otcp

 USER=T18OTCP  1  NAME=T18O TCP/IP STACK
  DEFAULT-GROUP=OMVSGRP  2
  ATTRIBUTES=NONE
  REVOKE DATE=NONE   RESUME DATE=NONE
  LAST-ACCESS=96.085/11:42:21
  CLASS AUTHORIZATIONS=NONE
  NO-INSTALLATION-DATA
  NO-MODEL-NAME
  LOGON ALLOWED   (DAYS)          (TIME)
  ---------------------------------------------
  ANYDAY                          ANYTIME
   GROUP=OMVSGRP   AUTH=USE
     CONNECTS=   313  UACC=NONE
     CONNECT ATTRIBUTES=NONE
     REVOKE DATE=NONE   RESUME DATE=NONE
 SECURITY-LEVEL=NONE SPECIFIED
 CATEGORY-AUTHORIZATION
  NONE SPECIFIED
 SECURITY-LABEL=NONE SPECIFIED

 OMVS INFORMATION
 ----------------
 UID= 0000000000  3
 HOME= /
 PROGRAM= /bin/sh

rlist started t18otcp.* stdata

 STDATA INFORMATION
 ------------------
 USER= T18OTCP  1
 GROUP= OMVSGRP  2
 TRUSTED= NO  4
 PRIVILEGED= NO
 TRACE= NO
```

Figure 214. RACF Definitions for a Separate OpenEdition Stack

1 T18OTCP is the RACF started task ID of this TCP/IP for MVS stack.

2 OMVSGRP is the RACF group ID of this TCP/IP for MVS stack.

3 This TCP/IP for MVS stack has an OMVS UID of 0 assigned.

4 TRUSTED=NO, as the OMVS UID of this stack is 0.

10.1.1.2 SYS1.PARMLIB(BPXPRMxx) Definitions for T18OTCP

In our MVS system we used the converged sockets file system. The following definitions in SYS1.PARMLIB(BPXPRMxx) were used to define this.

```
/* We use the converged socket support - BPXTCINT                  */

FILESYSTYPE TYPE(CINET)
            ENTRYPOINT(BPXTCINT)   1
NETWORK DOMAINNAME(AF_INET)   2
        DOMAINNUMBER(2)
        MAXSOCKETS(10000) 3
        TYPE(CINET)
        INADDRANYPORT(10000)
        INADDRANYCOUNT(2000)
SUBFILESYSTYPE NAME(T18OTCP)
               TYPE(CINET)
               ENTRYPOINT(BPXTIINT)
               DEFAULT
```

Figure 215. BPXPRMxx for TCP/IP OpenEdition Stack Using Converged Sockets

1 BPXTCINT specifies converged sockets with TCP/IP for MVS as transport provider.

2 AF_INET is the socket address type for this transport provider.

3 MAXSOCKETS should be large enough to open new sockets for OpenEdition applications.

10.1.2 PROFILE.TCPIP Customization

When separate TCP/IP stacks are used to run standard TCP/IP applications and OpenEdition applications, the PROFILE data set of the OpenEdition stack only includes definitions for the OpenEdition applications and any required non-OpenEdition servers on that stack, such as a RouteD server or maybe a domain name server.

```
PORT
    7 UDP  OMVS  1              ; OE Echo
    7 TCP  OMVS                 ; OE Echo
    9 UDP  OMVS                 ; OE Discard
    9 TCP  OMVS                 ; OE Discard
   13 UDP  OMVS                 ; OE Daytime
   13 TCP  OMVS                 ; OE Daytime
   19 UDP  OMVS                 ; OE Chargen
   19 TCP  OMVS                 ; OE Chargen
   20 TCP  OMVS                 ; OE FTP Server
           DELAYACKS            ; Delay transmission acknowledgements
   21 TCP  OMVS                 ; OE FTP server control port
   23 TCP  OMVS                 ; OE Telnet server
   37 TCP  OMVS                 ; OE Timeserver
   37 UDP  OMVS                 ; OE Timeserver
   53 TCP  T18ODNS  2           ; Caching-only name server
   53 UDP  T18ODNS  2           ; Caching-only name server
   80 TCP  OMVS                 ; OE WEB server
  111 UDP OMVS                  ; OE Portmapper Server
  111 TCP OMVS                  ; OE Portmapper Server
  123 TCP OMVS                  ; OE Web server ???
  512 TCP OMVS                  ; OE Remote Execution Server
  513 TCP OMVS                  ; OE Rlogin Server
  514 TCP OMVS                  ; OE Remote Shell Server
  514 UDP OMVS                  ; OE SyslogD Server
  520 UDP T18OROUT  2           ; RouteD Server
 8000 TCP OMVS                  ; OE WEB server
```

Figure 216. PROFILE.TCPIP Extract for a Separate OpenEdition Stack

1 Keyword OMVS indicates that these ports are reserved for OpenEdition.

2 The only port numbers that are reserved for non-OpenEdition applications in this sample setup is the domain name server and the RouteD port numbers, which allow us to run these two non-OpenEdition servers on the OpenEdition stack. This can be done without conflicts with OpenEdition servers, because there currently is no domain name server or RouteD servers in the OpenEdition socket environment.

10.1.3 Network Connections

The connection to the non-OpenEdition stack allowing access to the network is over an IUCV link between the two TCP/IP stacks. The following figure shows the definitions in the TCP/IP profile data set that define this link.

```
;
; This is the OpenEdition stack - T18OTCP
; ******************************
;
; Device and Link definitions for IUCV link to non-OpenEdition stack
;
DEVICE DEVTON   IUCV XYZZY XYZZY T18NTCP B  1
LINK   LINKTON  IUCV 0     DEVTON

HOME
   192.168.254.1   LINKTON     ; To T18NTCP - the non-OpenEdition stack

BSDROUTINGPARMS false
   LINKTOA   2000       0     255.255.255.0   192.168.254.2

START DEVTON                   ; Start IUCV link to T18NTCP
```

Figure 217. TCPIP.PROFILE IUCV Link Definitions in an OpenEdition Stack

In this sample setup, the IUCV link definitions create a point-to-point link between the stacks using a private class C network 192.168.254.0 with the endpoint addresses 192.168.254.1 assigned to the OpenEdition stack and 192.168.254.2 to the non-OpenEdition stack.

10.2 TCP/IP Definitions for the Non-OpenEdition Stack

The non-OpenEdition TCP/IP in the scenarios in this book is used only to provide network access to the OpenEdition TCP/IP stack.

10.2.1 Network Connections for Non-OpenEdition TCP/IP Stack

The two TCP/IP stacks communicate over an IUCV point-to-point link. See Figure 218 for the definitions in your non-OpenEdition stack, and see Figure 217 on page 182 for the matching definitions in your OpenEdition stack.

```
;
; This is the non-OpenEdition stack - T18ATCP
; ***********************************
;
; Do not connect to OpenEdition
NOOE
;
; Device and Link definitions for IUCV link to the OpenEdition stack
;
DEVICE DEVTOO   IUCV XYZZY XYZZY T18OTCP A 1
LINK   LINKTOO  IUCV 0     DEVTOO

HOME
   192.168.254.2   LINKTOO     ; To T18OTCP - the OpenEdition stack

BSDROUTINGPARMS false
   LINKTOO   2000       0     255.255.255.0   192.168.254.1

START DEVTOO                    ; Start IUCV link to T18OTCP
```

Figure 218. TCPIP.PROFILE IUCV Link Definitions in a Non-OpenEdition Stack

1 The IUCV device statement must be coded with an A in one stack and a B in the other stack. The sequence with XYZZY XYZZY must be coded exactly as specified.

10.2.1.1 Ethernet Interface over 3172

T18NTCP provides Ethernet access to the network. The connection is through the Ethernet port on an IBM 3172 Model 3.

```
;
DEVICE DEVEN1  LCS           302   NETMAN
LINK   EN1     ETHEROR802.3  0     DEVEN1
;
HOME
   9.24.105.74     EN1          ; Primary   9.24.105.0 - testing on M
;
BSDROUTINGPARMS false    ;  Default max mtu size of 576 bytes is used
;                                              (point to point links)
     EN1       2000       0     255.255.255.0   0
ENDBSDROUTINGPARMS
;
START DEVEN1               ; 3172-3 ICP Ethernet
START DEVTR1               ; 3172-3 ICP T/R
```

Figure 219. TCP/IP Ethernet Link

10.2.1.2 Token-Ring Interface over 3172

T18NTCP also provides token-ring access to the network. The connection is through a token-ring port on an IBM 3172 Model 3.

```
;
DEVICE DEVTR1  LCS           30A   NETMAN
LINK   TR1     IBMTR         0     DEVTR1
;
HOME
   9.24.104.74     TR1          ; Primary   9.24.104.0
;
BSDROUTINGPARMS false    ;
;
     TR1       4052       0     255.255.255.0   0
ENDBSDROUTINGPARMS
;
START DEVTR1               ; 3172-3 ICP T/R
```

Figure 220. TCP/IP Token-Ring Link

Appendix A. Communication Server for AIX Scenario Definitions

The following listings were taken from the RS/6000 systems after each scenario. They are here to supplement the definitions that are discussed in each chapter.

A.1 Definitions for Scenario 1

A.1.1 AIX SNA Profiles from RS60007

```
sna:
        prof_name                                       = "sna"
        max_sessions                                    = 200
        max_conversations                               = 200
        restart_action                                  = once
        dynamic_inbound_partner_lu_definitions_allowed = yes
        standard_output_device                          = "/dev/console"
        standard_error_device                           = "/var/sna/sna.stderr"
        nmvt_action_when_no_nmvt_process                = reject
        trusted_group_ids                               = {system}
        sense_detail_level                              = specific
        start_snmp_subagent                             = no
        limited_resource_timeout                        = no
        limited_resource_timeout_value                  = 15
        comments                                        = ""

control_pt:
        prof_name                                       = "node_cp"
        xid_node_id                                     = "*"
        network_name                                    = "USIBMRA"
        control_pt_name_alias                           = "RA6007CP"
        control_pt_name                                 = "RA6007CP"
        control_pt_node_type                            = appn_network_node
        max_cached_trees                                = 500
        max_nodes_in_topology_database                  = 500
        route_addition_resistance                       = 128
        comments                                        = ""

local_lu_lu6.2:
        prof_name                                       = "anynetlu"
        local_lu_name                                   = "RA6K7ANY"
        local_lu_alias                                  = "RA6K7ANY"
        local_lu_dependent                              = no
        local_lu_address                                =
        sscp_id                                         = *
        link_station_prof_name                          = ""
        conversation_security_list_profile_name         = ""
        rrm_enabled                                     = no
        comments                                        = ""

link_station_eia232d:
        prof_name                                       = "l07175"
        use_control_pt_xid                              = yes
        xid_node_id                                     = "*"
        sna_dlc_profile_name                            = "sdlc"
        stop_on_inactivity                              = no
        time_out_value                                  = 0
```

```
        LU_registration_supported                   = no
        LU_registration_profile_name                = ""
        link_tracing                                = no
        trace_format                                = long
        hpr_support                                 = yes
        secondary_local_station_address             = 193
        station_type                                = secondary
        remote_secondary_station_address            = 1
        call_out_on_activation                      = yes
        verify_adjacent_node                        = no
        net_id_of_adjacent_node                     = ""
        cp_name_of_adjacent_node                    = ""
        xid_node_id_of_adjacent_node                = "*"
        node_type_of_adjacent_node                  = learn
        solicit_sscp_sessions                       = yes
        activate_link_during_system_init            = yes
        activate_link_on_demand                     = no
        cp_cp_sessions_supported                    = yes
        cp_cp_session_support_required              = no
        adjacent_node_is_preferred_server           = no
        initial_tg_number                           = 0
        restart_on_normal_deactivation              = yes
        restart_on_abnormal_deactivation            = yes
        TG_effective_capacity                       = 9600
        TG_connect_cost_per_time                    = 0
        TG_cost_per_byte                            = 0
        TG_security                                 = nonsecure
        TG_propagation_delay                        = telephone
        TG_user_defined_1                           = 128
        TG_user_defined_2                           = 128
        TG_user_defined_3                           = 128
        comments                                    = ""

sna_dlc_eia232d:
        prof_name                                   = "sdlc"
        datalink_device_name                        = "mpq0"
        force_timeout                               = 120
        user_defined_max_i_field                    = no
        max_i_field_length                          = 265
        max_active_link_stations                    = 1
        num_reserved_inbound_activation             = 0
        num_reserved_outbound_activation            = 0
        encoding                                    = nrzi
        RTS_signal                                  = controlled
        DTR_signal                                  = dtr
        clocking                                    = external
        transmit_rate                               = 1200
        network_type                                = nonswitched
        answer_mode                                 = automatic
        transmit_window_count                       = 7
        retransmit_count                            = 10
        retransmit_threshold                        = 10
        secondary_inactivity_timeout                = 30
        primary_repoll_frequency                    = 30
        primary_repoll_threshold                    = 10
        primary_repoll_count                        = 15
        link_type                                   = point_to_point
        primary_idlelist_poll_frequency             = 60
        primary_slowlist_poll_frequency             = 1
```

```
        retry_interval                          = 60
        retry_limit                             = 0
        comments                                = ""

mode:
        prof_name                               = "SNACKETS"
        mode_name                               = "SNACKETS"
        max_sessions                            = 100
        min_conwinner_sessions                  = 50
        min_conloser_sessions                   = 0
        auto_activate_limit                     = 0
        max_adaptive_receive_pacing_window      = 16
        receive_pacing_window                   = 7
        max_ru_size                             = 3840
        min_ru_size                             = 128
        class_of_service_name                   = "#INTER"
        comments                                = ""

socksna_minimum:
        prof_name                               = "rs7"
        IP_address                              = "192.168.210.11"
        subnet_mask                             = "255.255.255.0"
        lu_template                             = "RA6K7ANY"
        map_mask                                = "255.255.255.255"
        mode                                    = "SNACKETS"
        max_send_buff                           = 8300
        datagram_conv_timeout                   = 90
        connection_start_timeout                = 90
        comments                                = ""

socksna_remote:
        prof_name                               = "snack000"
        IP_address                              = "192.168.210.1"
        map_mask                                = "255.255.255.255"
        lu_template                             = "SNACK000"
        network                                 = "USIBMRA"
        comments                                = ""
```

A.2 Definitions for Scenario 2

A.2.1 AIX SNA Profiles from RS600028

```
sna:
        prof_name                               = "sna"
        max_sessions                            = 200
        max_conversations                       = 200
        restart_action                          = once
        dynamic_inbound_partner_lu_definitions_allowed = yes
        standard_output_device                  = "/dev/console"
        standard_error_device                   = "/var/sna/sna.stderr"
        nmvt_action_when_no_nmvt_process        = reject
        trusted_group_ids                       = {system}
        sense_detail_level                      = specific
        start_snmp_subagent                     = no
        limited_resource_timeout                = no
        limited_resource_timeout_value          = 15
        comments                                = ""
```

```
control_pt:
        prof_name                                   = "node_cp"
        xid_node_id                                 = "*"
        network_name                                = "USIBMRA"
        control_pt_name_alias                       = "R6028CP"
        control_pt_name                             = "R6028CP"
        control_pt_node_type                        = appn_end_node
        max_cached_trees                            = 500
        max_nodes_in_topology_database              = 500
        route_addition_resistance                   = 128
        comments                                    = ""

local_lu_lu6.2:
        prof_name                                   = "anynetlu"
        local_lu_name                               = "RAL0000D"
        local_lu_alias                              = "RAL0000D"
        local_lu_dependent                          = no
        local_lu_address                            =
        sscp_id                                     = *
        link_station_prof_name                      = ""
        conversation_security_list_profile_name     = ""
        rrm_enabled                                 = no
        comments                                    = ""

link_station_ethernet:
        prof_name                                   = "rai60028"
        use_control_pt_xid                          = yes
        xid_node_id                                 = "*"
        sna_dlc_profile_name                        = "ent0"
        stop_on_inactivity                          = no
        time_out_value                              = 0
        LU_registration_supported                   = no
        LU_registration_profile_name                = ""
        link_tracing                                = no
        trace_format                                = long
        hpr_support                                 = yes
        access_routing_type                         = link_address
        remote_link_name                            = ""
        remote_link_address                         = 0x400052005006
        mac_addr_format                             = non-canonical
        remote_sap                                  = 0x04
        call_out_on_activation                      = yes
        verify_adjacent_node                        = no
        net_id_of_adjacent_node                     = ""
        cp_name_of_adjacent_node                    = ""
        xid_node_id_of_adjacent_node                = "*"
        node_type_of_adjacent_node                  = learn
        solicit_sscp_sessions                       = yes
        activate_link_during_system_init            = yes
        activate_link_on_demand                     = no
        cp_cp_sessions_supported                    = yes
        cp_cp_session_support_required              = no
        adjacent_node_is_preferred_server           = no
        initial_tg_number                           = 0
        restart_on_normal_deactivation              = yes
        restart_on_abnormal_deactivation            = yes
        restart_on_activation                       = no
        TG_effective_capacity                       = 4300800
        TG_connect_cost_per_time                    = 0
```

```
        TG_cost_per_byte                            = 0
        TG_security                                 = nonsecure
        TG_propagation_delay                        = lan
        TG_user_defined_1                           = 128
        TG_user_defined_2                           = 128
        TG_user_defined_3                           = 128
        comments                                    = ""

sna_dlc_ethernet:
        prof_name                                   = "ent0"
        datalink_device_name                        = "ent0"
        force_timeout                               = 120
        user_defined_max_i_field                    = no
        max_i_field_length                          = 4096
        max_active_link_stations                    = 100
        num_reserved_inbound_activation             = 0
        num_reserved_outbound_activation            = 0
        dlc_protocol                                = 802.3
        transmit_window_count                       = 16
        retransmit_count                            = 8
        receive_window_count                        = 8
        inact_timeout                               = 48
        response_timeout                            = 4
        acknowledgement_timeout                     = 1
        link_name                                   = ""
        local_sap                                   = 0x04
        retry_interval                              = 60
        retry_limit                                 = 0
        dynamic_link_station_supported              = yes
        trace_base_listen_link_station              = no
        trace_base_listen_link_station_format       = long
        dynamic_lnk_solicit_sscp_sessions           = yes
        dynamic_lnk_cp_cp_sessions_supported        = yes
        dynamic_lnk_cp_cp_session_support_required  = no
        dynamic_lnk_TG_effective_capacity           = 4300800
        dynamic_lnk_TG_connect_cost_per_time        = 0
        dynamic_lnk_TG_cost_per_byte                = 0
        dynamic_lnk_TG_security                     = nonsecure
        dynamic_lnk_TG_propagation_delay            = lan
        dynamic_lnk_TG_user_defined_1               = 128
        dynamic_lnk_TG_user_defined_2               = 128
        dynamic_lnk_TG_user_defined_3               = 128
        dynamic_lnk_hpr_support                     = yes
        comments                                    = ""

mode:
        prof_name                                   = "SNACKETS"
        mode_name                                   = "SNACKETS"
        max_sessions                                = 100
        min_conwinner_sessions                      = 50
        min_conloser_sessions                       = 0
        auto_activate_limit                         = 0
        max_adaptive_receive_pacing_window          = 16
        receive_pacing_window                       = 7
        max_ru_size                                 = 3840
        min_ru_size                                 = 128
        class_of_service_name                       = "#CONNECT"
        comments                                    = ""
```

```
socksna_minimum:
        prof_name                                       = "rs28"
        IP_address                                      = "192.168.210.13"
        subnet_mask                                     = "255.255.255.0"
        lu_template                                     = "RAL"
        map_mask                                        = "255.255.255.0"
        mode                                            = "SNACKETS"
        max_send_buff                                   = 8300
        datagram_conv_timeout                           = 90
        connection_start_timeout                        = 90
        comments                                        = ""
```

A.3 Definitions for Scenario 3

A.3.1 AIX SNA Profiles from RS60007

```
sna:
        prof_name                                       = "sna"
        max_sessions                                    = 200
        max_conversations                               = 200
        restart_action                                  = once
        dynamic_inbound_partner_lu_definitions_allowed = yes
        standard_output_device                          = "/dev/console"
        standard_error_device                           = "/var/sna/sna.stderr"
        nmvt_action_when_no_nmvt_process                = reject
        trusted_group_ids                               = {system}
        sense_detail_level                              = specific
        start_snmp_subagent                             = no
        limited_resource_timeout                        = no
        limited_resource_timeout_value                  = 15
        comments                                        = ""

control_pt:
        prof_name                                       = "node_cp"
        xid_node_id                                     = "*"
        network_name                                    = "USIBMRA"
        control_pt_name_alias                           = "R6007CP"
        control_pt_name                                 = "R6007CP"
        control_pt_node_type                            = appn_end_node
        max_cached_trees                                = 500
        max_nodes_in_topology_database                  = 500
        route_addition_resistance                       = 128
        comments                                        = ""

local_lu_lu6.2:
        prof_name                                       = "anynetlu"
        local_lu_name                                   = "RAL0000B"
        local_lu_alias                                  = "RAL0000B"
        local_lu_dependent                              = no
        local_lu_address                                =
        sscp_id                                         = *
        link_station_prof_name                          = ""
        conversation_security_list_profile_name         = ""
        rrm_enabled                                     = no
        comments                                        = ""

link_station_token_ring:
        prof_name                                       = "r6k7any"
```

```
        use_control_pt_xid                      = yes
        xid_node_id                             = "*"
        sna_dlc_profile_name                    = "tok0"
        stop_on_inactivity                      = no
        time_out_value                          = 0
        LU_registration_supported               = no
        LU_registration_profile_name            = ""
        link_tracing                            = no
        trace_format                            = long
        hpr_support                             = yes
        access_routing_type                     = link_address
        remote_link_name                        = ""
        remote_link_address                     = 0x10005ab1ac7d
        mac_addr_format                         = canonical
        remote_sap                              = 0x04
        call_out_on_activation                  = yes
        verify_adjacent_node                    = no
        net_id_of_adjacent_node                 = ""
        cp_name_of_adjacent_node                = ""
        xid_node_id_of_adjacent_node            = "*"
        node_type_of_adjacent_node              = learn
        solicit_sscp_sessions                   = yes
        activate_link_during_system_init        = yes
        activate_link_on_demand                 = no
        cp_cp_sessions_supported                = yes
        cp_cp_session_support_required          = no
        adjacent_node_is_preferred_server       = no
        initial_tg_number                       = 0
        restart_on_normal_deactivation          = yes
        restart_on_abnormal_deactivation        = yes
        restart_on_activation                   = no
        TG_effective_capacity                   = 4300800
        TG_connect_cost_per_time                = 0
        TG_cost_per_byte                        = 0
        TG_security                             = nonsecure
        TG_propagation_delay                    = lan
        TG_user_defined_1                       = 128
        TG_user_defined_2                       = 128
        TG_user_defined_3                       = 128
        comments                                = ""

sna_dlc_token_ring:
        prof_name                               = "tok0"
        datalink_device_name                    = "tok0"
        force_timeout                           = 120
        user_defined_max_i_field                = no
        max_i_field_length                      = 4096
        max_active_link_stations                = 100
        num_reserved_inbound_activation         = 0
        num_reserved_outbound_activation        = 0
        transmit_window_count                   = 16
        dynamic_window_increment                = 1
        retransmit_count                        = 8
        receive_window_count                    = 8
        priority                                = 0
        inact_timeout                           = 48
        response_timeout                        = 4
        acknowledgement_timeout                 = 1
        link_name                               = ""
```

```
        local_sap                                   = 0x04
        retry_interval                              = 60
        retry_limit                                 = 0
        dynamic_link_station_supported              = yes
        trace_base_listen_link_station              = no
        trace_base_listen_link_station_format       = long
        dynamic_lnk_solicit_sscp_sessions           = yes
        dynamic_lnk_cp_cp_sessions_supported        = yes
        dynamic_lnk_cp_cp_session_support_required  = no
        dynamic_lnk_TG_effective_capacity           = 4300800
        dynamic_lnk_TG_connect_cost_per_time        = 0
        dynamic_lnk_TG_cost_per_byte                = 0
        dynamic_lnk_TG_security                     = nonsecure
        dynamic_lnk_TG_propagation_delay            = lan
        dynamic_lnk_TG_user_defined_1               = 128
        dynamic_lnk_TG_user_defined_2               = 128
        dynamic_lnk_TG_user_defined_3               = 128
        dynamic_lnk_hpr_support                     = yes
        comments                                    = ""

mode:
        prof_name                                   = "SNACKETS"
        mode_name                                   = "SNACKETS"
        max_sessions                                = 100
        min_conwinner_sessions                      = 50
        min_conloser_sessions                       = 0
        auto_activate_limit                         = 0
        max_adaptive_receive_pacing_window          = 16
        receive_pacing_window                       = 7
        max_ru_size                                 = 3840
        min_ru_size                                 = 128
        class_of_service_name                       = "#CONNECT"
        comments                                    = ""

socksna_minimum:
        prof_name                                   = "rs7"
        IP_address                                  = "192.168.210.11"
        subnet_mask                                 = "255.255.255.0"
        lu_template                                 = "RAL"
        map_mask                                    = "255.255.255.0"
        mode                                        = "SNACKETS"
        max_send_buff                               = 8300
        datagram_conv_timeout                       = 90
        connection_start_timeout                    = 90
        comments                                    = ""

socksna_gw:
        prof_name                                   = "ethernet"
        destination_type                            = net
        destination_addr                            = "9.24.105.0"
        gateway_addr                                = "192.168.210.13"
        comments                                    = ""

socksna_gw:
        prof_name                                   = "mvs_to_mvs"
        destination_type                            = net
        destination_addr                            = "192.168.254.0"
        gateway_addr                                = "192.168.210.13"
        comments                                    = ""
```

A.3.2 AIX SNA Profiles from RS600028

```
sna:
        prof_name                                       = "sna"
        max_sessions                                    = 200
        max_conversations                               = 200
        restart_action                                  = once
        dynamic_inbound_partner_lu_definitions_allowed = yes
        standard_output_device                          = "/dev/console"
        standard_error_device                           = "/var/sna/sna.stderr"
        nmvt_action_when_no_nmvt_process                = reject
        trusted_group_ids                               = {system}
        sense_detail_level                              = specific
        start_snmp_subagent                             = no
        limited_resource_timeout                        = no
        limited_resource_timeout_value                  = 15
        comments                                        = ""

control_pt:
        prof_name                                       = "node_cp"
        xid_node_id                                     = "*"
        network_name                                    = "USIBMRA"
        control_pt_name_alias                           = "RA6028CP"
        control_pt_name                                 = "RA6028CP"
        control_pt_node_type                            = appn_network_node
        max_cached_trees                                = 500
        max_nodes_in_topology_database                  = 500
        route_addition_resistance                       = 128
        comments                                        = ""

local_lu_lu6.2:
        prof_name                                       = "anynetlu"
        local_lu_name                                   = "RALOOOOD"
        local_lu_alias                                  = "RALOOOOD"
        local_lu_dependent                              = no
        local_lu_address                                =
        sscp_id                                         = *
        link_station_prof_name                          = ""
        conversation_security_list_profile_name         = ""
        rrm_enabled                                     = no
        comments                                        = ""

sna_dlc_token_ring:
        prof_name                                       = "tok0"
        datalink_device_name                            = "tok0"
        force_timeout                                   = 120
        user_defined_max_i_field                        = no
        max_i_field_length                              = 4096
        max_active_link_stations                        = 100
        num_reserved_inbound_activation                 = 0
        num_reserved_outbound_activation                = 0
        transmit_window_count                           = 16
        dynamic_window_increment                        = 1
        retransmit_count                                = 8
        receive_window_count                            = 8
        priority                                        = 0
        inact_timeout                                   = 48
        response_timeout                                = 4
        acknowledgement_timeout                         = 1
        link_name                                       = ""
```

```
        local_sap                                       = 0x04
        retry_interval                                  = 60
        retry_limit                                     = 20
        dynamic_link_station_supported                  = yes
        trace_base_listen_link_station                  = no
        trace_base_listen_link_station_format           = long
        dynamic_lnk_solicit_sscp_sessions               = yes
        dynamic_lnk_cp_cp_sessions_supported            = yes
        dynamic_lnk_cp_cp_session_support_required      = no
        dynamic_lnk_TG_effective_capacity               = 4300800
        dynamic_lnk_TG_connect_cost_per_time            = 0
        dynamic_lnk_TG_cost_per_byte                    = 0
        dynamic_lnk_TG_security                         = nonsecure
        dynamic_lnk_TG_propagation_delay                = lan
        dynamic_lnk_TG_user_defined_1                   = 128
        dynamic_lnk_TG_user_defined_2                   = 128
        dynamic_lnk_TG_user_defined_3                   = 128
        dynamic_lnk_hpr_support                         = yes
        comments                                        = ""

mode:
        prof_name                                       = "SNACKETS"
        mode_name                                       = "SNACKETS"
        max_sessions                                    = 100
        min_conwinner_sessions                          = 50
        min_conloser_sessions                           = 0
        auto_activate_limit                             = 0
        max_adaptive_receive_pacing_window              = 16
        receive_pacing_window                           = 7
        max_ru_size                                     = 3840
        min_ru_size                                     = 128
        class_of_service_name                           = "#CONNECT"
        comments                                        = ""

socksna_minimum:
        prof_name                                       = "rs28"
        IP_address                                      = "192.168.210.13"
        subnet_mask                                     = "255.255.255.0"
        lu_template                                     = "RAL"
        map_mask                                        = "255.255.255.0"
        mode                                            = "SNACKETS"
        max_send_buff                                   = 8300
        datagram_conv_timeout                           = 90
        connection_start_timeout                        = 90
        comments                                        = ""
```

A.4 Definitions for Scenario 4

A.4.1 AIX SNA Profiles from RS60007

```
sna:
        prof_name                                       = "sna"
        max_sessions                                    = 200
        max_conversations                               = 200
        restart_action                                  = once
        dynamic_inbound_partner_lu_definitions_allowed = yes
        standard_output_device                          = "/dev/console"
        standard_error_device                           = "/var/sna/sna.stderr"
```

```
        nmvt_action_when_no_nmvt_process            = reject
        trusted_group_ids                           = {system}
        sense_detail_level                          = specific
        start_snmp_subagent                         = no
        limited_resource_timeout                    = no
        limited_resource_timeout_value              = 15
        comments                                    = ""

control_pt:
        prof_name                                   = "node_cp"
        xid_node_id                                 = "*"
        network_name                                = "USIBMRA"
        control_pt_name_alias                       = "R6007CP"
        control_pt_name                             = "R6007CP"
        control_pt_node_type                        = appn_end_node
        max_cached_trees                            = 500
        max_nodes_in_topology_database              = 500
        route_addition_resistance                   = 128
        comments                                    = ""

local_lu_lu6.2:
        prof_name                                   = "anynetlu"
        local_lu_name                               = "RAL0000B"
        local_lu_alias                              = "RAL0000B"
        local_lu_dependent                          = no
        local_lu_address                            =
        sscp_id                                     = *
        link_station_prof_name                      = ""
        conversation_security_list_profile_name     = ""
        rrm_enabled                                 = no
        comments                                    = ""

link_station_eia232d:
        prof_name                                   = "107175"
        use_control_pt_xid                          = yes
        xid_node_id                                 = "*"
        sna_dlc_profile_name                        = "sdlc"
        stop_on_inactivity                          = no
        time_out_value                              = 0
        LU_registration_supported                   = no
        LU_registration_profile_name                = ""
        link_tracing                                = no
        trace_format                                = long
        hpr_support                                 = yes
        secondary_local_station_address             = 193
        station_type                                = secondary
        remote_secondary_station_address            = 1
        call_out_on_activation                      = yes
        verify_adjacent_node                        = no
        net_id_of_adjacent_node                     = ""
        cp_name_of_adjacent_node                    = ""
        xid_node_id_of_adjacent_node                = "*"
        node_type_of_adjacent_node                  = learn
        solicit_sscp_sessions                       = yes
        activate_link_during_system_init            = yes
        activate_link_on_demand                     = no
        cp_cp_sessions_supported                    = yes
        cp_cp_session_support_required              = no
        adjacent_node_is_preferred_server           = no
```

```
        initial_tg_number                           = 0
        restart_on_normal_deactivation              = yes
        restart_on_abnormal_deactivation            = yes
        TG_effective_capacity                       = 9600
        TG_connect_cost_per_time                    = 0
        TG_cost_per_byte                            = 0
        TG_security                                 = nonsecure
        TG_propagation_delay                        = telephone
        TG_user_defined_1                           = 128
        TG_user_defined_2                           = 128
        TG_user_defined_3                           = 128
        comments                                    = ""

sna_dlc_eia232d:
        prof_name                                   = "sdlc"
        datalink_device_name                        = "mpq0"
        force_timeout                               = 120
        user_defined_max_i_field                    = no
        max_i_field_length                          = 265
        max_active_link_stations                    = 1
        num_reserved_inbound_activation             = 0
        num_reserved_outbound_activation            = 0
        encoding                                    = nrzi
        RTS_signal                                  = controlled
        DTR_signal                                  = dtr
        clocking                                    = external
        transmit_rate                               = 1200
        network_type                                = nonswitched
        answer_mode                                 = automatic
        transmit_window_count                       = 7
        retransmit_count                            = 10
        retransmit_threshold                        = 10
        secondary_inactivity_timeout                = 30
        primary_repoll_frequency                    = 30
        primary_repoll_threshold                    = 10
        primary_repoll_count                        = 15
        link_type                                   = point_to_point
        primary_idlelist_poll_frequency             = 60
        primary_slowlist_poll_frequency             = 1
        retry_interval                              = 60
        retry_limit                                 = 0
        comments                                    = ""

mode:
        prof_name                                   = "SNACKETS"
        mode_name                                   = "SNACKETS"
        max_sessions                                = 100
        min_conwinner_sessions                      = 50
        min_conloser_sessions                       = 0
        auto_activate_limit                         = 0
        max_adaptive_receive_pacing_window          = 16
        receive_pacing_window                       = 7
        max_ru_size                                 = 3840
        min_ru_size                                 = 128
        class_of_service_name                       = "#INTER"
        comments                                    = ""

socksna_minimum:
        prof_name                                   = "rs7"
```

```
        IP_address                                      = "192.168.210.11"
        subnet_mask                                     = "255.255.255.0"
        lu_template                                     = "RAL"
        map_mask                                        = "255.255.255.0"
        mode                                            = "SNACKETS"
        max_send_buff                                   = 8300
        datagram_conv_timeout                           = 90
        connection_start_timeout                        = 90
        comments                                        = ""
```

A.5 Definitions for Scenario 5

A.5.1 AIX SNA Profiles from RS600014

```
sna:
        prof_name                                       = "sna"
        max_sessions                                    = 200
        max_conversations                               = 200
        restart_action                                  = once
        dynamic_inbound_partner_lu_definitions_allowed = yes
        standard_output_device                          = "/dev/console"
        standard_error_device                           = "/var/sna/sna.stderr"
        nmvt_action_when_no_nmvt_process                = reject
        trusted_group_ids                               = {system}
        sense_detail_level                              = specific
        start_snmp_subagent                             = no
        limited_resource_timeout                        = no
        limited_resource_timeout_value                  = 15
        comments                                        = ""

control_pt:
        prof_name                                       = "node_cp"
        xid_node_id                                     = "*"
        network_name                                    = "USIBMRA"
        control_pt_name_alias                           = "R60014CP"
        control_pt_name                                 = "R60014CP"
        control_pt_node_type                            = appn_end_node
        max_cached_trees                                = 500
        max_nodes_in_topology_database                  = 500
        route_addition_resistance                       = 128
        comments                                        = ""

local_lu_lu6.2:
        prof_name                                       = "anynetlu"
        local_lu_name                                   = "RAL0000F"
        local_lu_alias                                  = "RAL0000F"
        local_lu_dependent                              = no
        local_lu_address                                =
        sscp_id                                         = *
        link_station_prof_name                          = ""
        conversation_security_list_profile_name         = ""
        rrm_enabled                                     = no
        comments                                        = ""

link_station_token_ring:
        prof_name                                       = "rs60007"
        use_control_pt_xid                              = yes
        xid_node_id                                     = "*"
```

```
        sna_dlc_profile_name                    = "tok2"
        stop_on_inactivity                      = no
        time_out_value                          = 0
        LU_registration_supported               = no
        LU_registration_profile_name            = ""
        link_tracing                            = no
        trace_format                            = long
        hpr_support                             = yes
        access_routing_type                     = link_address
        remote_link_name                        = ""
        remote_link_address                     = 0x10005ab1eddd
        mac_addr_format                         = canonical
        remote_sap                              = 0x04
        call_out_on_activation                  = yes
        verify_adjacent_node                    = no
        net_id_of_adjacent_node                 = ""
        cp_name_of_adjacent_node                = ""
        xid_node_id_of_adjacent_node            = "*"
        node_type_of_adjacent_node              = learn
        solicit_sscp_sessions                   = yes
        activate_link_during_system_init        = yes
        activate_link_on_demand                 = no
        cp_cp_sessions_supported                = yes
        cp_cp_session_support_required          = no
        adjacent_node_is_preferred_server       = no
        initial_tg_number                       = 0
        restart_on_normal_deactivation          = yes
        restart_on_abnormal_deactivation        = yes
        restart_on_activation                   = no
        TG_effective_capacity                   = 4300800
        TG_connect_cost_per_time                = 0
        TG_cost_per_byte                        = 0
        TG_security                             = nonsecure
        TG_propagation_delay                    = lan
        TG_user_defined_1                       = 128
        TG_user_defined_2                       = 128
        TG_user_defined_3                       = 128
        comments                                = ""

sna_dlc_token_ring:
        prof_name                               = "tok2"
        datalink_device_name                    = "tok2"
        force_timeout                           = 120
        user_defined_max_i_field                = no
        max_i_field_length                      = 4096
        max_active_link_stations                = 100
        num_reserved_inbound_activation         = 0
        num_reserved_outbound_activation        = 0
        transmit_window_count                   = 16
        dynamic_window_increment                = 1
        retransmit_count                        = 8
        receive_window_count                    = 8
        priority                                = 0
        inact_timeout                           = 48
        response_timeout                        = 4
        acknowledgement_timeout                 = 1
        link_name                               = ""
        local_sap                               = 0x04
        retry_interval                          = 60
```

```
        retry_limit                                     = 0
        dynamic_link_station_supported                  = yes
        trace_base_listen_link_station                  = no
        trace_base_listen_link_station_format           = long
        dynamic_lnk_solicit_sscp_sessions               = yes
        dynamic_lnk_cp_cp_sessions_supported            = yes
        dynamic_lnk_cp_cp_session_support_required      = no
        dynamic_lnk_TG_effective_capacity               = 4300800
        dynamic_lnk_TG_connect_cost_per_time            = 0
        dynamic_lnk_TG_cost_per_byte                    = 0
        dynamic_lnk_TG_security                         = nonsecure
        dynamic_lnk_TG_propagation_delay                = lan
        dynamic_lnk_TG_user_defined_1                   = 128
        dynamic_lnk_TG_user_defined_2                   = 128
        dynamic_lnk_TG_user_defined_3                   = 128
        dynamic_lnk_hpr_support                         = yes
        comments                                        = ""

mode:
        prof_name                                       = "SNACKETS"
        mode_name                                       = "SNACKETS"
        max_sessions                                    = 100
        min_conwinner_sessions                          = 50
        min_conloser_sessions                           = 0
        auto_activate_limit                             = 0
        max_adaptive_receive_pacing_window              = 16
        receive_pacing_window                           = 7
        max_ru_size                                     = 3840
        min_ru_size                                     = 128
        class_of_service_name                           = "#CONNECT"
        comments                                        = ""

socksna_minimum:
        prof_name                                       = "rs14"
        IP_address                                      = "192.168.210.14"
        subnet_mask                                     = "255.255.255.0"
        lu_template                                     = "RAL"
        map_mask                                        = "255.255.255.0"
        mode                                            = "SNACKETS"
        max_send_buff                                   = 8300
        datagram_conv_timeout                           = 90
        connection_start_timeout                        = 90
        comments                                        = ""

socksna_gw:
        prof_name                                       = "net252"
        destination_type                                = net
        destination_addr                                = "192.168.252.0"
        gateway_addr                                    = "192.168.210.11"
        comments                                        = ""
```

A.5.2 AIX SNA Profiles from RS60007

```
sna:
        prof_name                                       = "sna"
        max_sessions                                    = 200
        max_conversations                               = 200
        restart_action                                  = once
        dynamic_inbound_partner_lu_definitions_allowed = yes
```

```
        standard_output_device                          = "/dev/console"
        standard_error_device                           = "/var/sna/sna.stderr"
        nmvt_action_when_no_nmvt_process                = reject
        trusted_group_ids                               = {system}
        sense_detail_level                              = specific
        start_snmp_subagent                             = no
        limited_resource_timeout                        = no
        limited_resource_timeout_value                  = 15
        comments                                        = ""

control_pt:
        prof_name                                       = "node_cp"
        xid_node_id                                     = "*"
        network_name                                    = "USIBMRA"
        control_pt_name_alias                           = "RA6007CP"
        control_pt_name                                 = "RA6007CP"
        control_pt_node_type                            = appn_network_node
        max_cached_trees                                = 500
        max_nodes_in_topology_database                  = 500
        route_addition_resistance                       = 128
        comments                                        = ""

local_lu_lu6.2:
        prof_name                                       = "anynetlu"
        local_lu_name                                   = "RAL0000B"
        local_lu_alias                                  = "RAL0000B"
        local_lu_dependent                              = no
        local_lu_address                                =
        sscp_id                                         = *
        link_station_prof_name                          = ""
        conversation_security_list_profile_name         = ""
        rrm_enabled                                     = no
        comments                                        = ""

sna_dlc_token_ring:
        prof_name                                       = "tok0"
        datalink_device_name                            = "tok0"
        force_timeout                                   = 120
        user_defined_max_i_field                        = no
        max_i_field_length                              = 4096
        max_active_link_stations                        = 100
        num_reserved_inbound_activation                 = 0
        num_reserved_outbound_activation                = 0
        transmit_window_count                           = 16
        dynamic_window_increment                        = 1
        retransmit_count                                = 8
        receive_window_count                            = 8
        priority                                        = 0
        inact_timeout                                   = 48
        response_timeout                                = 4
        acknowledgement_timeout                         = 1
        link_name                                       = ""
        local_sap                                       = 0x04
        retry_interval                                  = 60
        retry_limit                                     = 0
        dynamic_link_station_supported                  = yes
        trace_base_listen_link_station                  = no
        trace_base_listen_link_station_format           = long
        dynamic_lnk_solicit_sscp_sessions               = yes
```

```
        dynamic_lnk_cp_cp_sessions_supported          = yes
        dynamic_lnk_cp_cp_session_support_required    = no
        dynamic_lnk_TG_effective_capacity             = 4300800
        dynamic_lnk_TG_connect_cost_per_time          = 0
        dynamic_lnk_TG_cost_per_byte                  = 0
        dynamic_lnk_TG_security                       = nonsecure
        dynamic_lnk_TG_propagation_delay              = lan
        dynamic_lnk_TG_user_defined_1                 = 128
        dynamic_lnk_TG_user_defined_2                 = 128
        dynamic_lnk_TG_user_defined_3                 = 128
        dynamic_lnk_hpr_support                       = yes
        comments                                      = ""

mode:
        prof_name                                     = "SNACKETS"
        mode_name                                     = "SNACKETS"
        max_sessions                                  = 100
        min_conwinner_sessions                        = 50
        min_conloser_sessions                         = 0
        auto_activate_limit                           = 0
        max_adaptive_receive_pacing_window            = 16
        receive_pacing_window                         = 7
        max_ru_size                                   = 3840
        min_ru_size                                   = 128
        class_of_service_name                         = "#CONNECT"
        comments                                      = ""

socksna_minimum:
        prof_name                                     = "rs7"
        IP_address                                    = "192.168.210.11"
        subnet_mask                                   = "255.255.255.0"
        lu_template                                   = "RAL"
        map_mask                                      = "255.255.255.0"
        mode                                          = "SNACKETS"
        max_send_buff                                 = 8300
        datagram_conv_timeout                         = 90
        connection_start_timeout                      = 90
        comments                                      = ""

socksna_gw:
        prof_name                                     = "net104"
        destination_type                              = net
        destination_addr                              = "9.24.104.0"
        gateway_addr                                  = "192.168.210.14"
        comments                                      = ""
```

A.6 Definitions for Scenario 6

A.6.1 AIX SNA Profiles from RS600014

```
sna:
        prof_name                                     = "sna"
        max_sessions                                  = 200
        max_conversations                             = 200
        restart_action                                = once
        dynamic_inbound_partner_lu_definitions_allowed = yes
        standard_output_device                        = "/dev/console"
        standard_error_device                         = "/var/sna/sna.stderr"
```

```
        nmvt_action_when_no_nmvt_process              = reject
        trusted_group_ids                             = {system}
        sense_detail_level                            = specific
        start_snmp_subagent                           = no
        limited_resource_timeout                      = no
        limited_resource_timeout_value                = 15
        comments                                      = ""

control_pt:
        prof_name                                     = "node_cp"
        xid_node_id                                   = "*"
        network_name                                  = "USIBMRA"
        control_pt_name_alias                         = "RA6014CP"
        control_pt_name                               = "RA6014CP"
        control_pt_node_type                          = appn_network_node
        max_cached_trees                              = 500
        max_nodes_in_topology_database                = 500
        route_addition_resistance                     = 128
        comments                                      = ""

local_lu_lu6.2:
        prof_name                                     = "anynetlu"
        local_lu_name                                 = "RAL00003"
        local_lu_alias                                = "RAL00003"
        local_lu_dependent                            = no
        local_lu_address                              =
        sscp_id                                       = *
        link_station_prof_name                        = ""
        conversation_security_list_profile_name       = ""
        rrm_enabled                                   = no
        comments                                      = ""

sna_dlc_token_ring:
        prof_name                                     = "tok2"
        datalink_device_name                          = "tok2"
        force_timeout                                 = 120
        user_defined_max_i_field                      = no
        max_i_field_length                            = 4096
        max_active_link_stations                      = 100
        num_reserved_inbound_activation               = 0
        num_reserved_outbound_activation              = 0
        transmit_window_count                         = 16
        dynamic_window_increment                      = 1
        retransmit_count                              = 8
        receive_window_count                          = 8
        priority                                      = 0
        inact_timeout                                 = 48
        response_timeout                              = 4
        acknowledgement_timeout                       = 1
        link_name                                     = ""
        local_sap                                     = 0x04
        retry_interval                                = 60
        retry_limit                                   = 0
        dynamic_link_station_supported                = yes
        trace_base_listen_link_station                = no
        trace_base_listen_link_station_format         = long
        dynamic_lnk_solicit_sscp_sessions             = yes
        dynamic_lnk_cp_cp_sessions_supported          = yes
        dynamic_lnk_cp_cp_session_support_required    = no
```

```
        dynamic_lnk_TG_effective_capacity          = 4300800
        dynamic_lnk_TG_connect_cost_per_time       = 0
        dynamic_lnk_TG_cost_per_byte               = 0
        dynamic_lnk_TG_security                    = nonsecure
        dynamic_lnk_TG_propagation_delay           = lan
        dynamic_lnk_TG_user_defined_1              = 128
        dynamic_lnk_TG_user_defined_2              = 128
        dynamic_lnk_TG_user_defined_3              = 128
        dynamic_lnk_hpr_support                    = yes
        comments                                   = ""

mode:
        prof_name                                  = "SNACKETS"
        mode_name                                  = "SNACKETS"
        max_sessions                               = 100
        min_conwinner_sessions                     = 50
        min_conloser_sessions                      = 0
        auto_activate_limit                        = 0
        max_adaptive_receive_pacing_window         = 16
        receive_pacing_window                      = 7
        max_ru_size                                = 3840
        min_ru_size                                = 128
        class_of_service_name                      = "#CONNECT"
        comments                                   = ""

socksna_minimum:
        prof_name                                  = "rs14"
        IP_address                                 = "192.168.252.3"
        subnet_mask                                = "255.255.255.0"
        lu_template                                = "RAL"
        map_mask                                   = "255.255.255.0"
        mode                                       = "SNACKETS"
        max_send_buff                              = 8300
        datagram_conv_timeout                      = 90
        connection_start_timeout                   = 90
        comments                                   = ""
```

A.6.2 AIX SNA Profiles from RS60007

```
sna:
        prof_name                                  = "sna"
        max_sessions                               = 200
        max_conversations                          = 200
        restart_action                             = once
        dynamic_inbound_partner_lu_definitions_allowed = yes
        standard_output_device                     = "/dev/console"
        standard_error_device                      = "/var/sna/sna.stderr"
        nmvt_action_when_no_nmvt_process           = reject
        trusted_group_ids                          = {system}
        sense_detail_level                         = specific
        start_snmp_subagent                        = no
        limited_resource_timeout                   = no
        limited_resource_timeout_value             = 15
        comments                                   = ""

control_pt:
        prof_name                                  = "node_cp"
        xid_node_id                                = "*"
        network_name                               = "USIBMRA"
```

```
        control_pt_name_alias                       = "R6007CP"
        control_pt_name                             = "R6007CP"
        control_pt_node_type                        = appn_end_node
        max_cached_trees                            = 500
        max_nodes_in_topology_database              = 500
        route_addition_resistance                   = 128
        comments                                    = ""

link_station_channel:
        prof_name                                   = "rs6kmpc"
        use_control_pt_xid                          = yes
        xid_node_id                                 = "*"
        sna_dlc_profile_name                        = "mpc0"
        stop_on_inactivity                          = no
        time_out_value                              = 0
        LU_registration_supported                   = no
        LU_registration_profile_name                = ""
        link_tracing                                = no
        trace_format                                = long
        connection_name                             = "sna"
        verify_adjacent_node                        = no
        net_id_of_adjacent_node                     = ""
        cp_name_of_adjacent_node                    = ""
        xid_node_id_of_adjacent_node                = "*"
        node_type_of_adjacent_node                  = learn
        solicit_sscp_sessions                       = no
        activate_link_during_system_init            = yes
        activate_link_on_demand                     = no
        cp_cp_sessions_supported                    = yes
        cp_cp_session_support_required              = no
        adjacent_node_is_preferred_server           = no
        initial_tg_number                           = 0
        restart_on_normal_deactivation              = yes
        restart_on_abnormal_deactivation            = yes
        TG_effective_capacity                       = 39321600
        TG_connect_cost_per_time                    = 128
        TG_cost_per_byte                            = 128
        TG_security                                 = nonsecure
        TG_propagation_delay                        = minimum
        TG_user_defined_1                           = 128
        TG_user_defined_2                           = 128
        TG_user_defined_3                           = 128
        comments                                    = ""
        hpr_support                                 = yes

sna_dlc_channel:
        prof_name                                   = "mpc0"
        datalink_device_name                        = "mpc"
        force_timeout                               = 600
        user_defined_max_i_field                    = no
        max_i_field_length                          = 4096
        retry_interval                              = 60
        retry_limit                                 = 0
        comments                                    = ""

mode:
        prof_name                                   = "SNACKETS"
        mode_name                                   = "SNACKETS"
        max_sessions                                = 100
```

```
        min_conwinner_sessions                  = 50
        min_conloser_sessions                   = 0
        auto_activate_limit                     = 0
        max_adaptive_receive_pacing_window      = 16
        receive_pacing_window                   = 7
        max_ru_size                             = 3840
        min_ru_size                             = 128
        class_of_service_name                   = "#INTER"
        comments                                = ""

socksna_minimum:
        prof_name                               = "rs7"
        IP_address                              = "192.168.210.11"
        subnet_mask                             = "255.255.255.0"
        lu_template                             = "RAL"
        map_mask                                = "255.255.255.0"
        mode                                    = "SNACKETS"
        max_send_buff                           = 8300
        datagram_conv_timeout                   = 90
        connection_start_timeout                = 90
        comments                                = ""
```

Appendix B. AIX Software Code Level for AIX Test Machines

This Appendix lists the software code levels for the AIX machines used in the scenarios. The listings are the output from the AIX command `lslpp -l`. The list only includes LPPs that are important or necessary for using AnyNet or Host On-Demand scenarios.

```
  Fileset                      Level  State      Description
  ----------------------------------------------------------------------------
  FW.base                    3.1.0.0  COMMITTED  Base IBM Firewall
  FW.cfgcli                  3.1.0.0  COMMITTED  IBM Firewall Remote
                                                 Configuration Client
  FW.libraries               3.1.0.0  COMMITTED  IBM Firewall Common Libraries
                                                 and Catalogs
  FW.report                  3.1.0.0  COMMITTED  IBM Firewall Report Generation
                                                 Utilities
  SNA_CA.cfg                 1.2.1.1  COMMITTED  SNA Client Access
                                                 Configuration Package
  SNA_CA.msg.en_US.cfg       1.2.1.1  COMMITTED  SNA Client Access
                                                 Configuration Messages
  SNA_CA.rte                 1.2.1.1  COMMITTED  SNA Client Access
  bos.adt.syscalls           4.2.0.6  COMMITTED  System Calls Application
                                                 Development Toolkit
  bos.dlc.8023               4.2.0.4  COMMITTED  IEEE Ethernet (802.3) Data
                                                 Link Control
  bos.dlc.com                4.2.0.1  COMMITTED  Common Data Link Control files
  bos.dlc.com_enet           4.2.0.0  COMMITTED  Common Ethernet Data Link
                                                 files
  bos.dlc.ether              4.2.0.4  COMMITTED  Standard Ethernet Data Link
                                                 Control
  bos.dlc.fddi               4.2.0.4  COMMITTED  FDDI Data Link Control
  bos.dlc.qllc               4.2.0.1  COMMITTED  X.25 QLLC Data Link Control
  bos.dlc.sdlc               4.2.0.2  COMMITTED  SDLC Data Link Control
  bos.dlc.token              4.2.0.4  COMMITTED  Token-Ring Data Link Control
  bos.net.tcp.client        4.2.0.12  COMMITTED  TCP/IP Client Support
  bos.net.tcp.server         4.2.0.8  COMMITTED  TCP/IP Server
  bos.net.tcp.smit           4.2.0.0  COMMITTED  TCP/IP SMIT Support
  bos.sysmgt.trace           4.2.0.2  COMMITTED  Software Trace Service Aids
  bos.up                    4.2.0.11  COMMITTED  Base Operating System
                                                 Uniprocessor Runtime
  devices.mca.8fc3.diag      4.1.5.0  COMMITTED  ESCON Adapter Diagnostics
  devices.mca.8fc3.rte       1.1.0.5  COMMITTED  ESCON Adapter (8fc3) Software
  dtext.brwsr                2.3.0.2  COMMITTED  DynaText Browser
  escon.cuu                  3.2.0.6  COMMITTED  370 ESCON Control Unit Channel
                                                 Adapter Microcode
  host_on_demand.rte         1.0.0.0  COMMITTED  IBM Host On-Demand for AIX
  mpc.rte                    1.1.0.0  COMMITTED  Multipath Channel Driver
  sna.anynet.base            3.1.2.3  COMMITTED  AnyNet Base
  sna.anynet.snaip           3.1.2.3  COMMITTED  AnyNet APPC over TCP/IP
  sna.anynet.socksna         3.1.2.3  COMMITTED  AnyNet Sockets over SNA
  sna.books.adoc             4.2.0.0  COMMITTED  Communications Server APPC
                                                 Application Suite User's Guide
  sna.books.bmxdoc           4.2.0.0  COMMITTED  Block Mux Channel Adapter
                                                 User's Guide and Service Info
  sna.books.chdoc            4.2.0.1  COMMITTED  Channel Connectivity User's
                                                 Guide
  sna.books.cmdoc            4.2.0.0  COMMITTED  Communications Server Command
                                                 Reference
```

```
sna.books.cpicdoc          4.2.0.0  COMMITTED  Communications Server
                                               Introduction to CPI-C
                                               Programming
sna.books.crdoc            4.2.0.0  COMMITTED  Communications Server
                                               Configuration Reference
sna.books.dgdoc            4.2.0.0  COMMITTED  Communications Server
                                               Diagnosis Guide and Messages
sna.books.escdoc           4.2.0.1  COMMITTED  ESCON Adapter User's Guide and
                                               Service Information
sna.books.gendoc           4.2.0.0  COMMITTED  Communications Server General
                                               Information Manual
sna.books.gwdoc            4.2.0.0  COMMITTED  Communications Server SNA
                                               Gateway User's Guide
sna.books.ppdoc            4.2.0.0  COMMITTED  Communications Server Planning
                                               and Performance Guide
sna.books.snaipdoc         4.2.0.0  COMMITTED  Communications Server Anynet
                                               Guide to APPC over TCP/IP
sna.books.socksnadoc       4.2.0.0  COMMITTED  Communications Server Anynet
                                               Guide to Sockets over SNA
sna.books.tpdoc            4.2.0.0  COMMITTED  Communications Server
                                               Transaction Program Reference
sna.books.updoc            4.2.0.0  COMMITTED  Communications Server Up and
                                               Running!
sna.books.usdoc            4.2.0.0  COMMITTED  Communications Server User's
                                               Guide
sna.dlcchannel             2.1.0.2  COMMITTED  Channel Data Link Control
sna.dlcmpc                 1.1.0.0  COMMITTED  MPC Data Link Control
sna.gw                     3.1.2.3  COMMITTED  SNA Gateway
sna.instdlc.channel        3.1.2.0  COMMITTED  Communications Server for AIX
                                               Channel DLC Inclusion Fileset
sna.instdlc.ethernet       3.1.2.0  COMMITTED  Communications Server for AIX
                                               Ethernet DLC Inclusion Fileset
sna.instdlc.sdlc           3.1.2.0  COMMITTED  Communications Server for AIX
                                               SDLC DLC Inclusion Fileset
sna.instdlc.token          3.1.2.0  COMMITTED  Communications Server for AIX
                                               Token Ring DLC Inclusion
                                               Fileset
sna.lu0                    3.1.2.3  COMMITTED  Logical Unit 0 (LU0)
sna.msg.en_US.anynet.rte   3.1.2.3  COMMITTED  AnyNet Messages - U.S. English
sna.msg.en_US.rte          3.1.2.3  COMMITTED  SNA Base Messages - U.S.
                                               English
sna.msg.en_US.snapi        3.1.2.3  COMMITTED  SNAPI Messages - U.S. English
sna.rte                    3.1.2.3  COMMITTED  Communications Server Base
                                               (LU1, LU2, LU3, LU6.2)
sna.snapi                  3.1.2.3  COMMITTED  Communications Server SNAPI TP
                                               development tool
sna.toolkit.3270           3.1.2.3  COMMITTED  APPC 3270 Emulator
sna.toolkit.aftp           3.1.2.3  COMMITTED  APPC File Transfer
                                               Applications
sna.toolkit.aname          3.1.2.3  COMMITTED  APPC/APPN Name Server
sna.toolkit.basic          3.1.2.3  COMMITTED  Basic APPC Connectivity
                                               Applications
sna.toolkit.misc           3.1.2.3  COMMITTED  Miscellaneous APPC
                                               Applications
sna.toolkit.rte            3.1.2.3  COMMITTED  APPC Application Suite Common
                                               Routines
sna.xsna                   3.1.2.3  COMMITTED  X-windows Management Tool for
                                               Communications Server
```

Appendix C. Firewall Definitions

In scenario 5 and 6 the IBM Firewall V3R1 code was running on an RS/6000. Firewall configurations are not within the scope of this publication but for reference purposes the active configuration for RS60007 in scenario 6 is listed.

C.1 RS60007

The following definitions were taken from the IBM Firewall smit interface from RS60007.

C.1.1.1 IBM Firewall smit Interface

```
                          IBM Firewall V3R1 for AIX

Move cursor to desired item and press Enter.

  System Administration
  Filters
  Network Address Translation (NAT)
  Socks Services
  Users
  HTTP Proxy Configuration
  Virtual Private Network
  Simple Network Management Protocol (SNMP)
  System Logs
  View README
```

C.1.1.2 Network Interfaces

```
       127.127.0.2     Secure Interface
       192.168.210.11  Secure Interface
       9.24.104.76     Non-Secure Interface
```

C.1.1.3 Active Filters

```
Rule 1:
  Rule action               : permit
  Source Address            : 127.127.0.0
  Source Mask               : 255.255.0.0
  Destination Address       : 127.127.0.2
  Destination Mask          : 255.255.255.255
  Protocol                  : tcp
  Source Port/ICMP/OSPF Type :eq  1234
  Destination Port/ICMP Code :gt  1023
  Interface                 : specific
  Routing                   : both
  Direction                 : inbound
  Logging control           :yes
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 2:
  Rule action               : permit
  Source Address            : 127.127.0.2
  Source Mask               : 255.255.255.255
  Destination Address       : 127.127.0.0
  Destination Mask          : 255.255.0.0
  Protocol                  : tcp/ack
  Source Port/ICMP/OSPF Type :gt  1023
  Destination Port/ICMP Code :eq  1234
  Interface                 : specific
  Routing                   : both
  Direction                 : outbound
  Logging control           :yes
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 3:
  Rule action               : permit
  Source Address            : 0.0.0.0
  Source Mask               : 0.0.0.0
  Destination Address       : 9.24.104.76
  Destination Mask          : 255.255.255.255
  Protocol                  : tcp
  Source Port/ICMP/OSPF Type :gt  1023
  Destination Port/ICMP Code :eq  23
  Interface                 : non-secure
  Routing                   : local
  Direction                 : inbound
  Logging control           :no
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 4:
  Rule action                : permit
  Source Address             : 9.24.104.76
  Source Mask                : 255.255.255.255
  Destination Address        : 0.0.0.0
  Destination Mask           : 0.0.0.0
  Protocol                   : tcp/ack
  Source Port/ICMP/OSPF Type :eq  23
  Destination Port/ICMP Code :gt  1023
  Interface                  : non-secure
  Routing                    : local
  Direction                  : outbound
  Logging control            :no
  Fragment control           :yes
  Tunnel ID number           : 0
  Authenticate algorithm     : none
  Encryption algorithm       : none
```

```
Rule 5:
  Rule action                : permit
  Source Address             : 0.0.0.0
  Source Mask                : 0.0.0.0
  Destination Address        : 192.168.210.11
  Destination Mask           : 255.255.255.255
  Protocol                   : tcp
  Source Port/ICMP/OSPF Type :gt  1023
  Destination Port/ICMP Code :eq  23
  Interface                  : non-secure
  Routing                    : local
  Direction                  : inbound
  Logging control            :no
  Fragment control           :yes
  Tunnel ID number           : 0
  Authenticate algorithm     : none
  Encryption algorithm       : none
```

```
Rule 6:
  Rule action                : permit
  Source Address             : 192.168.210.11
  Source Mask                : 255.255.255.255
  Destination Address        : 0.0.0.0
  Destination Mask           : 0.0.0.0
  Protocol                   : tcp/ack
  Source Port/ICMP/OSPF Type :eq  23
  Destination Port/ICMP Code :gt  1023
  Interface                  : non-secure
  Routing                    : local
  Direction                  : outbound
  Logging control            :no
  Fragment control           :yes
  Tunnel ID number           : 0
  Authenticate algorithm     : none
  Encryption algorithm       : none
```

```
Rule 7:
  Rule action               : permit
  Source Address            : 0.0.0.0
  Source Mask               : 0.0.0.0
  Destination Address       : 192.168.210.1
  Destination Mask          : 255.255.255.255
  Protocol                  : icmp
  Operation type            :eq  8
  Operation code            :eq  0
  Interface                 : both
  Routing                   : both
  Direction                 : both
  Logging control           :no
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 8:
  Rule action               : permit
  Source Address            : 192.168.210.1
  Source Mask               : 255.255.255.255
  Destination Address       : 0.0.0.0
  Destination Mask          : 0.0.0.0
  Protocol                  : icmp
  Operation type            :eq  0
  Operation code            :eq  0
  Interface                 : both
  Routing                   : both
  Direction                 : both
  Logging control           :no
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 9:
  Rule action               : permit
  Source Address            : 0.0.0.0
  Source Mask               : 0.0.0.0
  Destination Address       : 9.24.104.76
  Destination Mask          : 255.255.255.255
  Protocol                  : icmp
  Operation type            :eq  8
  Operation code            :eq  0
  Interface                 : both
  Routing                   : both
  Direction                 : both
  Logging control           :no
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 10:
  Rule action               : permit
  Source Address            : 9.24.104.76
  Source Mask               : 255.255.255.255
  Destination Address       : 0.0.0.0
  Destination Mask          : 0.0.0.0
  Protocol                  : icmp
  Operation type            :eq  0
  Operation code            :eq  0
  Interface                 : both
  Routing                   : both
  Direction                 : both
  Logging control           :no
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 11:
  Rule action               : permit
  Source Address            : 0.0.0.0
  Source Mask               : 0.0.0.0
  Destination Address       : 192.168.210.11
  Destination Mask          : 255.255.255.255
  Protocol                  : icmp
  Operation type            :eq  8
  Operation code            :eq  0
  Interface                 : both
  Routing                   : both
  Direction                 : both
  Logging control           :no
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 12:
  Rule action               : permit
  Source Address            : 192.168.210.11
  Source Mask               : 255.255.255.255
  Destination Address       : 0.0.0.0
  Destination Mask          : 0.0.0.0
  Protocol                  : icmp
  Operation type            :eq  0
  Operation code            :eq  0
  Interface                 : both
  Routing                   : both
  Direction                 : both
  Logging control           :no
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 13:
  Rule action               : permit
  Source Address            : 0.0.0.0
  Source Mask               : 0.0.0.0
  Destination Address       : 192.168.210.1
  Destination Mask          : 255.255.255.255
  Protocol                  : tcp
  Source Port/ICMP/OSPF Type :gt  1023
  Destination Port/ICMP Code :eq  80
  Interface                 : non-secure
  Routing                   : route
  Direction                 : inbound
  Logging control           :yes
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 14:
  Rule action               : permit
  Source Address            : 0.0.0.0
  Source Mask               : 0.0.0.0
  Destination Address       : 192.168.210.1
  Destination Mask          : 255.255.255.255
  Protocol                  : tcp
  Source Port/ICMP/OSPF Type :gt  1023
  Destination Port/ICMP Code :eq  80
  Interface                 : secure
  Routing                   : route
  Direction                 : outbound
  Logging control           :yes
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 15:
  Rule action               : permit
  Source Address            : 192.168.210.1
  Source Mask               : 255.255.255.255
  Destination Address       : 0.0.0.0
  Destination Mask          : 0.0.0.0
  Protocol                  : tcp/ack
  Source Port/ICMP/OSPF Type :eq  80
  Destination Port/ICMP Code :gt  1023
  Interface                 : secure
  Routing                   : route
  Direction                 : inbound
  Logging control           :yes
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 16:
  Rule action               : permit
  Source Address            : 192.168.210.1
  Source Mask               : 255.255.255.255
  Destination Address       : 0.0.0.0
  Destination Mask          : 0.0.0.0
  Protocol                  : tcp/ack
  Source Port/ICMP/OSPF Type :eq  80
  Destination Port/ICMP Code :gt  1023
  Interface                 : non-secure
  Routing                   : route
  Direction                 : outbound
  Logging control           :yes
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

```
Rule 17:
  Rule action               : deny
  Source Address            : 0.0.0.0
  Source Mask               : 0.0.0.0
  Destination Address       : 0.0.0.0
  Destination Mask          : 0.0.0.0
  Protocol                  : all
  Source Port/ICMP/OSPF Type :any 0
  Destination Port/ICMP Code :any 0
  Interface                 : both
  Routing                   : both
  Direction                 : both
  Logging control           :yes
  Fragment control          :yes
  Tunnel ID number          : 0
  Authenticate algorithm    : none
  Encryption algorithm      : none
```

C.1.1.4 Groups

```
Group name      : firewall and MVS
Single objects  : 501 503 502
Description     :

Group name      : firewall
Single objects  : 503 502
Description     :
```

```
Name                : SNAGW traffic
Source Object       : 506
Destination Object  : 504
Services            : 504
Socks List          :
Description         :

Name                : telnet in to firewall
Source Object       : 1
Destination Object  : 508
Services            : 11
Socks List          :
Description         :

Name                : inbound ping
Source Object       : 1
Destination Object  : 505
Services            : 18
Socks List          :
Description         :

Name                : HTTP Inbound to MVS
Source Object       : 1
Destination Object  : 501
Services            : 502
Socks List          :
Description         :
```

C.1.1.5 Objects

```
Name               : firewall non-secure address
Address            : 9.24.104.76
Mask               : 255.255.255.255
Type               : Host
User Name          :
Filter Lifetime    :
Description        :

Name               : firewall secure address
Address            : 192.168.210.11
Mask               : 255.255.255.255
Type               : Host
User Name          :
Filter Lifetime    :
Description        :


Name               : MVS18
Address            : 192.168.210.1
Mask               : 255.255.255.255
Type               : Host
User Name          :
Filter Lifetime    :
Description        : Just the MVS system

Name               : SNA gateway network
Address            : 127.127.0.0
Mask               : 255.255.0.0
Type               : Network
User Name          :
Filter Lifetime    :

Description        : The 127.127 network
Name               : SNA gateway node
Address            : 127.127.0.2
Mask               : 255.255.255.255
Type               : Host
User Name          :
Filter Lifetime    :
Description        : Address associated with gw0

Name               : The World
Address            : 0
Mask               : 0
Type               : Network
User Name          :
Filter Lifetime    :
Description        :
```

Appendix D. Special Notices

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Appendix E. Related Publications

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

E.1 International Technical Support Organization Publications

For information on ordering these ITSO publications see “How to Get ITSO Redbooks” on page 223.

- *IBM Communications Server for OS/2 Warp Version 4.0 Enhancements*, SG24-4587
- *IBM TCP/IP Version 3 Release 2 for MVS Implementation Guide*, SG24-3687
- *Accessing OS/390 OpenEdition MVS from the Internet*, SG24-4721
- *A Guide to the Internet Connection Servers*, SG24-4805
- *Building a Firewall with the IBM Internet Connection Secure Network Gateway*, SG24-2577

E.2 Redbooks on CD-ROMs

Redbooks are also available on CD-ROMs. **Order a subscription** and receive updates 2-4 times a year at significant savings.

CD-ROM Title	Subscription Number	Collection Kit Number
System/390 Redbooks Collection	SBOF-7201	SK2T-2177
Networking and Systems Management Redbooks Collection	SBOF-7370	SK2T-6022
Transaction Processing and Data Management Redbook	SBOF-7240	SK2T-8038
AS/400 Redbooks Collection	SBOF-7270	SK2T-2849
RS/6000 Redbooks Collection (HTML, BkMgr)	SBOF-7230	SK2T-8040
RS/6000 Redbooks Collection (PostScript)	SBOF-7205	SK2T-8041
Application Development Redbooks Collection	SBOF-7290	SK2T-8037
Personal Systems Redbooks Collection	SBOF-7250	SK2T-8042

E.3 Other Publications

These publications are also relevant as further information sources:

- *VTAM V4R4 AnyNet Guide to Sockets over SNA*, SC31-8371
- *Communication Server for AIX AnyNet Guide to Sockets over SNA*, SC31-8217
- *Communication Server for AIX: Channel Connectivity User's Guide*, SC31-8219
- *AIX Version 4 ESCON Adapter: User's Guide and Service Information*, SC31-8197
- *Communications Server for AIX Planning and Performance Guide*, SC31-8220-01
- *VTAM V4R4 Network Implementation Guide*, SC31-8370

How to Get ITSO Redbooks

This section explains how both customers and IBM employees can find out about ITSO redbooks, CD-ROMs, workshops, and residencies. A form for ordering books and CD-ROMs is also provided.

This information was current at the time of publication, but is continually subject to change. The latest information may be found at http://www.redbooks.ibm.com.

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- **PUBORDER** — to order hardcopies in United States
- **GOPHER link to the Internet** - type GOPHER.WTSCPOK.ITSO.IBM.COM
- **Tools disks**

  To get LIST3820s of redbooks, type one of the following commands:

  ```
  TOOLS SENDTO EHONE4 TOOLS2 REDPRINT GET SG24xxxx PACKAGE
  TOOLS SENDTO CANVM2 TOOLS REDPRINT GET SG24xxxx PACKAGE (Canadian users only)
  ```

  To get BookManager BOOKs of redbooks, type the following command:

  ```
  TOOLCAT REDBOOKS
  ```

  To get lists of redbooks, type one of the following commands:

  ```
  TOOLS SENDTO USDIST MKTTOOLS MKTTOOLS GET ITSOCAT TXT
  TOOLS SENDTO USDIST MKTTOOLS MKTTOOLS GET LISTSERV PACKAGE
  ```

  To register for information on workshops, residencies, and redbooks, type the following command:

  ```
  TOOLS SENDTO WTSCPOK TOOLS ZDISK GET ITSOREGI 1996
  ```

  For a list of product area specialists in the ITSO: type the following command:

  ```
  TOOLS SENDTO WTSCPOK TOOLS ZDISK GET ORGCARD PACKAGE
  ```

- **Redbooks Web Site on the World Wide Web**

  http://w3.itso.ibm.com/redbooks

- **IBM Direct Publications Catalog on the World Wide Web**

  http://www.elink.ibmlink.ibm.com/pbl/pbl

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Redpieces

For information so current it is still in the process of being written, look at "Redpieces" on the Redbooks Web Site (http://www.redbooks.ibm.com/redpieces.htm). Redpieces are redbooks in progress; not all redbooks become redpieces, and sometimes just a few chapters will be published this way. The intent is to get the information out much quicker than the formal publishing process allows.

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