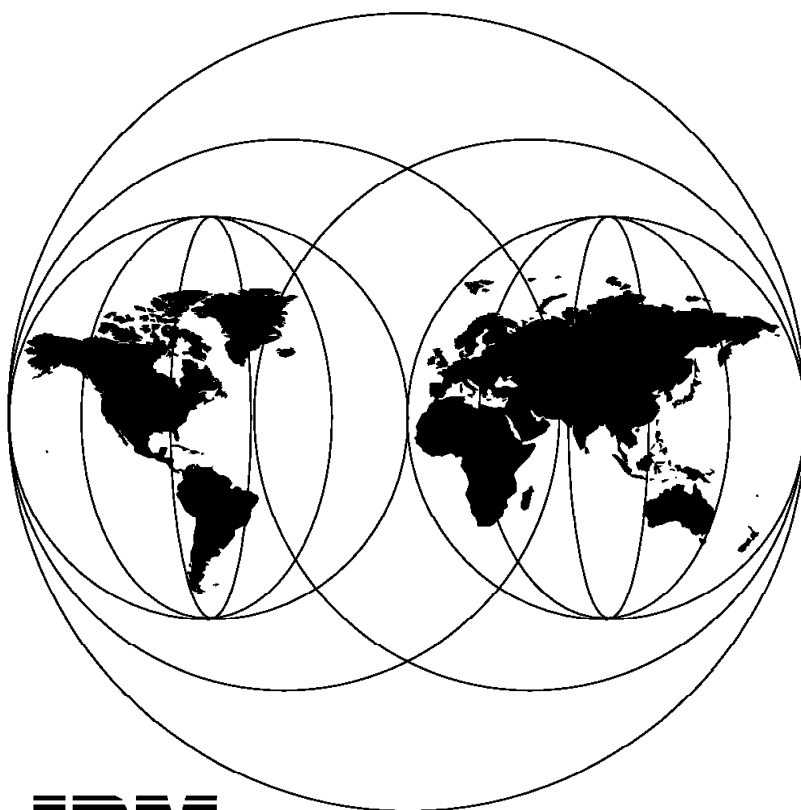


Communications Server for AIX Explored

June 1996



IBM

**International Technical Support Organization
Raleigh Center**



International Technical Support Organization

SG24-2591-00

**Communications Server
for AIX Explored**

June 1996

Take Note!

Before using this information and the product it supports, be sure to read the general information in Appendix A, "Special Notices" on page 233.

First Edition (June 1996)

This edition applies to Version 4 of Communications Server for AIX Program Number 5765-652 for use with the AIX Version 4.

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Preface

This redbook describes many of the new functions in Communications Server for AIX. It provides working examples and configuration guidelines for these new functions. This book could be used to explore features such as APPC over TCP/IP, AIX Sockets over SNA, SNA Application Access for AIX, SNA Client Access for AIX and SNA Gateway.

It includes configuration examples for a block multiplexer adapter and an ESCON adaptor used in SNA Channel for AIX and TCP/IP. The book explores some new features of SNA Gateway. Some guidelines for problem determination of Communication Server for AIX are provided in the book. It applies to the AIX Version 4.1.4 operating system using Communications Server for AIX Version 4.0. It provides a starting point for getting familiar with Communications Server for AIX.

Some knowledge of AIX V4, SMIT and System Network Architecture (SNA) is assumed.

How This Redbook Is Organized

This redbook is 249 pages. It is organized as follows:

- Chapter 1, "Overview of Communications Server for AIX"
This provides an overview of Communications Server for AIX.
- Chapter 2, "SNA Application Access for AIX"
This provides configuration examples of SNA Application Access for AIX for local domain and cross domain sessions.
- Chapter 3, "SNA Client Access for AIX"
This provides configuration examples of SNA Client Access for AIX for tn3270 and tn5250 clients.
- Chapter 4, "APPC over TCP/IP and AIX Sockets over SNA"
This provides some configuration examples of AnyNet for AIX APPC over TCP/IP and AIX Sockets over SNA.
- Chapter 5, "Block Multiplexer for SNA Channel for AIX and TCP/IP"
This provides a configuration example of block multiplexer used in SNA Channel for AIX and in TCP/IP environments.
- Chapter 6, "ESCON Adapter for SNA Channel for AIX and TCP/IP"
This provides a configuration example of ESCON used in SNA Channel for AIX and in TCP/IP environments.
- Chapter 7, "SNA Server for AIX and SNA Gateway"
This explores the minimized link usage feature of SNA Gateway with an example.
- Chapter 8, "Network Management"
This provides some configuration examples of network management.
- Chapter 9, "XSNA"

This provides some sample screens of Xsna.

- Chapter 10, “Guidelines to Problem Determination”

This provides some problem determination steps for Communications Server for AIX.

The Team That Wrote This Redbook

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Comments Welcome

We want our redbooks to be as helpful as possible. Should you have any comments about this or other redbooks, please send us a note at the following address:

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Your comments are important to us!

Chapter 1. Overview of Communications Server for AIX

IBM Communications Server for AIX offers a total enterprise networking solution. This offers SNA to AIX or UNIX connectivity and a whole lot more. This chapter describes some of the features of the Communications Server for AIX and the component software products.

1.1 Features of Communications Server for AIX

This section lists some of the highlights of the features available in Communications Server for AIX.

Multiprotocol Solutions

Integrates SNA and TCP/IP networks with AnyNet for AIX, reducing the need for parallel networks.

IBM Communications Server for AIX and TCP/IP interoperability products can be used to share data and applications across multiprotocol networks. This eases the formidable task of integrating a diverse environment of mainframe servers, mid-range computers and workstations across SNA and TCP/IP networks.

AnyNet for AIX functions and SNA Client Access for AIX offer many solutions for a customer's complex environment. This allows the customer to integrate applications designed to run over different protocols, without changing applications or modifying network hardware.

AnyNet for AIX based on Multiprotocol Transport Networking (MPTN) technology, an open industry standard architecture, is designed to allow any application to run over any network protocol.

AnyNet Solutions

Provides access to any TCP/IP or SNA application.

AnyNet APPC over TCP/IP can be used to extend APPC and CPI-C applications to TCP/IP users, without adding a separate SNA network. This allows AIX, APPC or CPI-C application, such as CICS/6000 or DB2/6000, to communicate from a central computer and workstations across an existing TCP/IP network, without changing the applications.

AnyNet Sockets over SNA allows customers to add BSD sockets applications to existing SNA networks, without adding a separate TCP/IP network. This allows AIX or UNIX users to access sockets applications such as File Transfer Protocol (FTP), SNMP, Lotus Notes and NetView across an SNA network.

SNA Application Access and SNA Client Access

IBM SNA Application Access for AIX allows SNA 3270 devices to gain access to AIX or UNIX applications, such as CICS/6000 or DB2/6000 (this includes devices, either real or emulated, located anywhere on an SNA network).

IBM SNA Client Access for AIX provides access to SNA networks for a wide range of TCP/IP clients. SNA Client Access for AIX works as a

TCP/IP Telnet server, providing SNA network access to client applications running anywhere in the TCP/IP network.

Integration and Scalability

Provides a cost-efficient, scalable solution from small networks to large enterprise networks. Communications Server was designed with AIX and RS/6000 in mind. By taking advantage of system facilities, this design enables maximum performance and data throughput. From a network of only a few nodes to a network of tens of thousands of nodes, Communications Server for AIX integrates applications and protocols seamlessly.

Runs on AIX Version 4. Please note that most of the functions of Communications Server for AIX are available under AIX Version 3.2 and other versions of SNA Server for AIX.

SNA Channel for AIX

If the mainframe server is running at capacity and it cannot be expanded, there should be a way to offload some of this activity to free up application processing. The Channel Attachment feature of Communications Server for AIX supports a directly attached connection from your centralized computer to your RS/6000 system.

Communications Server for AIX supports direct S/390 channel and ESCON attachment. This enables off-loading of critical applications, such as database and transaction processing.

Communications Server for AIX supports Client Input Output/Sockets (CLIOS), which is a data transfer protocol that utilizes the Block Multiplexer and ESCON channels in the TCP/IP environment for high speed file and data transfer.

Gateway Support

Provides a powerful gateway server for SNA and TCP/IP clients.

The SNA Gateway function of Communications Server allows many SNA clients to go through a single communication server to one or more centralized computers. It also allows clients to access, on the fly, a backup host that shares the workload and improves availability of resources. The enterprise gateway can concentrate thousands of sessions into the host using only one physical connection.

3270 Emulation

Included with the Communications Server for AIX is a single user license for IBM 3270 Host Connections program. This allows any administrative work to be carried out.

TN3270E Emulation

SNA Client Access for AIX also provides Telnet 3270E server functions. The standard extensions allow users to print from mainframe applications to printers attached to their workstations or to printers in their TCP/IP network. SNA Client Access for AIX can also pass responses on printing, which allows end-to-end printer confirmation.

In addition, TN3270E server supports industry-standard TN3270E clients. This allows you to access LUs by LU names.

Easy to Install and Configure

Communications Server for AIX includes XSNA graphical interface to display and manage the SNA resources easily. The XSNA tool allows the user to display line and session information, stop and start resources and start traces on a graphical interface.

1.2 Components Used in this Redbook

The following software and hardware components were used to test the various functions of Communications Server for AIX V4.

- SNA Server for AIX V3.1
- SNA Gateway V3.1
- SNA Application Access for AIX V1.2.1
- SNA Client Access for AIX V1.2.1
- SNA DLC for Channel
- AnyNet for AIX
- AIX NetView Service Point V1.2.1
- PCOM/3270
- DOS/Windows Client
- OS/2 Client
- AIX Client
- Token-Ring High-Performance Network Adapter
- Ethernet High-Performance LAN Adapter or the Ethernet Integrated Adapter
- Block Multiplexer Channel
 - Block Multiplexer Channel Adapter
 - Block Multiplexer Adapter Cable
 - Block Multiplexer Interface Assembly
 - BUS and TAG cable of appropriate length
- ESCON Channel
 - ESCON Channel Adapter
 - ESCON fiber optic cabling and connectors
- MVS ESA Host

The hardware that was used in the examples in this book is:

- RS60002 (RISC System/6000 Model 530)
- RS60005 (RISC System/6000 Model 370)
- RS60007 (RISC System/6000 Model 520H)
- RS600012 (RISC System/6000 Model 370)
- RS600020 (RISC System/6000 Model J30)
- PS/2 486 for OS/2
- PS/2 386 for DOS/Windows

- ES/9000 and 3745/6

The network diagram of systems used is given in Figure 1.

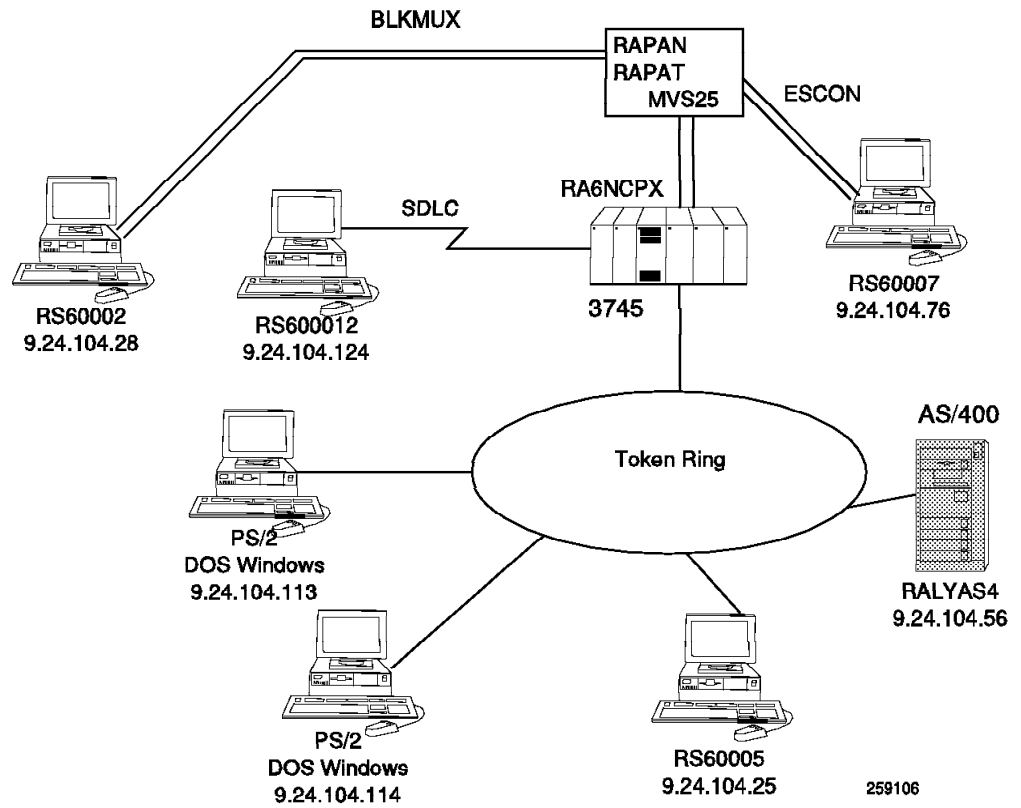


Figure 1. Network Diagram for Systems Used

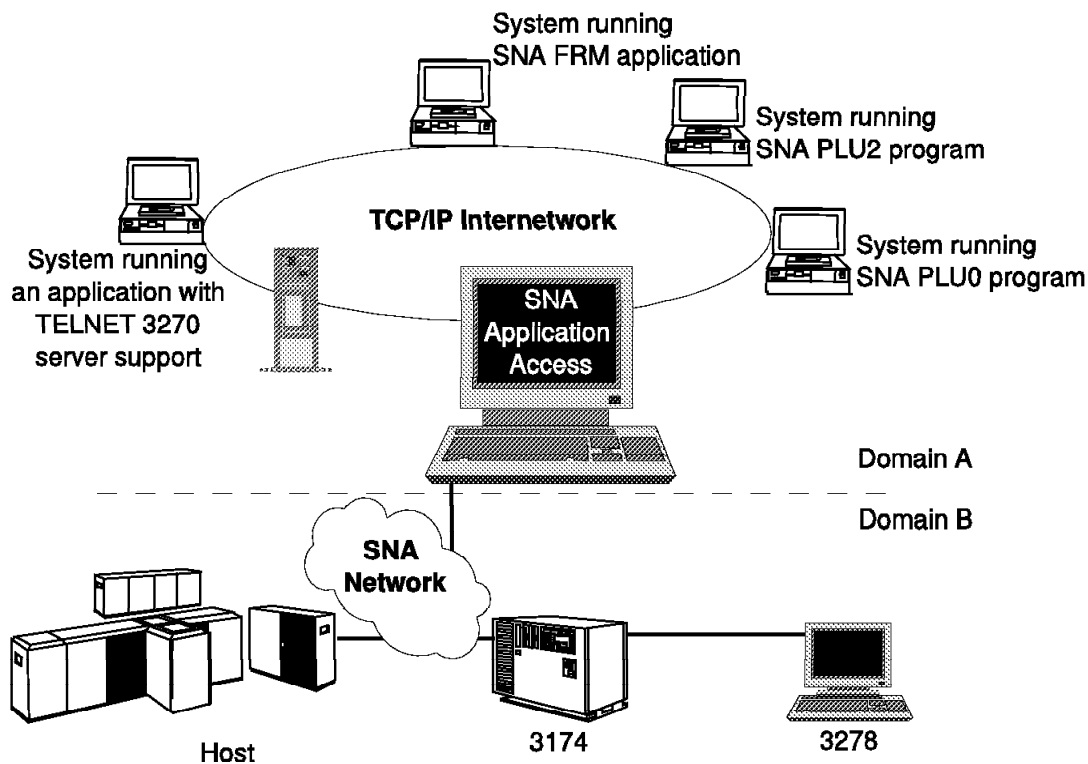
Chapter 2. SNA Application Access for AIX

SNA Application Access for AIX enables SNA 3270 applications to communicate with IBM RISC System/6000 systems. With SNA Application Access for AIX, display stations anywhere in an SNA network can interact with applications running on AIX systems.

This chapter provides configuration examples to test some of the following features of SNA Application Access for AIX:

- Local-domain session support
- Cross-domain session support
- Token-ring and SDLC link connections
- Logical unit (LU) support for SNA 3270 display stations (LU type 2)
- Access to AIX applications by using ASCII dumb terminal mode or VT100 terminal emulation
- Enabling SNA 3270 devices to appear as TN3270 client terminals
- Providing SNA APIs to allow existing, or user-developed applications to interact with SNA peripheral and SNA 3270 devices

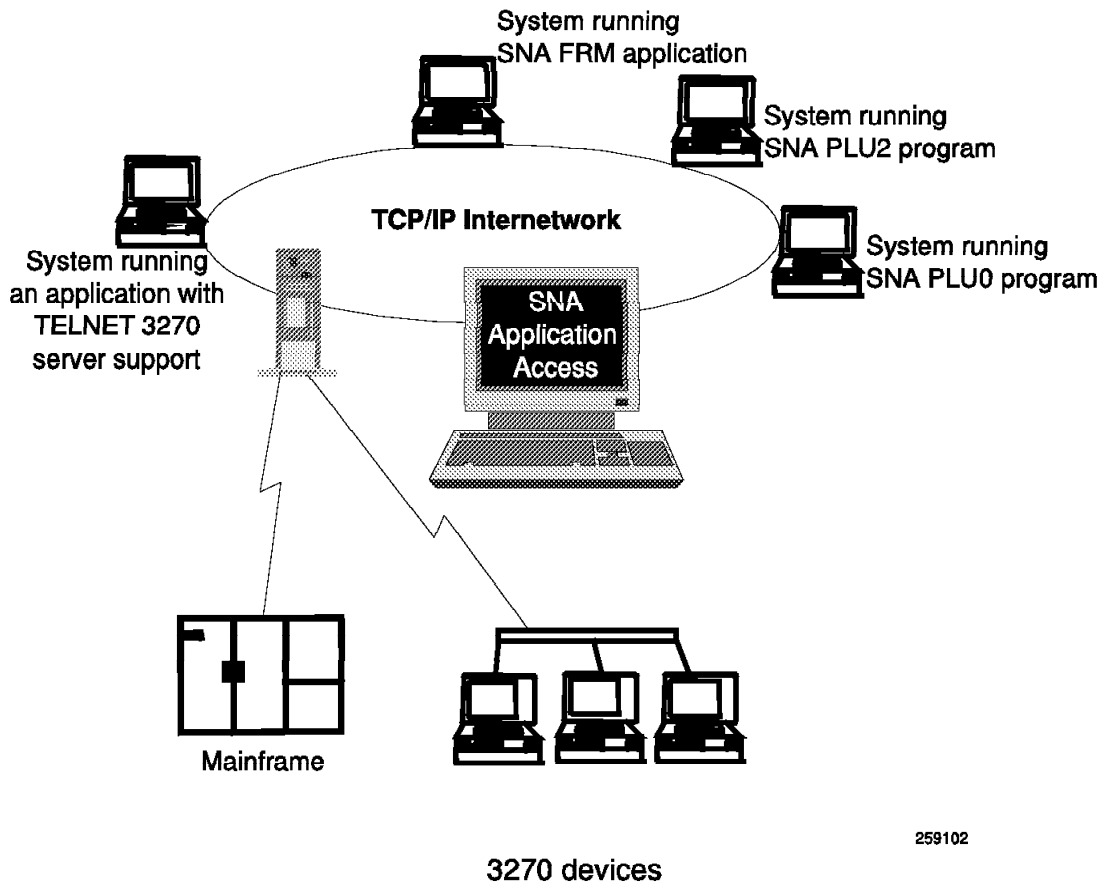
Figure 2 shows SNA Application Access for AIX used in a cross-domain configuration.



259101

Figure 2. SNA Application Access for AIX in Cross Domain

Figure 3 on page 6 shows SNA Application Access for AIX used in a local-domain configuration.



259102

Figure 3. SNA Application Access for AIX in Local Domain

SNA Application Access for AIX allows users on SNA 3270 devices located anywhere on an SNA network to run AIX applications. It supports SDLC, token-ring and Ethernet. It can handle session initiation requests from other cross-domain session managers and direct-connected SNA peripheral devices.

The various components of SNA Application Access for AIX are as follows:

SNA Application Server (*snapu5*)

The SNA Application Server emulates a PU 4 or PU 5 device, supporting LU 0, LU 1, LU 2 and LU 3. It establishes an SSCP-LU with each LU. It assists in establishing LU-LU session, when an AIX program send a BIND request to an SNA peripheral device.

AIX Application Gateway

The AIX Application Gateway enables SNA 3270 display stations to appear as VT100 terminals to AIX applications.

Telnet 3270 Access

The Telnet 3270 Access enables SNA peripheral devices, which are managed by SNA Application Server to access systems that support the standard Telnet protocol TN3270.

SNA Passthru

The SNA Passthru works along with SNA Server for AIX as a session-level router for SNA peripheral devices attached to the Application Server (local domain). SNA peripheral device users can establish sessions with a variety of SNA hosts and host applications.

Application Programming interfaces

snaPLU0: Low-level Primary LU API

snaPLU2: SNA 3270 and SCS Data Stream API

snaFRM: SNA 3270 Forms API

Figure 4 shows the various components of SNA Application Access for AIX.

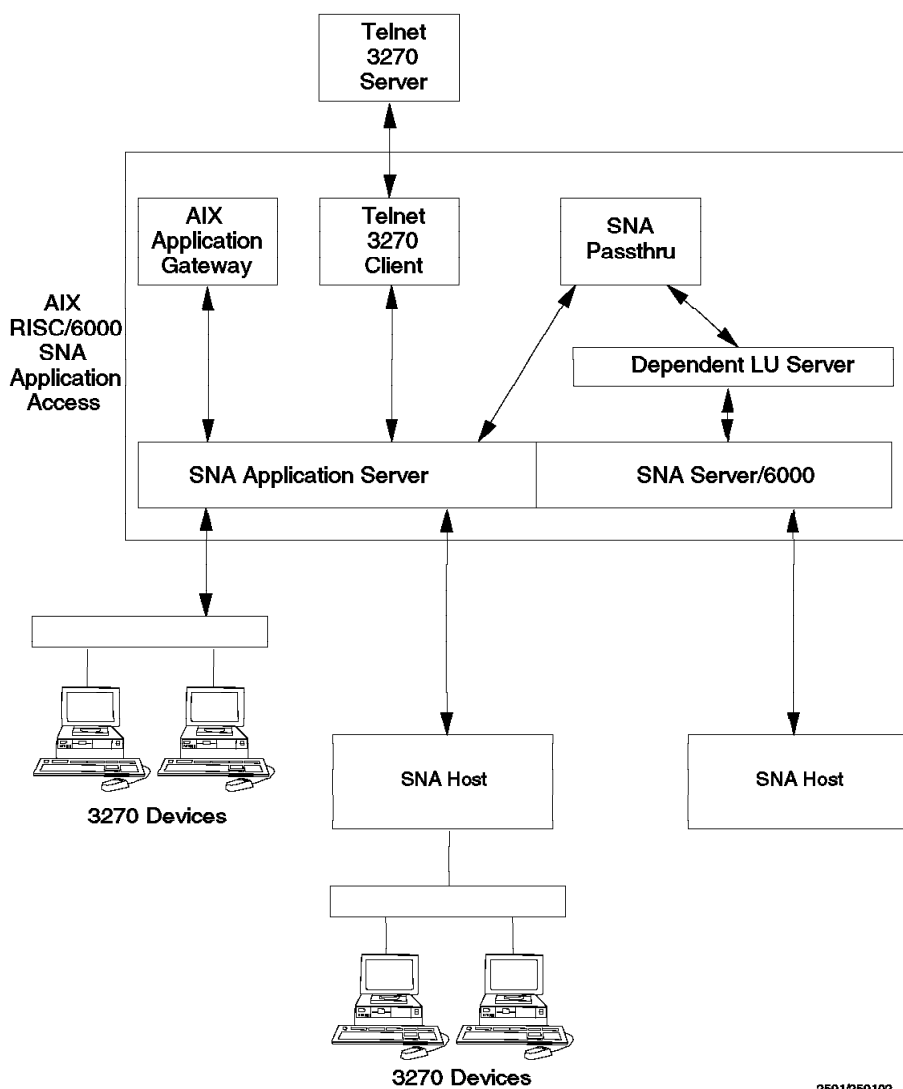


Figure 4. Components of SNA Application Access for AIX

2.1 Installing SNA Application Access for AIX

SNA Application Access for AIX V1.2.1 has the following prerequisite:

- AIX V4.1.4 (or later)

Please refer to the document *SNA Application Access User's Guide*, SC31-8087 regarding the full details of hardware, software and memory requirements.

Note

Please see 10.1, "SNA Profiles Maintenance" on page 211 regarding backing up of SNA profiles and restoring them, before installing SNA Application Access for AIX software.

Follow these installation steps:

1. Log in as root.
2. Enter `smit install` on the AIX command line to start the SMIT installation utility.
3. Follow the path shown below:

```
Install / Update Software
Install / Update Selectable Software (Custom Install)
  Install Software Products at Latest Level
    Install New Software Products at Latest Level
```

4. Identify and select INPUT device / directory for software.
5. Select the filesets for SNA Application Access for AIX and SNA Application Access for AIX configuration package from the install media and install these.

Note: The description and version number could change between releases. Select the proper language package as per your requirement.

```
SNA_AA.cfg - SMIT configuration interface
SNA_AA.msg.En_US.cfg - English messages for SMIT interface
SNA_AA.rte - SNA_AA base product
```

6. View the SMIT screen or `smit.log` and check whether the installation was successful.
7. If the installation is successful, you will get this message:

```
Installp Summary
-----
Name                               Fix Id Part  Event      Result      State
-----
SNA_AA.rte                         1.2.1.0  COMMITTED  SNA Application Access  ED
SNA_AA.cfg                         1.2.1.0  COMMITTED  SNA Application Access  ED
SNA_AA.msg.en_US.cfg               1.2.1.0  COMMITTED  SNA Application Access  ED
```

8. You need to install SNA Server for AIX V3.1 only if you plan to use the SNA Passthru function to access remote host applications.

9. The installation of SNA Application Access for AIX inserts additional lines in the `/etc/services` file as shown in Figure 5 on page 9. Please ensure that these TCP/IP ports are not in use already.

```
# The following lines added by SNA_AA installation
brx_sna_gtwy      5060/tcp
brx_sna_host      5061/tcp
brxadmin_pu5      5062/tcp
snatn3270         5063/tcp
snaapplgtwy      5064/tcp
brx_pu2_espd     5065/tcp
brxadmin_pu2     5066/tcp
snapassthru      5067/tcp
# End of lines added by SNA_AA installation
```

Figure 5. Extract of `/etc/services` File

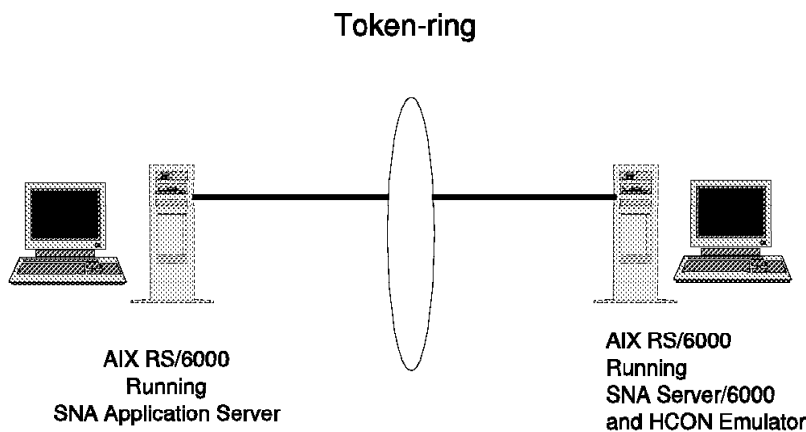
10. If necessary, install `hcon.rte V2.1.3` on the client RS600020.

2.2 Sample Local-Domain Configuration Token-Ring Link

The SNA Application Server supports the direct connection of SNA peripheral devices to an AIX system. The SNA Application Server controls these devices, which belong to the SNA domain controlled by the SNA Application Server. No path or cross-domain definitions are required since all the routing and session establishment is handled locally by the SNA Application Server.

In this example, we will connect a RS/6000 (RS600012) running SNA Application Access for AIX to a RS/6000 running SNA Server for AIX (RS600020). RS600020 uses HCON terminal emulator to emulate a SNA peripheral display device 3278. This display device will be configured to access SNA Application Server running on RS600012.

It is assumed that you do not have any user-defined SNA profiles at this point. Figure 6 shows a diagram for this example.



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Figure 6. SNA Application Access for AIX in Local-Domain Token-Ring

2.2.1 Configuration File Local-Domain Example

1. Use the following SMIT fast path command to start the configuration of SNA Application Access for AIX:

```
smit snaaa
```

2. Select the following:

```

                                     SNA Application Access
Move cursor to desired item and press Enter.

Configuration
Product Information
SNA Server/6000 Configuration and Management
```

```

                                     Configuration
Move cursor to desired item and press Enter.

Set Configuration File
Control Point
Client Application Access
Peripheral Devices
Cross Domain Resources
Remote Application Access
Telnet 3270 Application Access

Verify Definitions
```

3. Enter the full path name of the configuration file. In this example we used /usr/lpp/SNA_AA/bin/LOCALTR.config. Please note that the configuration file may not be created at this point. We have not entered any definitions so far.

```

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

SNA Application Access configuration file      [Entry Fields]
                                              [ /usr/lpp/SNA_AA/bin/L0>
```

2.2.2 Control Point Definition Local-Domain Example

Define only one control point per RS/6000. Control Point names the controlling SNA resource for the SNA Application Server.

1. Follow these steps to define a control point.

```

                                     Configuration
Move cursor to desired item and press Enter.

Set Configuration File
Control Point
Client Application Access
Peripheral Devices
Cross Domain Resources
Remote Application Access
Telnet 3270 Application Access
```

2. Choose the following option:

```
Control Point

Move cursor to desired item and press Enter.

Add a Control Point Definition
Change/Show a Control Point Definition
Remove Control Point Definitions
Export Control Point Definitions
Verify Definitions
```

3. Enter values as shown in the following screen.

```
Add a Control Point Definition

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

* Control Point Name      [Entry Fields]
Sub area number          [SA4UNIX]
Network name             [04]
                        [USIBMRA]
```

2.2.3 Applications Definition Local-Domain Example

We need to define the applications that are accessed from SNA peripheral devices through the SNA Application server.

1. Follow the path shown below.

```
Configuration

Move cursor to desired item and press Enter.

Set Configuration File
Control Point
Client Application Access
Peripheral Devices
Cross Domain Resources
Remote Application Access
Telnet 3270 Application Access

Verify Definitions
```

```
Client Application Access

Move cursor to desired item and press Enter.

Add an Application Definition
Change/Show an Application Definition
Remove Application Definitions
Export Application Definitions
Verify Definitions
```

2. Add the UNIX application so the peripheral SNA devices can access AIX with the SNA application gateway.

```

Add an Application Definition

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

* Application Name                                     [Entry Fields]
Name of control point owning the application          [UNIX]
Desired status of application at startup              [SA4UNIX]
                                                       ACTIVE

```

2.2.4 Peripheral Devices Definition Local-Domain Example

This definition represents a Physical Unit Type 2 (PU2) peripheral device (such as a 3174). An SNA peripheral device is a station on a line that is responsible for coordinating communications between the SNA Application Server and its associated logical units.

1. Define the peripheral devices to the SNA Application Server.

```

Configuration

Move cursor to desired item and press Enter.

Set Configuration File
Control Point
Client Application Access
Peripheral Devices
Cross Domain Resources
Remote Application Access
Telnet 3270 Application Access

Verify Definitions

```

```

Peripheral Devices

Move cursor to desired item and press Enter.

Quick Gen
Advanced Options

```

2. Choose a name for the peripheral device profile.

```

Peripheral Device Quick Gen

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

* Gen name                                     [Entry Fields]
                                                       [RS12AA ]

```

Note: Quick gen name is RS12AA meaning RS12 Application Access.

3. Choose no to create a LINE definition.


```

Peripheral Device Quick Gen: Line Definition

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

Do you wish to use an existing LINE definition? [Entry Fields]
no

```

4. Choose token-ring for the physical line type.

```

Peripheral Device Quick Gen: New Line

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

Choose the physical line type [Entry Fields]
token_ring

```

```

Peripheral Device Quick Gen: Information

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

Gen name RS12AA [Entry Fields]
* Line type token_ring
Adapter number [0] 1
Remote link address [10005AC95035] 2
Desired status of resources at startup ACTIVE
SSCP-LU session messages file [/usr/lpp/SNA_AA/bin/me> 3
LU addresses or address ranges to add [2] 4

```

Notes:

1 Uses streams driver under AIX 4.1.4.

2 This is the Universally Administered Address (UAA) the remote RS/6000. In our case, that is RS600020. On RS600020, we used the command `lscfg -l tok0 -v`, which listed the address.

We also confirmed that alternate token-ring address was not configured on RS600020. The command `lsattr -E -l tok0` could be used to check the locally administered address (LAA).

3 The messages file is `/usr/lpp/SNA_AA/bin/messages`.

4 LU address which will be used as local LU address later on by RS600020 to make an LU 2 connection. This definition represents a program or device that accepts sessions and exchanges data with applications. A logical unit acts as an SLU.

5. You will get the following message:

```
COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

Profile type 'TRLINE' name 'RS12AATR' ADDED.
Profile type 'PU2' name 'RS12AA' ADDED.
Profile type 'LU' name 'RS12AA02' ADDED.
```

2.2.5 Starting SNA Application Server Local-Domain Example

Follow the steps below to start SNA Application Server.

2.2.5.1 Check \$PATH and Working Directory

Check the variable PATH using the command `echo $PATH` to see that it includes a period (.) so that commands can be run from the current working directory.

2.2.5.2 Start snapu5 Daemon

The following command starts the snapu5 daemon:

```
cd /usr/lpp/SNA_AA/bin
snapu5 -f LOCALTR.config
```

Note: You should be in the `/usr/lpp/SNA_AA/bin` directory.

You will get the following screen:

```
Copyright (c)1995 CNT/Brixton Systems, Inc.
BPU40001 : Initializing snapu5 SNA Server

# BPU40002 : Initialization complete
```

2.2.5.3 Local Operator Interface snaop5

To check the SNA Application Server status, you can use the local operator interface, *snaop5*.

1. Start SNA Application Server Operator with the command `snaop5`. SNA Application Server provides a local operator interface that is styled after the command interfaces available from NetView and VTAM. The local operator can activate, deactivate, and display the status of SNA Application Server resources.

snaop5 is an interactive utility and the prompt is normally the AIX host name, which is `rs600012` in our case.

2. If SNA Application Server is inactive you should get a message like this:

```
rs600012:/usr/lpp/SNA_AA/bin > snaop5
Copyright (c)1995 CNT/Brixton Systems, Inc.
OP400003 : could not attach to SNA_PU5 SNA Server Manager
cInttcp_create: Connection refused
OP400009 : Welcome to the SNA_PU5 SNA Server Manager
NONE->
```

3. Start SNA Application Server in such a case.

4. To check the PU5 status of the SNA Application Server, enter:

display sa4unix

```
rs600012-> display sa4unix
                DISPLAY NET,ID=SA4UNIX,SCOPE=ALL
SA4UNIX        Control Point    Active
UNIX           Logical Unit     Active
RS12AATR       Link             Active
RS12AA         Link Station     Pending Active Contacted
RS12AA02       Logical Unit     Reset
```

5. To check the RS12AATR link (line) status, enter:

display RS12AATR

We got the following response:

```
rs600012-> display RS12AATR
                DISPLAY NET,ID=RS12AATR,SCOPE=ALL
SA4UNIX        Control Point    Active
RS12AATR       Link             Active
RS12AA         Link Station     Pending Active Contacted
RS12AA02       Logical Unit     Reset
```

6. To check the RS12AA link station status, enter:

dis RS12AA

The application responds with the following output:

```
rs600012-> dis RS12AA
SA4UNIX        Control Point    Active
RS12AATR       Link             Active
RS12AA         Link Station     Pending Active Contacte
RS12AA02       Logical Unit     Reset
```

7. To check the status of LU RS12AA02, enter:

dis RS12AA02

We got the following response:

```
rs600012-> dis RS12AA02
                DISPLAY NET,ID=RS12AA02,SCOPE=ALL
SA4UNIX        Control Point    Active
RS12AATR       Link             Active
RS12AA         Link Station     Pending Active Contacted
RS12AA02       Logical Unit     Reset
```

The RS12AA status will be Pending Active Contacted while the adjacent link station is not active or connected.

8. The link station RS12AA would be in a status of polling as per the following display, which would continuously appear in snaop5 as per the polling frequency.

```
rs600012->
OP400010 : ***** RS12AA inoperative, reason = 1
rs600012->
OP40000e : ***** RS12AA activated
```

2.2.6 SNA Application Access for AIX Local Domain Configuration File

Figure 7 shows the /usr/lpp/SNA_AA/bin/LOCALTR.config file created by the configuration of the SNA Application Server.

```
CP      NAME = SA4UNIX,
        SA = 4,
        NETWORK = USIBMRA;

APPL    NAME = UNIX,
        CP_NAME = SA4UNIX,
        ISTATUS = ACTIVE;

TRLINE  NAME = RS12AATR,
        DEVICE = '/dev/d1pi/tr',
        PPA = 0,
        ISTATUS = ACTIVE,
        FUNC_ADDRESS = x'c00000000000',
        GROUP_ADDRESS = x'c00000000000',
        LAN_RATE = RING_4Mbs,
        MAXDATA = 4109;

PU2     NAME = RS12AA,
        LINK_NAME = RS12AATR,
        MAXDATA = 265,
        OUTFRAME = 7,
        MODULO = 128,
        REPLY_TIMEOUT = 1,
        RETRIES = 3,
        ISTATUS = ACTIVE,
        RMTMACADDR = x'10005AC95035',
        RMTLSAP = x'04',
        LCLLSAP = x'04',
        GRPLSAP = x'05',
        INFRAME = 7,
        RESPONSE_TIMEOUT = 1,
        RESPONSE_COUNT = 7,
        DW_ACK_COUNT = 7,
        DW_INCR = 1;

LU      NAME = RS12AA02,
        PU_NAME = RSAA12,
        LOCADDR = 2,
        PACING = 1,
        LOGMODE = L32782,
        ISTATUS = ACTIVE,
        MESSAGES = '/usr/lpp/SNA_AA/bin/messages',
;
;
```

Figure 7. /usr/lpp/SNA_AA/bin/LOCALTR.config File

2.2.7 Configuration of the SNA Server for AIX

Please note that we are using RS600020 running SNA Server for AIX to provide a 3270 display session through HCON in this example. Normally, customers would connect a 3270 display device to AIX Application Server through a controller such as the 3174 (local domain).

1. The next step is to configure the SNA Server for AIX on RS600020 to connect to the SNA Application server on RS600012.

You have to create the following SNA profiles on the system RS600020:

- A token-ring link station
- An LU type 2 session
- An HCON session to use SNA LU 2

2.2.7.1 Configuration of Control Point

To define the Control Point Profile, enter `smitty _snacpch` and make changes as per following:

```
Change/Show Control Point Profile

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

* Profile name                                [Entry Fields]
XID node ID                                  node_cp
Network name                                  [*]
Control Point (CP) name                       [USIBMRA]
Control Point alias                           [RS20]
Control Point type                             [RS20]
Maximum number of cached routing trees        appn_end_node
Maximum number of nodes in the TRS database   [500]
Route addition resistance                      [500]
Comments                                       [128]
Comments                                       []
```

Figure 8. Control Point Profile for RS600020

2.2.7.2 SNA DLC Profile Configuration

We added an SNA DLC token-ring profile on RS600020 by issuing the following command:

```
mksnaobj -t'sna_dlc_token_ring' -J 'no' RS20
```

Set the field to dynamic link station support as "no".

2.2.7.3 Configuration of Link Station Profile

We added a calling link station profile on RS600020 by issuing the following command:

```
mksnaobj -t'link_station' -w'token_ring' -y 'RS20' -d '10005AB14FCB' TORS12
```

The token-ring address for RS600012 is 10005AB14FCB. We used the command `lscfg -l tok0 -v` on RS600012 to get this UAA address.

2.2.7.4 Configuration of LU 2 Session Profile

Use the command `smitty _snasess2mk` to go directly to the SMIT menu to add the LU 2 session profile. The user-modified fields are highlighted.

```

                                     Add LU 2 Session Profile

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

                                     [Entry Fields]
* Profile name                        [AA02]
  Local LU name                       [AA02]
* Local LU address (1-255)           [2]
  System services control point
  (SSCP) ID (*, 0-65535)             [*]
  Link Station Profile name          [TORS12]
  Network name                      [USIBMRA]
  Remote LU name                     []
  Maximum number of rows             [24]
  Maximum number of columns         [80]

Comments                             []

```

Figure 9. LU 2 Session Profile for RS600020

2.2.8 HCON Configuration on SNA Application Access for AIX Client

We need to configure HCON to use the `e789 3270` terminal emulation program. Here are the steps to configure an HCON session:

1. Add user root as an HCON user by entering the following:
`mkhconu -N root`
2. Add an HCON session for the user root by entering the following:
`smitty mkhcons_st`
Choose the local LU AA02, which was configured in Figure 9.

```

                                Add SNA Display Session

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

[TOP]                                [Entry Fields]
HCON user name                        root
SESSION name                          a
Session USE                            []
* SNA logical connection prefix or profile [AA02]
LANGUAGE                               English (U.S.A.)
* KEYBOARD table                       [/usr/lib/hcon/e789_ktb>
* COLOR table                           [/usr/lib/hcon/e789_ctb>
* File used by SAVES key                 [/e789_saves]
* File used by REPLS key                 [/e789_repls]
* Local printer used by PRINT key       [lp0]
Host TYPE                               CMS
Host LOGIN ID                           []
Autolog NODE ID                          []
Autolog TRACE                             no
Autolog TIMEOUT (seconds)                 []
Host file transfer PROGRAM                [IND$FILE]
File transfer DIRECTION                   down
* File transfer WAIT period (minutes)     [0]
* File transfer RECOVERY time (minutes)   [0]
* Maximum I/O buffer SIZE (bytes)        [2048]

```

Figure 10. HCON SNA Display Session

2.2.9 SNA Server for AIX Profiles 3270 Client

The following listing shows some of the relevant SNA profiles that were used on RS600020:

```

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}
  comments           = ""

control_pt:
  prof_name           = "node_cp"
  xid_node_id        = "*"
  network_name       = "USIBMRA"
  control_pt_name_alias = "RS20"
  control_pt_name     = "RS20"
  control_pt_node_type = appn_end_node
  max_cached_trees   = 500
  max_nodes_in_topology_database = 500
  route_addition_resistance = 128
  comments           = ""

```

```

session_lu2:
  prof_name                = "AA02"
  link_station_profile_name = "TORS12"
  local_lu_name            = ""
  network_name             = "USIBMRA"
  remote_lu_name           = ""
  comments                 = ""
  local_lu_address         = 2
  sscp_id                  = *
  max_rows                 = 24
  max_columns              = 80
  comments                 = ""

link_station_token_ring:
  prof_name                = "TORS12"
  use_control_pt_xid       = yes
  xid_node_id              = "*"
  sna_dlc_profile_name     = "RS20"
  stop_on_inactivity       = no
  time_out_value           = 0
  LU_registration_supported = no
  LU_registration_profile_name = ""
  link_tracing             = no
  trace_format             = long
  access_routing_type      = link_address
  remote_link_name         = ""
  remote_link_address      = 0x10005AB14FCB
  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 = no
  activate_link_on_demand  = no
  cp_cp_sessions_supported = no
  cp_cp_session_support_required = no
  adjacent_node_is_preferred_server = no
  initial_tg_number        = 0
  restart_on_normal_deactivation = no
  restart_on_abnormal_deactivation = no
  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                = "RS20"
  datalink_device_name     = "tok0"
  force_timeout            = 120
  user_defined_max_i_field = no

```



```

max_i_field_length           = 30729
max_active_link_stations    = 100
num_reserved_inbound_activation = 0
num_reserved_outbound_activation = 0
transmit_window_count       = 127
dynamic_window_increment    = 1
retransmit_count            = 8
receive_window_count        = 1
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 = 1an
dynamic_lnk_TG_user_defined_1 = 128
dynamic_lnk_TG_user_defined_2 = 128
dynamic_lnk_TG_user_defined_3 = 128
comments                    = ""

```

2.2.10 Testing of Local-Domain Configuration

Please follow the steps in this section to test the local-domain configuration.

2.2.10.1 Verify Profiles and Start SNA Link

1. Verify and update SNA profiles on RS600020 by issuing the command `verifysna -U`.
2. We are in a position to start link station on RS600020.

Use the command `sna -start` to start SNA.

Use the command `start -s 1 -p TORS12` to start the link station. We used explicitly defined link stations in this example, rather than dynamic link stations. We saw earlier that the status of link station RS12 on RS600012 is as follows:

```

RS12AA      Link Station      Pending Active Contacted

```

This means that the link station RS12AA is ready and waiting. We got the following response on RS600020:

```

rs600020:/ > start -s 1 -p TORS12
0105-2723 The "TORS12" Link Station has been started.

```

2.2.10.2 Display SNA Resources

1. Use the command `display RS12AA` under `snaop5` on RS600020.

```
rs600012-> display RS12AA
                DISPLAY NET, ID=RS12AA, SCOPE=ALL
SA4UNIX        Control Point      Active
RS12AATR       Link               Active
RS12AA         Link Station       Active
RS12AA02       Logical Unit       Active
```

2. On RS600020 verify that the LU 2 session is established by issuing the command `sna -d s123`. We got the following response:

```
rs600020:/home/root > sna -d s123

Local LU Session      Session      Local  Host      Link
ID    type type      profile name  LU addr SSCP ID  station  State
-----
1     2   SSCP-LU AA02                2      65535   TORS12   Active
```

3. On RS600020 check the link status.

```
rs600020:/ > sna -d l

Link      Adjacent      Node      Device      # of local  In
station   CP name       type      name        sessions   use
-----
TORS12    USIBMRA.SA4UNIX  LEN  tok0        Active      0 No
```

4. On RS600012 display the PU status of the link station RS12:

```
rs600012-> display RS12AA
                DISPLAY NET, ID=RS12AA, SCOPE=ALL
SA4UNIX        Control Point      Active
RS12AATR       Link               Active
RS12AA         Link Station       Active
RS12AA02       Logical Unit       Active
```

The Active status for the link station RS12 indicates that the adjacent station has contacted the RS12TR link.

2.2.10.3 Start HCON Session from Client to Server

1. Start an HCON session on RS600020 to have LU-LU session with the SNA application server on RS600012 by issuing the following command:

```
e789 a
```

We got the following display:

```

Welcome to SNA Application Access

Please select an application:

UNIX
TSO
TN3270
SNAPT

LOGON APPLID(<appl>) LOGMODE(<mode>) DATA(<data>)

appl ==>

```

Figure 11. SNA Application Server Prompt Menu

- The logical unit RS12AA02 is in state active/Contacted; enter the following command at the snaop prompt:

```
dis RS12AA02
```

```

rs600012-> dis RS12AA02
                DISPLAY NET,ID=RS12AA02,SCOPE=ALL
SA4UNIX        Control Point      Active
RS12AATR       Link               Active
RS12AA         Link Station       Active
RS12AA02      Logical Unit        Active/Contacted

```

SNA Server for AIX on RS600020 has successfully connected to SNA Application Server on RS600012.

2.2.10.4 Start SNA AIX Application Gateway

SNA AIX application gateway allows 3270 display devices to access AIX applications as a VT100 terminal. Start SNA AIX application gateway on RS600012 by issuing the following command:

```
cd /usr/lpp/SNA_AA/bin
sna_run_gateway
```

We got the following message:

```

Starting the Application Gateway...

Copyright (c)1995 CNT/Brixton Systems, Inc.

```

To check the application gateway status, enter the following command at the snaop prompt:

```
dis UNIX
```

```

rs600012-> dis UNIX
                DISPLAY NET,ID=UNIX,SCOPE=ALL
SA4UNIX        Control Point      Active
UNIX           Logical Unit        Active/Contacted

```

The UNIX logical unit is in the Active/Contacted state after we start the SNA gateway application.

2.2.10.5 Run UNIX Application from 3270 Session

1. We can now choose the UNIX application from the screen shown in Figure 11 on page 23 by entering:

UNIX

We got the following display:

```
Release 1.0                                     01/27/95
  A
  A A   PPP  PPP  L   I  CCC   A   TTTTT  I  000  N   N
  A  A   P P  P P  L   I  C     A A   T   I  0  0  N N  N
  A AAA A  PPP  PPP  L   I  C     AAAAA  T   I  0  0  N N  N
  A      A  P   P   LLLL I  CCC  A   A   T   I  000  N   N

      GGGG
      G  G  A  TTTTT EEEEE W   W  A  Y   Y
      G      A A  T  E   W  W  W  A  A  Y  Y
      G GGG AAAAA  T  EEE  W  W  W  AAAAA  YYY
      G  G A  A  T  E   W  W  W  A  A  Y
      GGGG A  A  T  EEEEE  WW  WW  A  A  Y

      Copyright (c) 1994 Brixton Systems Inc.

      USERNAME
      PASSWORD

F1=Help F3=Back
```

Figure 12. Application Gateway Menu

2. Enter the AIX username and password at this menu. Please use the Tab key to toggle between username and password. Press the Ctrl or Action key to log on to AIX.

```

*****
*
*
* Welcome to AIX Version 4.1.4 !
*
*
* Please see the README file in /usr/lpp/bos for information pertinent to
* this release of the AIX Operating System.
*
*
*****

Last login: Tue Apr 30 08:57:42 EDT 1996 on /dev/pts/7
rs600012:/ >

F1=Help F5=Keys

```

3. The RS12AA02 status is Active/Session as we have a LU-LU session between the RS600020 and RS60012. Use the command `dis RS12AA02` on RS600012 at the `snaop5` prompt.

```

rs600012-> dis RS12AA02
                DISPLAY NET,ID=RS12AA02,SCOPE=ALL
SA4UNIX        Control Point      Active
RS12AATR       Link               Active
RS12AA         Link Station       Active
RS12AA02       Logical Unit       Active/Session

```

4. Display the LU 2 sessions on RS600020.

```

rs600020:/ > sna -d s123

```

Local ID	LU type	Session type	Session profile name	Local LU addr	Host SSCP ID	Link station	State
2	2	LU-LU	AA02	2	65535	TORS12	Active
1	2	SSCP-LU	AA02	2	65535	TORS12	Active

5. The following screen shows the LU 2 sessions on RS600012 at the `snaop5` prompt:

```

rs600012-> dis sessions
                DISPLAY NET,SESSIONS,SCOPE=ALL,LIST=ALL
SA4UNIX        Control Point      Active
SID00007       Session           Active           PLU=UNIX, SLU=RS12AA02

```

2.3 Sample Cross-Domain Configuration SDLC Link

Cross-domain sessions are sessions that span two different SNA domains. The SNA Application Server represents one domain and an SNA host (mainframe) represents the other domain. A cross-domain session connects an application in the SNA Application Server to a resource controlled by an SNA host. The SNA Application Server acknowledges the associated resources as a cross-domain resource (CDRSC).

The SNA Application Server supports sessions with the cross-domain manager (CDRM) (SSCP-SSCP session) and sessions with the CDRSC (LU-LU session). To establish the cross-domain sessions, the SNA Server for AIX must connect to the SNA network and activate routes to systems in remote domains.

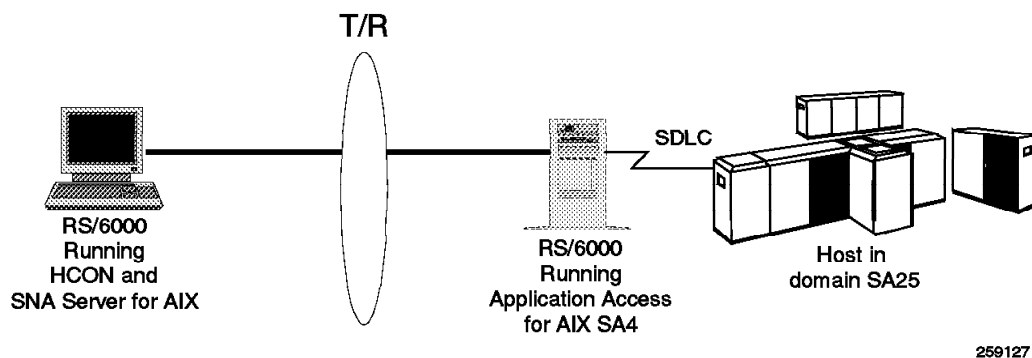
The SNA Server for AIX also enables you to predefine relationships between CDRMs and CDRSCs. If you do not predefine these relationships, the SNA Application Server dynamically connects to all CDRMs and established sessions with the CDRSC.

The purpose of the example in this section is to connect an SNA 3270 display station from subarea 25 to the Application Gateway on a RS/6000 system at subarea 4.

A session between the 3270 (in subarea 25) and the Application Gateway (in subarea 4) must open both domains. The SNA host manages all the devices in SA 25, while the 3745 communication controller provides network communication for the SNA host and the 3174 cluster controller.

Figure 13 shows SNA Application Access for AIX used in a cross-domain configuration using SDLC link. In this network, we used an RS/6000 running HCON and a 3270 emulator to test the cross-domain configuration. This diagram shows what kind of SNA display devices could be connected to the RS/6000 running SNA Application Access for AIX. This RS/6000 running HCON was separately configured to get an SA25 login screen, which is not shown in this example.

We tested this configuration from a native 3270 terminal connected to SA25 as well.



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Figure 13. Diagram for Cross-Domain SDLC Example

The SNA Application Server software and the SDLC communication adapter on RS/6000 (RS600012) manages subarea 4. The SNA Application Server acts as a

gateway between the SNA network devices and the Application Gateway client. The Application Gateway client provides line at time and VT100 terminal access for SNA 3270 display terminal.

The SNA Application Server needs to be configured as a cross-domain manager. The SNA network configuration needs to be modified to recognize the SNA Application Server as a new cross-domain manager.

When the configuration is completed, a user at the 3270 display station can establish a session to the Application Gateway by requesting UNIX from the SNA host logon screen. Figure 14 shows SNA Application Access for AIX used in a cross-domain configuration.

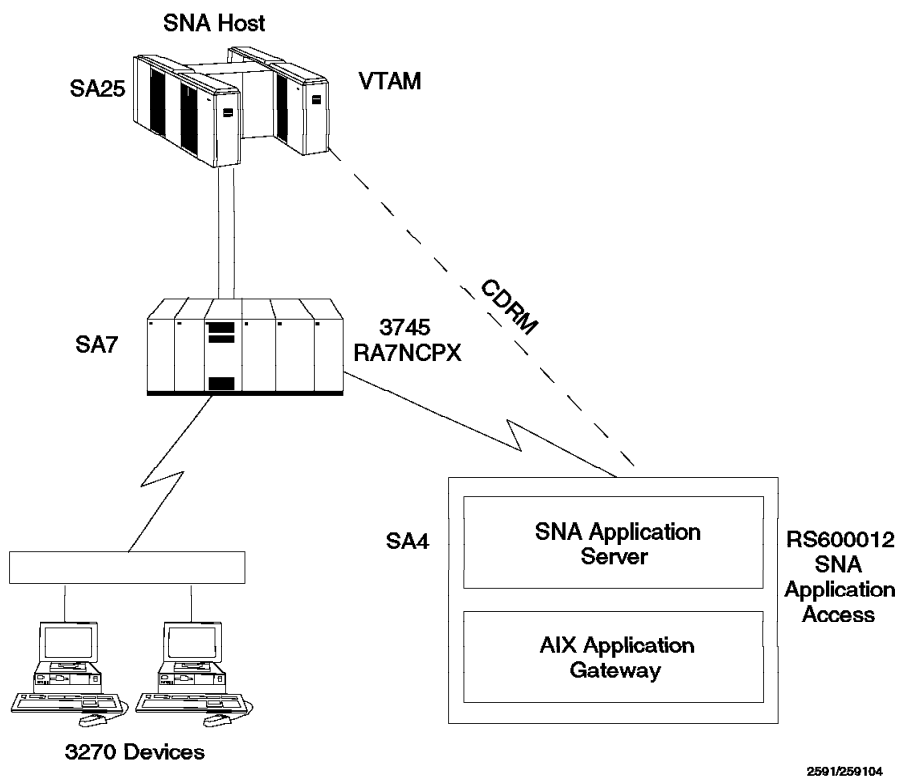


Figure 14. Cross-Domain Configuration

2.3.1 Configuration File Cross-Domain Example

To configure the SNA Application Server to use the SDLC line, follow the steps below:

1. Enter the following SMIT fast path command for SNA Application Access for AIX:

```
smit snaaa
```
2. Select the following:

```

SNA Application Access

Move cursor to desired item and press Enter.

Configuration
Product Information
SNA Server/6000 Configuration and Management

```

```

Configuration

Move cursor to desired item and press Enter.

Set Configuration File
Control Point
Client Application Access
Peripheral Devices
Cross Domain Resources
Remote Application Access
Telnet 3270 Application Access

Verify Definitions

```

Figure 15. SNA Application Access for AIX Configuration SMIT Screen

3. We used /usr/lpp/SNA_AA/bin/SNAPU5.config as the name of the configuration file in our example.

```

Set Configuration File

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

SNA Application Access configuration file      [Entry Fields]
                                              [ /usr/lpp/SNA_AA/bin/SN>

```

2.3.2 Control Point Definition Cross-Domain Example

The control point represents the PU4/5 SNA resource and oversees all of the communications provided by the SNA Application Server. The control point controls cross-domain and local-domain connections and local application connections. Only one control point can be defined.

1. Define a Control point.

```

Configuration

Move cursor to desired item and press Enter.

Set Configuration File
Control Point
Client Application Access
Peripheral Devices
Cross Domain Resources
Remote Application Access
Telnet 3270 Application Access

```

2. Choose the following option:


```

Control Point

Move cursor to desired item and press Enter.

Add a Control Point Definition
Change/Show a Control Point Definition
Remove Control Point Definitions
Export Control Point Definitions
Verify Definitions

```

3. Enter RA6012CP for the Control Point Name, 4 for the Sub area number and USIBMRA for the Network name.

```

Add a Control Point Definition

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

* Control Point Name      [Entry Fields]
  Sub area number        [RS6004CP]
  Network name           [04]
                        [USIBMRA]

```

2.3.3 Line Definition Cross-Domain Example

This definition represents the physical attachment to the communication media.

1. Add a Line Definition.

```

Configuration

Move cursor to desired item and press Enter.

Set Configuration File
Control Point
Client Application Access
Peripheral Devices
Cross Domain Resources
Remote Application Access
Telnet 3270 Application Access

Verify Definitions

```

2. Choose the following option:

```

Advanced Options

Move cursor to desired item and press Enter.

Physical Links
Type 4 Physical Units
Route Definitions
Cross Domain Resources

```

Figure 16. Advanced Options

SNA Application Server V1.2.1 supports token-ring, SDLC and Ethernet 802.3 as shown in the following screen.

```

Physical Links

Move cursor to desired item and press Enter.

Token Ring
SDLC
Ethernet

```

3. On the above SMIT screen, select SDLC. Then choose the following:

```

SDLC

Move cursor to desired item and press Enter.

Add a SDLC Line Definition
Change/Show a SDLC Line Definition
Remove SDLC Line Definitions
Export SDLC Line Definitions
Verify Definitions

```

4. Enter SDLCPU5 for the SDLC Line Name field and /dev/mpq0 for the Device name field. For this example we use the port 0 on the mpq adapter.

```

Add a SDLC Line Definition

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

* SDLC Line Name           [Entry Fields]
Device name                [SDLCLIN]
Desired status of network controller at startup  [/dev/mpq0]
Clock source               ACTIVE
Duplex support             EXTERNAL
NRZI encoding supported?  FULL
Physical link type        YES
Close line when carrier detect (CD) signal lost? RS232
Polling frequency (in 1/10 second intervals)    NO
Line speed (bits per second) [2]
                          9600

```

Note: Check the VTAM definition for the SNA host with the SDLC Line definition for SNA Application Access for AIX.

Figure 17 on page 31 shows an example of the SDLC line definition in VTAM.

```

*****
*      PU TYPE 4 LINK TO RS/6000
*****
G07RSINN GROUP LNCTL=SDLC,          *
              DIAL=NO,              *
              REPLYTO=1,            *
              TYPE=NCP

L07171  LINE ADDRESS=(171,FULL),    LINE ADDRESS          *
              CLOCKNG=EXT,          INTERNAL CLOCKING      *
              DUPLEX=FULL,          MODEM STRAPPING IS FULL *
              MONLINK=YES,          MONITOR LINK FOR ACTPU  *
              NRZI=YES,              *
              SDLCST=(RA7SPRIS,RA7SSECS), *
              RETRIES=(7,7,17),     TIME OUT OCCURS AFTER 4 MINUTES *
              SERVLIM=254,          *
              SPEED=9600

```

Figure 17. VTAM Listing of LINE L07171

Figure 18 shows a VTAM listing of the PU P07175A.

```

P07171A  PU ADDR=3,                3270 ADDRESS='C' (EBCDIC)
              MAXDATA=521,          MAXIMUM AMOUNT OF DATA
              MAXOUT=7,             MAX SDLC FRAMES BEFORE RESPONSE
              PACING=7,             PACING SET BY BIND IMAGE
              ANS=CONTINUE,         KEEPS CROSS-DOMAIN RUNNING
              PASSLIM=7,
              PUTYPE=4,
              RETRIES=(,1,4),       4 RETRIES, 1 SECOND BETWEEN      *
              DISCNT=(NO),          (V) VTAM ONLY                    *
              XID=YES,              PU T 2.1 NODE                      *
              ISTATUS=ACTIVE
*

```

Figure 18. VTAM Listing of PU P07171A

The following shows the path definition on the host.

```

PATH DESTSA=4,
ER0=(7,3),VR0=0

```

2.3.4 Adjacent Communication Controller Definition (PU4)

This definition represents an SNA communications controller (such as 3745) attached to the line media. To route messages through the SNA network, the SNA Application Server accesses the SNA network through the adjacent communications controller. Only one adjacent communications controller can be defined for each SDLC line, but multiple adjacent communications controllers can be defined for each token-ring line.

Select Type 4 Physical Units from the SMIT menu shown in Figure 16 on page 29. Then in the next SMIT screen, select Add a PU 4 Definition.

```

                                Add a PU 4 Definition

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

[TOP]                                [Entry Fields]
* PU name                            [SDLCPU5]
Line name                            [SDLCLIN]
Adjacent subarea number (0-65535)    [7]
Transmission group number (0-255)    [3]
Maximum frame size (1-4129)          [2081]
Maximum outgoing frames allowed (1 - (modulo-1)) [7]
Station type                          BOTH
Frame format (modulo) for this PU    8
Line time out                         [1]
Maximum retries before declaring error (1-7) [3]
Desired status of line at startup     ACTIVE

SDLC lines only:
Local link address (hex 00-ff)       [C1]
Operate in Two Alternate Mode?       NO

```

Figure 19. Add a PU 4 Definition

2.3.5 Path Definition Cross-Domain Example

To communicate with a CDRM or CDRSC, you must configure a route to the associated subarea of the resource. You can define only one path for each destination, but you can define different routes to the destination in the path definition.

The next step in the cross-domain configuration process is to determine the new routes needed to connect the SNA Application Server to the SNA host. The SNA network supports two logical route levels:

- Explicit routes
 - The underlying explicit routes need to be defined before defining the virtual routes. Explicit routes flow only in one direction, so two explicit routes are needed for each virtual route, one for each direction of flow.
- Virtual routes
 - These define the end-to-end communications between SNA subarea nodes. Virtual routes use underlying explicit routes to traverse the network.

You will need to coordinate with the Network Systems Programmers of Mainframe to choose the subareas and routes necessary to define the cross-domain link. Once the subarea and routes are decided, the following definitions will need to be added to VTAMGEN and NCPGEN:

- VTAM major node definition for the CDRM
- VTAM CDRSC definition
- VTAM and NCP path definitions

1. Path Definition

Define the route to the SNA host. Select Route Definitions from the SMIT menu in Figure 16 on page 29.

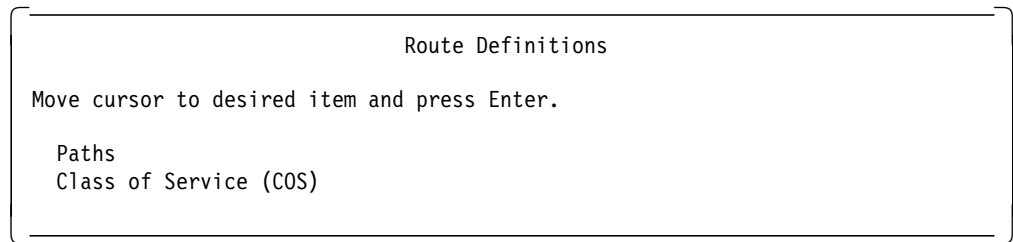


Figure 20. Route Definitions

Select Paths and Add a Path Definition.

Define a PATH for the subarea 7 and another one for the subarea 25.

2. We defined the SNAPU5PT PATH to reach the subarea 7.

```

                                Add a Path Definition

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

[TOP]                                [Entry Fields]
* Path Name                            SNAPU5PT
Destination subarea number (0-65535)    [7]

Explicit routes (clear TG number to remove)
ER #0      TG number (1-255)            [3]
           Adjacent subarea (0-65535) [7]
ER #1      TG number (1-255)            []
           Adjacent subarea (0-65535) []
ER #2      TG number (1-255)            []
           Adjacent subarea (0-65535) []

.....

ER #14     TG number (1-255)            []
           Adjacent subarea (0-65535) []
ER #15     TG number (1-255)            []
           Adjacent subarea (0-65535) []

Virtual routes (clear value to remove)
VR #0      Explicit route #              [0]
           Priority 0:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 1:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 3:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
VR #1      Explicit route #              []
           Priority 0:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 1:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 3:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []

.....

```

Figure 21. Path to Reach SA 7

3. Define the SNAPU5PH PATH to reach the subarea 25.

```

                                Add a Path Definition

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

[TOP]                                [Entry Fields]
* Path Name                            SNAPU5PH
Destination subarea number (0-65535)   [25]

Explicit routes (clear TG number to remove)
ER #0      TG number (1-255)           []
           Adjacent subarea (0-65535) []
ER #1      TG number (1-255)           [3]
           Adjacent subarea (0-65535) [7]
ER #2      TG number (1-255)           []
           Adjacent subarea (0-65535) []

.....

ER #14     TG number (1-255)           []
           Adjacent subarea (0-65535) []
ER #15     TG number (1-255)           []
           Adjacent subarea (0-65535) []

Virtual routes (clear value to remove)
VR #0      Explicit route #             [1]
           Priority 0:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 1:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 3:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
VR #1      Explicit route #             []
           Priority 0:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 1:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 3:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []

.....

```

Figure 22. Path to Reach SA 25

4. Define a Class of Service (COS). Select Class of Service from the SMIT screen in Figure 20 on page 33 and then select Add a COS Definition.

```

                                Add a COS Definition

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

[TOP]                                [Entry Fields]
* Class of service name                [SDLCCOS]

Virtual Routes (blank entries to remove):
Virtual route number (0-15)            [0]
Priority (0-2)                          [0]

Virtual route number (0-15)            [1]
Priority (0-2)                          [1]

Virtual route number (0-15)            [2]
Priority (0-2)                          [2]

Virtual route number (0-15)            []
Priority (0-2)                          [0]
[MORE...36]

```

Figure 23. Add a COS Definition

2.3.6 Cross-Domain Manager Definition

The cross-domain manager, represented by the SNA Application Server, must be defined to the SNA host.

2.3.6.1 Cross-Domain Manager Definition for Host

See Figure 24 which shows the CDRM definitions on the host.

```

                                VBUILD TYPE=CDRSC
                                NETWORK NETID=USIBMRA
UNIX      CDRSC   CDRM=RS6004CP

                                VBUILD TYPE=CDRM
                                NETWORK NETID=USIBMRA
RS6004CP CDRM   CDRDYN=YES,CDRSC=OPT,SUBAREA=04

```

Figure 24. Defining the Cross-Domain Manager to the Host

The CDRDYN parameter indicates that the SNA Application Server can dynamically create cross-domain resources. The SNA Application Server is assigned subarea address 4 and is identified by the name RS6004CP.

The CDRSC parameter indicates that the SNA host can dynamically create cross-domain resources for session requests originating in the SNA Application Server domain. The Application Gateway client is defined by the line:

```

UNIX      CDRSC CDRM=RS6004CP

```


2.3.6.2 Cross-Domain Manager Definition for RS/6000

This definition represents the SNA host that controls another SNA domain. SNA Application Access for AIX shares session information with other CDRMs to establish sessions with resources in other SNA domains. The SNA Application Server dynamically creates cross-domain manager definitions when a CDRM attempts to connect to the SNA Application Server if you have not already configured the CDRM. Therefore, you need to define CDRMs only when you want to assign a CDRSC to a specific CDRM.

1. Select Cross Domain Resources from the SMIT menu after selecting Advanced Options from the Cross Domain Resources menu.

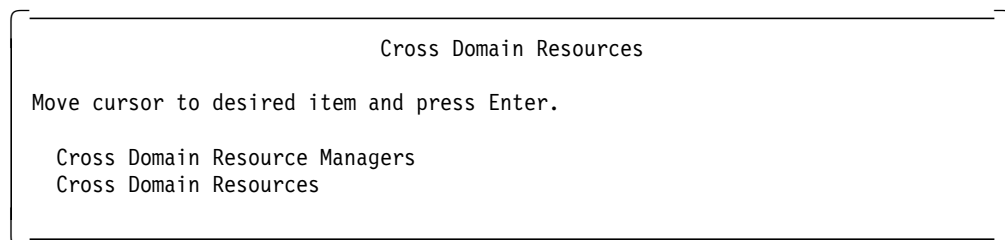


Figure 25. Cross Domain Resources

2. We need to add a CDRM for RS/6000 and another one for VTAM. Select Cross Domain Resource Managers and Add a CDRM Definition.

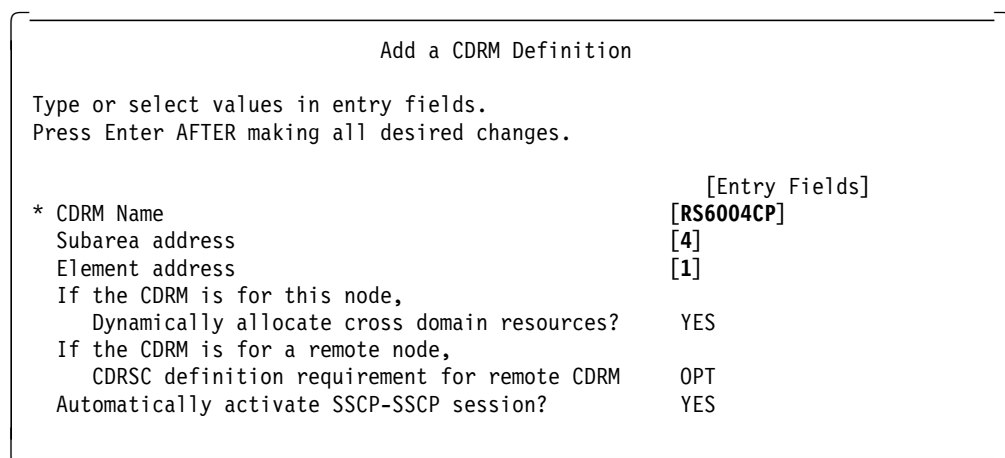
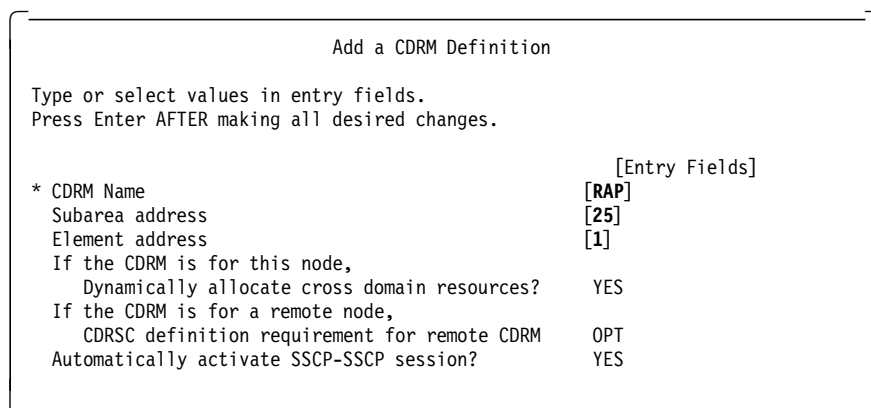


Figure 26. Add a CDRM Definition



2.3.7 Cross-Domain Resource Definition

This definition represents a logical unit (LU) in another SNA domain. The SNA Application Server dynamically creates cross-domain resource definitions when a CDRSC attempts to establish a session with an application on the SNA Application Server if the CDRSC has not already been configured. This means that a CDRSC needs to be defined only when you want to assign a CDRSC to a specific CDRM. A CDRSC acts as a secondary logical unit.

2.3.8 Application Definition Cross-Domain Example

This definition represents the connecting point for a client program to attach to the SNA Application Server.

Define the applications that the peripheral devices can access through the SNA Application Server.

```

                                Add an Application Definition
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

* Application name                                [Entry Fields]
* Name of control point owning the application    [UNIX]
Desired status of application at startup          [RS6004CP]
                                                    ACTIVE
```

2.3.9 Listing of Cross-Domain Configuration

The configuration of the cross-domain resources is complete. Verify the configuration by selecting Verify Definitions from the SMIT menu in Figure 15 on page 28. Check that the verification is successful.

```

                                COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

verifyaa command OK.
```

Figure 27 on page 39 is the configuration file created for the SDLC connection with SNA Application Access for AIX.

```

CP      NAME = RS6004CP,
        SA = 4,
        NETWORK = USIBMRA;

APPL   NAME = UNIX,
        CP_NAME = RS6004CP,
        ISTATUS = ACTIVE;

SDLCLINE      NAME = SDLCLINE,
               DEVICE = '/dev/mpq1',
               ISTATUS = ACTIVE,
               CLOCK = EXTERNAL,
               DUPLEX = HALF,
               NRZI = YES,
               PHYSICAL_LINK_TYPE = RS232,
               CD_MONITOR = NO,
               PAUSE = 2,
               SPEED = 9600;

PU4     NAME = SDLCPU5,
        LINK_NAME = SDLCLINE,
        MAXDATA = 2081,
        OUTFRAME = 7,
        MODULO = 8,
        REPLY_TIMEOUT = 1,
        RETRIES = 3,
        ISTATUS = ACTIVE,
        ADJ_SA = 7,
        TGN = 3,
        MODE = BOTH,
        ADDR = x'c1',
        TWA = NO;

PATH    NAME = SNAPU5PT,
        DESTSA = 7,
        ERO = (7,3),
        VRO = ERO,
        AUTO = (VRO,P0);

PATH    NAME = SNAPU5PH,
        DESTSA = 25,
        ER1 = (7,3),
        VRO = ER1,
        AUTO = (VRO,P0);

CDRM    NAME = RS6004CP,
        SA = 4,
        EA = 1,
        CDRDYN = YES,
        CDRSC = OPT,
        AUTO = YES;

CDRM    NAME = RAP,
        SA = 25,
        EA = 1,
        CDRDYN = YES,
        CDRSC = OPT,
        AUTO = YES;

COS     NAME = TRCOS,
        VR = (VRO,P0),(VR1,P1),(VR2,P2),(VR3,P0);

```

Figure 27. /usr/lpp/SNA_AA/bin/SNAPU5.config File

2.4 Sample Cross-Domain Configuration Token-Ring Link

The purpose of the example in this section is to enable a 3270 display terminal in subarea 25 to access AIX applications on RS/6000 at subarea 4. RS600012 is configured to be on subarea 4, whereas the 3270 display terminal will be in subarea 25. We tested this example from a native 3270 terminal in the subarea 25 SNA network. We also used a 3270 emulator running on an RS/6000 with an SA25 host screen.

It is assumed that you do not have any user-defined SNA profiles at this point.

Figure 28 shows SNA Application Access for AIX used in a cross-domain configuration using token-ring link.

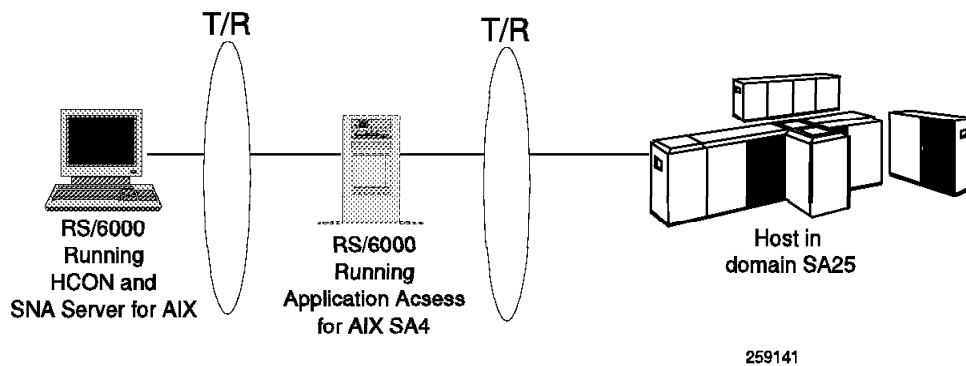


Figure 28. Diagram for Cross-Domain Token-Ring Example

To configure the token-ring cross-domain, follow the steps below.

2.4.1 Configuration File Cross-Domain Example

Set the SNA Application Server configuration file by issuing the following command:

```
snaafile -S SNAAG_CFG -p '/usr/lpp/SNA_AA/bin/TOKPU5.config'
```

See 2.3.1, "Configuration File Cross-Domain Example" on page 27 for additional SMIT screens.

Set Configuration File

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

SNA Application Access configuration file	[Entry Fields] [/usr/lpp/SNA_AA/bin/TO>
---	--

2.4.2 Control Point Definition Cross-Domain Example

Add a control point as follows:

```

                                     Add a Control Point Definition
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

* Control Point Name                    [Entry Fields]
Sub area number                         [RS6020CP]
Network name                            [04]
                                         [USIBMRA]
```

Refer to 2.3.2, "Control Point Definition Cross-Domain Example" on page 28 for additional SMIT screens.

2.4.3 Line Definition Cross-Domain Example

1. Select Token Ring for the Physical Links from the SMIT screen in Figure 16 on page 29.
2. Select Add a Token Ring Line Definition from the next SMIT screen. We got the following SMIT screen:

```

                                     Add a Token Ring Line Definition
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

* Token Ring Line Name                  [Entry Fields]
Adapter number                          [TOKLINE]
Desired status of network controller at startup [0]
Functional token ring MAC address mask     ACTIVE
Group token ring MAC address              [c00000000000]
Maximum frame size (1-4472)               [4109]
```

Figure 29. Add a Token Ring Line Definition

2.4.4 Adjacent Communication Controller Definition (PU 4)

Add a PU 4 definition by using a SMIT screen as follows:

```

                                Add a PU 4 Definition

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

[TOP]                                [Entry Fields]
* PU name                            [TOKPU5]
  Line name                           [TOKLINE]
  Adjacent subarea number (0-65535)   [7]
  Transmission group number (0-255)   [3]
  Maximum frame size (1-4129)         [2081]
  Maximum outgoing frames allowed (1 - (modulo-1)) [7]
  Station type                         BOTH
  Frame format (modulo) for this PU    128
  Line time out                        [1]
  Maximum retries before declaring error (1-7) [3]
  Desired status of line at startup    ACTIVE

SDLC lines only:
  Local link address (hex 00-ff)       []
  Operate in Two Alternate Mode?      NO

Token ring and Ethernet lines only 1
  Remote MAC address                  [400002070000]
  Remote SAP (hex 02-ec)              [04]
  Local SAP (hex 02-ec)               [04]
  Local group SAP (hex 02-ec)         [05]
  Maximum incoming frames allowed (1-(modulo-1)) [7]
  LLC response timeout (1-30, 1/10 sec.) [1]
  LLC acknowledgement count (1 - incoming frames) [7]
  Dynamic window increment delay (1-127) [7]
  Dynamic window increase (1-127)     [1]

[BOTTOM]

```

Note: **1** SNA Application Access for AIX Version 1.2.1 supports Ethernet 802.3 as well.

2.4.5 Path Definition Cross-Domain Example

See 2.3.5, "Path Definition Cross-Domain Example" on page 32 for additional details on paths. Add paths as shown below.

Add a Path Definition

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

```
[TOP]                                     [Entry Fields]
* Path Name                               SNAPU5PT
Destination subarea number (0-65535)     [7]

Explicit routes (clear TG number to remove)
ER #0      TG number (1-255)              [3]
           Adjacent subarea (0-65535)    [7]
ER #1      TG number (1-255)              []
           Adjacent subarea (0-65535)    []
ER #2      TG number (1-255)              []
           Adjacent subarea (0-65535)    []

.....

ER #14     TG number (1-255)              []
           Adjacent subarea (0-65535)    []
ER #15     TG number (1-255)              []
           Adjacent subarea (0-65535)    []

Virtual routes (clear value to remove)
VR #0      Explicit route #                [0]
           Priority 0:
           Minimum window size (1-max.)   []
           Maximum window size (min.-255) []
           Priority 1:
           Minimum window size (1-max.)   []
           Maximum window size (min.-255) []
           Priority 3:
           Minimum window size (1-max.)   []
           Maximum window size (min.-255) []
VR #1      Explicit route #                []
           Priority 0:
           Minimum window size (1-max.)   []
           Maximum window size (min.-255) []
           Priority 1:
           Minimum window size (1-max.)   []
           Maximum window size (min.-255) []
           Priority 3:
           Minimum window size (1-max.)   []
           Maximum window size (min.-255) []

.....
```

```

                                Add a Path Definition

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

[TOP]                                [Entry Fields]
* Path Name                          SNAPU5PH
Destination subarea number (0-65535) [25]

Explicit routes (clear TG number to remove)
ER #0      TG number (1-255)          []
           Adjacent subarea (0-65535) []
ER #1      TG number (1-255)          [3]
           Adjacent subarea (0-65535) [7]
ER #2      TG number (1-255)          []
           Adjacent subarea (0-65535) []

.....

ER #14     TG number (1-255)          []
           Adjacent subarea (0-65535) []
ER #15     TG number (1-255)          []
           Adjacent subarea (0-65535) []

Virtual routes (clear value to remove)
VR #0      Explicit route #           [1]
           Priority 0:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 1:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 3:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
VR #1      Explicit route #           []
           Priority 0:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 1:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []
           Priority 3:
             Minimum window size (1-max.) []
             Maximum window size (min.-255) []

.....

```

2.4.6 Cross-Domain Manager Definition

1. See 2.3.6, "Cross-Domain Manager Definition" on page 36 for details on the cross-domain manager. Add the cross-domain manager for RS6020CP as shown in this section.


```

                                Add a CDRM Definition
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                [Entry Fields]
* CDRM Name                      [RS6020CP]
Subarea address                  [4]
Element address                  [1]
If the CDRM is for this node,
    Dynamically allocate cross domain resources?    YES
If the CDRM is for a remote node,
    CDRSC definition requirement for remote CDRM    OPT
Automatically activate SSCP-SSCP session?          YES

```

2. Add a CDRM for RAP as shown below.

```

                                Add a CDRM Definition
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                [Entry Fields]
* CDRM Name                      [RAP]
Subarea address                  [25]
Element address                  [1]
If the CDRM is for this node,
    Dynamically allocate cross domain resources?    YES
If the CDRM is for a remote node,
    CDRSC definition requirement for remote CDRM    OPT
Automatically activate SSCP-SSCP session?          YES

```

2.4.7 Application Definition Cross-Domain Example

See 2.3.8, “Application Definition Cross-Domain Example” on page 38 for additional details on the application definition. Add an application definition as shown below:

```

                                Add an Application Definition
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                [Entry Fields]
* Application name                [UNIX]
* Name of control point owning the application    [RS6020CP]
    Desired status of application at startup      ACTIVE

```

2.4.8 Configuration File Cross-Domain Token-Ring Example

Figure 30 on page 46 shows the contents of the configuration file created for the SNA Application Access for AIX cross-domain example with token-ring.

```

CP   NAME = RS6020CP,
     SA = 4,
     NETWORK = USIBMRA;

APPL NAME = UNIX,
     CP_NAME = RS6020CP,
     ISTATUS = ACTIVE;

TRLIN NAME = TOKLINE,
     DEVICE = '/dev/dlpi/tr',
     ISTATUS = ACTIVE,
     FUNC_ADDRESS = x'c00000000000',
     GROUP_ADDRESS = x'c00000000000',
     LAN_RATE = RING_4Mbs,
     MAXDATA = 4109;

PU4  NAME = TOKPU5,
     LINK_NAME = TOKLINE,
     MAXDATA = 2081,
     OUTFRAME = 7,
     MODULO = 128,
     REPLY_TIMEOUT = 1,
     RETRIES = 3,
     ISTATUS = ACTIVE,
     ADJ_SA = 7,
     TGN = 3,
     MODE = BOTH,
     RMTMACADDR = x'400002070000',
     RMTLSAP = x'04',
     LCLLSAP = x'04',
     GRPLSAP = x'05',
     INFRAME = 7,
     RESPONSE_TIMEOUT = 1,
     RESPONSE_COUNT = 7,
     DW_ACK_COUNT = 7,
     DW_INCR = 1;

PATH NAME = SNAPU5PT,
     DESTSA = 7,
     ER0 = (7,3),
     VR0 = ER0,
     ;

PATH NAME = SNAPU5PH,
     DESTSA = 25,
     ER1 = (7,3),
     VR0 = ER1,
     ;

CDRM NAME = RS6020CP,
     SA = 4,
     EA = 1,
     CDRDYN = YES,
     CDRSC = OPT,
     AUTO = YES;

CDRM NAME = RAP,
     SA = 25,
     EA = 1,
     CDRDYN = YES,
     CDRSC = OPT,
     AUTO = YES;

```

Figure 30. /usr/lpp/SNA_AA/bin/TOKPU5.config File

2.4.9 Host Definition for Token-Ring Cross Domain

Figure 31 shows the host definition for the token-ring connection with SNA Application Access for AIX.

```
RA7GT939 GROUP ECLTYPE=(LOGICAL,SUB),
          CAPACITY=1M,
          SDLCST=(RA7SPRIT,RA7SSECT),
          PHYRSC=P071093S,
          TYPE=NCP,
          DIAL=NO,
          LNCTL=SDLC,
          LEVEL2=ECLNAVL2,
          LEVEL3=ECLNAVL3,
          LEVEL5=NCP,
          XIO=(ECLNAVXL,ECLNAVXS,ECLNAVXI,ECLNAVXK),
          USERID=(5668854,ECLVBDT,NORECMS,,ECLNMVT),
          LINEADD=NONE,
          NPACOLL=NO,
          PUTYPE=4,
          COMPOWN=YES,
          RETRIES=(6,0,0,6)
*
* ==> RS/6000
*
L071093A LINE TGN=3,
          ISTATUS=INACTIVE,
          UACB=X$L3A
*
P071093A PU ADDR=0410005AB14FCB,   MAPS RS/6000 TR ADDR
          PUTYPE=4
*
```

Figure 31. Host Definition for Token-Ring Cross-Domain

2.4.10 Testing of Cross-Domain Token-Ring Example

1. Start SNA Application Server by issuing the following command:
snapu5 -f TOKPU5.config
2. Check for a successful initialization message.
3. SNA Application Access for AIX provides a local operator interface to activate, deactivate and display the status of SNA Application Server resources.

There are four commands available under the snaop5 tool:

act: Activates an SNA resource
inact: Deactivates an SNA resource
display: Monitors and displays the status of SNA resources
stats: Displays SNA resource statistics

We will show the status of the SNA resources with snaop5 on the RS/6000 and with NetView on the SNA host. We used the cross-domain token-ring configuration as described in this section.

4. Start SNA_PU5 SNA Server Manager by issuing the following command:
rs600012:/usr/lpp/SNA_AA/bin >snaop5

You need to be in the same directory as above.

- You can enter snaop5 commands at the operator prompt:

```
rs600012->
```

Note: For a complete description of the SNA Application Operator command, refer to Chapter 11 of *SNA Application Access for AIX User's Guide*, SC31-8087-00.

- To display the status of the line station enter dis stations.

```
rs600012-> dis stations
                DISPLAY NET,STATIONS,SCOPE=ALL
RS6004CP       Control Point      Active
TOKLINE        Link                Active
TOKPU5         Link Station        Active
```

- The PU P071093A and the LINE L071093A should be active on the host side:

```
NCCF                N E T V I E W      RAPAN SWAMY    05/07/96 12:19:26
C RAPAN      DISPLAY NET, ID=L071093A, SCOPE=ALL
  RAPAN      IST097I  DISPLAY ACCEPTED
' RAPAN
IST075I     NAME = L071093A                , TYPE = LINE
IST486I     STATUS= ACTIV----G, DESIRED STATE= ACTIV
IST087I     TYPE = LEASED                  , CONTROL = SDLC
IST1440I    USE = NCP, DEFINED RESOURCE, CANNOT BE REDEFINED
IST134I     GROUP = RA7GT939, MAJOR NODE = RA7NCPX
IST1068I    PHYSICAL RESOURCE (PHYSRSC) = P071093S
IST1500I    STATE TRACE = OFF
IST396I     LNKSTA  STATUS  CTG GTG  ADJNODE  ADJSA  NETID
IST397I     P071093A  ACTIV----E  3  3                4  USIBMRA
IST314I     END

-----
C RAPAN      DISPLAY NET, ID=P071093A, SCOPE=ALL
  RAPAN      IST097I  DISPLAY ACCEPTED
' RAPAN
IST075I     NAME = P071093A                , TYPE = LINK STATION
IST486I     STATUS= ACTIV----E, DESIRED STATE= ACTIV
IST081I     LINE NAME = L071093A, LINE GROUP = RA7GT93P, MAJNOD = RA7NCPX
IST396I     LNKSTA  STATUS  CTG GTG  ADJNODE  ADJSA  NETID
IST397I     P071093A  ACTIV----E  3  3                4  USIBMRA
IST610I                                LINE L071093A - STATUS ACTIV----E
IST314I     END
```

Note: The LINE in the host and link and the link station on RS/6000 must be active before you complete the remaining tests.

- Display the routes on RS/6000 before starting the application:

```
rs600012-> dis routes,destsub=25
                DISPLAY NET,ROUTES,DESTSUB=25
OP40003d : (1) DISPLAY ACCEPTED
rs600012->
(0001) VR      TP      STATUS  ER      ADJSUB  TG      STATUS
(0001)          0          INACT  1       7       3       ACT
(0001) 0       1       INACT  1       7       3       ACT
(0001) 0       2       ACT    1       7       3       ACT
```

- Start the Application Gateway on RS/6000 by issuing the following command:

```
rs600012:/usr/lpp/SNA_AA/bin > sna_run_gateway
```

- From a 3270 host terminal use the command logon applid(unix) to start a session to the SNA Server for AIX.

You should get the following screen:

```

Release 1.0                                     01
  A
  A A   PPP  PPP  L   I  CCC   A   TTTTT I  000  N
  A  A   P P  P P  L   I  C     A A   T  I  O  O  N N
  A AAA A  PPP  PPP  L   I  C   AAAAA T  I  O  O  N N
  A     A  P   P   LLLL I  CCC A   A   T  I  000  N

      GGGG
      G  G  A  TTTTT EEEEE W   W  A  Y   Y
      G   A  A  T   E   W  W  W  A  A  Y   Y
      G  GGG AAAAA T   EEE  W  W  W  AAAAA  YYY
      G   G  A  A  T   E   W  W  W  A  A  Y
      GGGG A  A  T   EEEEE WW WW  A  A  Y

      Copyright (c) 1994 Brixton Systems Inc.

      USERNAME
      PASSWORD

F1=Help F3=Back

```

11. Log on to RS/6000 from the 3270 terminal using your user ID and the password. Remember to use Ctrl/Active key after password. You should get the AIX login screen.
12. To display the status of Clients Application, enter `dis appls`.

```

rs600012-> dis appls
          DISPLAY NET,APPLS,SCOPE=ALL
RS6020CP   Control Point      Active
UNIX       Logical Unit       Active/Contacted

```

13. NetView gives the following information:

```

NCCF                N E T V I E W   RAPAN SWAMY   05/07/96 12:29:42
C RAPAN   DISPLAY NET, ID=UNIX, SCOPE=ALL
RAPAN     IST097I  DISPLAY ACCEPTED
' RAPAN
IST075I   NAME = USIBMRA.UNIX   , TYPE = CDRSC
IST486I   STATUS= ACT/S       , DESIRED STATE= ACTIVE
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 = CDRSCAIX
IST479I   CDRM NAME = RS6020CP, VERIFY OWNER = NO
IST1184I  CPNAME = USIBMRA.RS6020CP - NETSRVR = ***NA***
IST1131I  DEVICE = CDRSC
IST654I   I/O TRACE = OFF, BUFFER TRACE = OFF
IST171I   ACTIVE SESSIONS = 0000000001, SESSION REQUESTS = 0000000000
IST206I   SESSIONS:
IST634I   NAME      STATUS      SID          SEND RECV VR TP NETID
IST635I   RAPT421  ACTIV-S     F88F0164A0DD6CFD 001B 0009  0  0 USIBMRA
IST314I   END
-----

```

There is a session established with UNIX, so the status is ACT/S.

14. To display the status of routes, enter `dis routes,destsub=25`.

```
rs600012-> dis routes,destsub=25
                DISPLAY NET,ROUTES,DESTSUB=25
OP40003d : (12) DISPLAY ACCEPTED
rs600012->
(0012) VR      TP      STATUS  ER      ADJSUB  TG      STATUS
(0012)          0          ACT    1        7        3        ACT
(0012) 0        0          INACT  1        7        3        ACT
(0012) 0        1          ACT    1        7        3        ACT
(0012) 0        2          ACT    1        7        3        ACT
```

15. Information from NetView:

```
NCCF                N E T V I E W      RAPAN SWAMY    05/07/96 12:38:20
* RAPAN      D NET,ROUTE,DESTSUB=4
  RAPAN      IST097I DISPLAY ACCEPTED
' RAPAN
IST535I ROUTE DISPLAY 8 FROM SA          25 TO SA          4
IST808I ORIGIN PU = ISTPUS25 DEST PU = ***NA*** NETID = USIBMRA
IST536I VR TP      STATUS  ER      ADJSUB  TGN  STATUS  CUR MIN MAX
IST537I 0 0        ACTIV  0          7  1  ACTIV1  3  2  6
IST537I 0 1        INACT  0          7  1  ACTIV1
IST537I 0 2        ACTIV  0          7  1  ACTIV1  3  2  6
IST537I          1          UNDEF
IST537I          2          UNDEF
IST537I          3          UNDEF
IST537I          4          UNDEF
IST537I          5          UNDEF
IST537I          6          UNDEF
IST537I          7          UNDEF
IST537I          8          UNDEF
IST537I          9          UNDEF
IST537I         10         UNDEF
IST314I END
```

16. To display the status of sessions, enter dis sessions.

```
rs600012-> dis sessions
                DISPLAY NET,SESSIONS,SCOPE=ALL,LIST=ALL
RS6020CP      Control Point      Active
SID00008      Session            Active      PLU=UNIX, SLU=RAPT421
```

17. Display the active session in NetView.

```
NCCF                N E T V I E W      RAPAN SWAMY    05/07/96 12:44:54
C RAPAN      DISPLAY NET,ID=RAPT421,SCOPE=ALL
  RAPAN      IST097I DISPLAY ACCEPTED
' RAPAN
IST075I NAME = USIBMRA.RAPT423 , TYPE = LOGICAL UNIT
IST486I STATUS= ACT/S          , DESIRED STATE= ACTIV
IST977I MDLTAB=***NA*** ASLTAB=***NA***
IST861I MODETAB=AMODETAB USSTAB=US3270 LOGTAB=***NA***
IST934I DLOGMOD=M2BSCQ USS LANGTAB=***NA***
IST597I CAPABILITY-PLU INHIBITED,SLU ENABLED ,SESSION LIMIT 00000001
IST351I LOCAL 3270 MAJOR NODE = RAPP42
IST077I SIO = 00068 CUA = 0423
IST1131I DEVICE = LU
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST171I ACTIVE SESSIONS = 0000000001, SESSION REQUESTS = 0000000000
IST206I SESSIONS:
IST634I NAME      STATUS      SID          SEND RECV VR TP NETID
IST635I UNIX      ACTIV-P    F88F0164A0DD6CFD 000C 0024 0 0 USIBMRA
IST314I END
```

18. To display the status of cross-domain manager, enter dis cdrms.

```
rs600012-> dis cdrms
                DISPLAY NET,CDRMS,SCOPE=ALL
RS6004CP       Control Point      Active
RAP           CDRM                Active      SA=25, EA=1, NETID=USIBMRA
```

19. The NetView display of the host CDRMS is as follows:

```
NCCF                N E T V I E W      RAPAN SWAMY    05/07/96 12:48:03
C RAPAN             DISPLAY NET,CDRMS,SCOPE=ALL
  RAPAN             IST097I DISPLAY ACCEPTED
' RAPAN
IST350I             DISPLAY TYPE = CDRMS
IST089I             RA$WRA  TYPE = CDRM SEGMENT      , ACTIV
IST482I             RAK      ACTIV, SA              20, EL    1, NETID = USIBMRA
IST482I             RAP      ACTIV, SA              25, EL    1, NETID = USIBMRA
IST482I             RAH      PACDR, SA              17, EL    1, NETID = USIBMRA
IST482I             RA1      ACTIV, SA              1, EL    1, NETID = USIBMRA
IST482I             RA39     ACTIV, SA              39, EL    1, NETID = USIBMRA
IST482I             RA36     ACTIV, SA              36, EL    1, NETID = USIBMRA
IST482I             RA$WRA4  TYPE = CDRM SEGMENT      , ACTIV
IST482I             RS6020CP ACTIV, SA              4, EL    1, NETID = USIBMRA
IST314I             END
???
```

20. To display the status of the cross-domain resource, enter dis cdrscs.

```
rs600012-> dis cdrscs
                DISPLAY NET,CDRSCS,SCOPE=ALL
RS6020CP         Control Point      Active
RAP             CDRM                Active
  RAPT421        Logical Unit        Active/Session
```

21. The NetView display is as follows:

```
NCCF                N E T V I E W      RAPAN SWAMY    05/07/96 12:52:51
C RAPAN             DISPLAY NET,CDRSCS,SCOPE=ALL
  RAPAN             IST097I DISPLAY ACCEPTED
' RAPAN
IST350I             DISPLAY TYPE = CDRSCS
IST089I             ISTPDILU TYPE = CDRSC SEGMENT      , ACTIV
IST1276I            RA600120      ACTIV      CDRM = ***NA***
IST1276I            RA60012A      ACTIV      CDRM = ***NA***
IST1276I            USIBMRA.UNIX  ACTIV      CDRM = RS6020CP
IST314I             END
-----
???
```

22. On RS/6000, the logged on user has the following information for a who command:

```
rs600012:/usr/lpp/SNA_AA/bin > who
root      pts/5      May 16 01:28      (swamy.au.ibm.com)
root      pts/4      May 16 01:15      (BrxUNIXGTWY)
```

The user will appear to have logged on from the terminal BrxUNIXGTWY.

2.5 Configuring the SNA Passthru

The purpose of the example in this section is to enable a 3270 emulator in subarea 4 to access a host application using RS600012 as an SNA Passthru. RS600012 and RS600020 will be configured to be in local domain 4 using SNA Application Access for AIX. RS600012 will have an SDLC link to the host.

SNA Passthru allows 3270 devices, which are connected in the local domain as that of RS/6000 running SNA Application Access for AIX, to access host applications. There are two steps in this configuration:

1. A local domain configuration between the 3270 device (another RS/6000 using 3270 emulator) and RS/6000 running SNA Application Access for AIX
2. A dependent LU 0 secondary LU (SLU) server configuration on the RS/6000 running SNA Application Access for AIX

It is assumed that you do not have any user-defined SNA profiles at this point.

Figure 32 shows a SNA Application Access for AIX and SNA Passthru configuration using a token-ring link. The diagram also shows the host SDLC link.

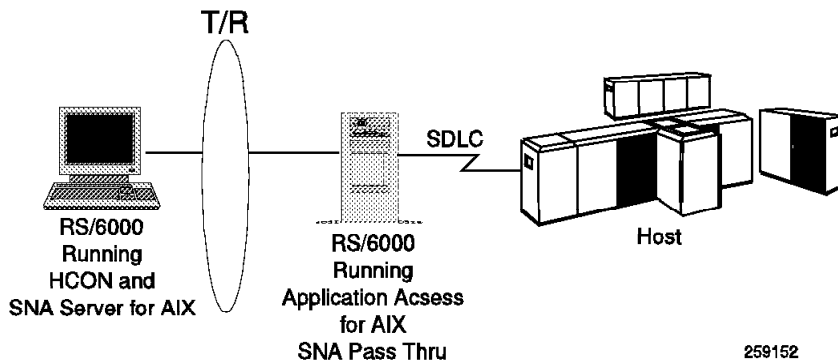


Figure 32. Diagram for Cross-Domain Token-Ring Example

There are four steps to establishing and configuring an SNA Passthru session:

1. Establish SNA peripheral device connectivity.
2. Establish SNA network connectivity.
3. Configure SNA Passthru.
4. Attach to the SNA host application.

In this example, we configure SNA Server for AIX on RS600012 to communicate with the host and RS600020 to access host applications using SNA Passthru.

2.5.1.1 Components of SNA Passthru

There are several components in SNA Passthru to establish links between the SNA peripheral devices and the SNA network. The dependent LU server *sna_dlu*, in conjunction with SNA Server for AIX, manages the connections with the SNA host. The SNA application server manages the connections with the SNA peripheral devices.

2.5.2 Local Domain Configuration

Follow the steps below to configure SNA Application Access for AIX on RS600012 for a local domain token-ring configuration.

- 2.2.1, “Configuration File Local-Domain Example” on page 10
- 2.2.2, “Control Point Definition Local-Domain Example” on page 10
- 2.2.3, “Applications Definition Local-Domain Example” on page 11
- 2.2.4, “Peripheral Devices Definition Local-Domain Example” on page 12
- 2.2.5, “Starting SNA Application Server Local-Domain Example” on page 14

Follow the steps below to configure SNA Server for AIX on RS600020.

- 2.2.7.1, “Configuration of Control Point” on page 17
- 2.2.7.2, “SNA DLC Profile Configuration” on page 17
- 2.2.7.3, “Configuration of Link Station Profile” on page 17
- 2.2.7.4, “Configuration of LU 2 Session Profile” on page 18

Follow the steps below to configure HCON on RS600020.

- 2.2.8, “HCON Configuration on SNA Application Access for AIX Client” on page 18

2.5.3 SNA Passthru Application Definition

Add an application SNAPT on RS600012 as per the steps below.

1. At the AIX command line, enter `smitty snaaa_cfg_app1`

Select the following:

```
Client Application Access

Move cursor to desired item and press Enter.

Add an Application Definition
Change/Show an Application Definition
Remove Application Definitions
Export Application Definitions
Verify Definitions
```

2. Add the SNAPT application.

```
Add an Application Definition

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

* Application Name                               [Entry Fields]
Name of control point owning the application     [SNAPT]
Desired status of application at startup         [SA4UNIX]
                                                ACTIVE
```

3. Figure 33 on page 54 shows the `/usr/lpp/SNA_AA/bin/LOCALTR.config` file, which was modified by adding the SNA Passthru application.

```

CP      NAME = SA4UNIX,
        SA = 4,
        NETWORK = USIBMRA;

APPL   NAME = UNIX,
        CP_NAME = SA4UNIX,
        ISTATUS = ACTIVE;

APPL   NAME = SNAPT,
        CP_NAME = SA4UNIX,
        ISTATUS = ACTIVE;

TRLINE NAME = RS12AATR,
        DEVICE = '/dev/dlpi/tr',
        PPA = 0,
        ISTATUS = ACTIVE,
        FUNC_ADDRESS = x'c00000000000',
        GROUP_ADDRESS = x'c00000000000',
        LAN_RATE = RING_4Mbps,
        MAXDATA = 4109;

PU2    NAME = RS12AA,
        LINK_NAME = RS12AATR,
        MAXDATA = 265,
        OUTFRAME = 7,
        MODULO = 128,
        REPLY_TIMEOUT = 1,
        RETRIES = 3,
        ISTATUS = ACTIVE,
        RMTMACADDR = x'10005AC95035',
        RMTLSAP = x'04',
        LCLLSAP = x'04',
        GRPLSAP = x'05',
        INFRAME = 7,
        RESPONSE_TIMEOUT = 1,
        RESPONSE_COUNT = 7,
        DW_ACK_COUNT = 7,
        DW_INCR = 1;

LU     NAME = RS12AA02,
        PU_NAME = RSAA12,
        LOCADDR = 2,
        PACING = 1,
        LOGMODE = L32782,
        ISTATUS = ACTIVE,
        MESSAGES = '/usr/lpp/SNA_AA/bin/messages',
;

```

Figure 33. /usr/lpp/SNA_AA/bin/LOCALTR.config File for SNA Passthru

4. We have to stop and start the SNA Application Server so that the changes are effective. You may use the command `kill` within the utility `snaop5` to stop SNA Application Server.

```

cd /usr/lpp/SNA_AA/bin
snaop5 -f LOCALTR.config

```

2.5.4 Configuring SDLC Link Station to Host

This section shows the steps to configure an SDLC link station on RS60012 for host connectivity. It is assumed that you do not have any SNA profiles configured on SNA Server for AIX on RS60012.

2.5.4.1 Configure the Control Point

We used the following command to configure the control point:

```
chснаobj -t'control_pt' -e 'USIBMRA' -a 'RS12' node_cp
```

2.5.4.2 Add SDLC EIA232D SNA DLC Profile

We used the following command to add an SDLC SNA DLC profile:

```
mkснаobj -t'sna_dlc_eia232d' RS12S
```

2.5.4.3 Add SDLC EIA232D Link Station Profile

We used the following command to add an SDLC link station profile:

```
mkснаobj -t'link_station' -w'eia232d' -y 'RS12S' -b '193' RS12S
```

Verify the SNA profiles by issuing the command `verifysna`.

2.5.5 Configuring the SNA Network Connectivity

SNA Passthru uses SNA Server for AIX and the the dependent LU server to communicate with the SNA network. Follow these steps to configure the dependent LU server.

1. At the AIX command line, enter `smitty snaaa`.
2. Follow the path shown below.

```
Configuration
Remote Application Access
Dependent LU Server
```

2.5.5.1 Dependent LU Configuration File

1. Set the Dependent LU Configuration File as shown below.

```
Dependent LU Server

Move cursor to desired item and press Enter.

Set Dependent LU Configuration File
Quick Gen
Advanced Options
```

Figure 34. Dependent LU Server Menu

2. Enter the full pathname of the configuration file. We used `/usr/lpp/SNA_AA/bin/sna_dlu.config` as the dependent LU configuration file.

```
Set Dependent LU Server Configuration File

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

Dependent LU Server configuration file [Entry Fields]
[/usr/lpp/SNA_AA/bin/sn>
```

2.5.5.2 Dependent LU Configuration Quick Gen

1. Select Quick Gen from the Dependent LU Server menu, as shown in Figure 34 on page 55.
2. Enter the gen name RS12.

```
Dependent LU Server Quick Gen

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

* Gen name                                [Entry Fields]
                                           [RS12D]
```

3. See 2.5.4, “Configuring SDLC Link Station to Host” on page 54 for the steps to configure an SDLC link station from RS600012 to the host. We will use the link station RS12S in this example.
4. Specify yes to the field in the next SMIT screen, to use an existing link station.

```
Dependent LU Server Quick Gen: Link Station Definition

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

Do you wish to use an existing link station  [Entry Fields]
definition?                                yes
```

5. Select RS12S from the list generated by function key F4. RS12S is an SDLC link station configured as per 2.5.4, “Configuring SDLC Link Station to Host” on page 54.

```
Dependent LU Server Quick Gen: Existing Link Station

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

Enter the Link Station Profile name to use  [Entry Fields]
                                           [RS12S]
```

6. Enter the values for LU 2 addresses in the following screen.

```

Quick Gen for Dependent LU Server

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

                                     [Entry Fields]
Configuration name                    RS12D
Link Station                          RS12S
Link station type                      SDLC(eia232d)
Local secondary station address        193
Calling link station?                  yes

XID Node ID                           [*]
Operator service name                   [brxadmin_pu2]
Dependent LU server instance service name [brx_pu2_esp&brkr.

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                                    [6-7]
LU 3                                    []

```

7. We were running SNA Server for AIX when we configured our example. Thus, the new profiles were updated dynamically. We got the following messages:

```

COMMAND STATUS

Command: OK          stdout: yes      stderr: no

Before command completion, additional instructions may appear below.

Configuring SNA profiles....done.

Building Dependent LU Server configuration.....done.

Verifying SNA profiles...

Normal verification being performed since SNA is not running.

Profile type 'link_station_eia232d' name 'RS12S' CHANGED. 1
Profile type 'lu_reg' name 'RS12D' ADDED.
Profile type 'lu0_slu' name 'RS12D06' ADDED.
Profile type 'lu0_slu' name 'RS12D07' ADDED.

/usr/bin/verifysna command OK.
All profiles verified and updated.

Signaling AnyNet to read verified database.

Verifying SNA AA profiles...
/usr/bin/verifydlu command OK.

Dependent LU Server configuration succeeded.

```

Note:

1 These lines show the SNA profiles that are added by DLU configuration. SNA Application Access for AIX and SNA Server for AIX can both use the same token-ring adapter simultaneously. However, the two products must be configured to use different SAP addresses. (SAPs must be multiples of 4.) This is the field Local SAP address in the token-ring SNA DLC profile in SMIT.

8. The following shows the contents of the dependent server configuration file that was created in this section.

```

rs600012:/usr/lpp/SNA_AA/bin > pg sna_dlu.config

GSNA_PROFILE   NAME = RS12D,
                DEVICE = '/dev/gsna/RS12S';

LU             NAME = RS12D06,
                PROFILE_NAME = RS12D,
                LOCADDR = 6,
                PACING = 1,
                LUTYPE = 2;

LU             NAME = RS12D07,
                PROFILE_NAME = RS12D,
                LOCADDR = 7,
                PACING = 1,
                LUTYPE = 2;

SERVICES       PU2_ADMIN = brxadmin_pu2,
                PU2_ESPD = brx_pu2_espd;

```

2.5.5.3 Start the Servers

1. Start SNA Server for AIX with the following command:

```
sna -s sna
```

2. Start the SDLC link station to the host by issuing the following command:

```
sna -s 1 -p RS12S
```

3. Start the dependent LU server with the following command:

```
cd /usr/lpp/SNA_AA/bin
sna_dlu -f sna_dlu.config
```

2.5.6 Configuration of SNA Passthru

The SNA Passthru function is a client application of the SNA Application Server; it has two components:

- PtMgr
- PtCld

The process PtMgr starts a PtCld process for each SNA peripheral device.

SNA Passthru needs to be configured to use the dependent LU server.

1. At the AIX command line, enter `smitty snaaa` and follow this path.

```

Configuration
Remote Application Access
Passthru

```

2. Set the Passthru configuration file.

```

                                     Passthru

Move cursor to desired item and press Enter.

Set Passthru Configuration File
Add a Virtual LU Definition
Change/Show a Virtual LU Definition
Remove Virtual LU Definitions
Export Virtual LU Definitions
Verify Definitions

```

3. Enter the name of the configuration file you want to create. We used /usr/lpp/SNA_AA/bin/sna_passthru.config in our example.

```

Set Passthru Configuration File

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

Passthru configuration file [Entry Fields]
                           [ /usr/lpp/SNA_AA/bin/sn>

```

4. From the Passthru main menu, select Add a Virtual LU Definition.

```

Add a Virtual LU Definition

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

* Peripheral LU Name [RS12AA02]
  Default virtual LU name [RS12D06]
  Default host name [SA25]
  Default service name [ ]
  File name containing display banner [snapt_banner.scr]
  Automatically logon to host using login string? no
    If yes, Host application login string [ ]

Alternate virtual LUs (clear LU or Service name to
remove)
  Virtual LU name [ ]
  Host name [ ]
  Service name [ ]

  Virtual LU name [ ]
  Host name [ ]
  Service name [ ]

```

We added only one virtual LU in this test.

5. The contents of the SNA Passthru configuration file, which was created in this section, are as follows:

```

rs600012:/usr/lpp/SNA_AA/bin > cat sna_passthru.config

DEF_LU NAME = RS12AA02,
        DEFAULT_VLU = (VLU_NAME = RS12D06, HOST_NAME = SA25),
        ATTACH = QUERY,
        ADMIN = NONE,
        BANNER = 'snapt_banner.scr',
        AUTO_LOGIN = '';

```

6. Start the SNA Passthru Application:

```
ptMgr -f sna_passthru.config
```

Note: Figure 35 on page 60 gives a sample script to start the SNA Passthru function on the RS/6000.

```

# Script to start SNA Passthru #
# Start the SNA Application Server
snapu5 -f LOCALTR.config
sleep 10
# Start the Dependent LU Server
sna_dlu -f sna_dlu.config
sleep 10
# Start the SNA Passthru
ptMgr -f sna_passthru.config

```

Figure 35. Sample Script to Start SNA Passthru

Note: If you plan to run SNA Server for AIX and SNA Application Access for AIX on the same RISC System/6000, SNA Server for AIX must be started first. If you stop SNA Server for AIX while SNA Application Access for AIX is still running, you will need to stop SNA Application Access for AIX before restarting SNA Server for AIX.

2.5.7 Testing of SNA Passthru

There are several components in this configuration:

- SNA Application Server
- Dependent LU Server
- SNA Passthru

1. Verify the link station on RS600020 with the command `sna -d l`.

```

rs600020:/ > sna -d l
  Link      Adjacent      Node   Device      # of local  In
  station   CP name         type   name        sessions   Use
-----
TORS12     USIBMRA.SA4UNIX LEN    tok0        Active     1 Yes

```

2. Display the status of the link station on RS600012 using the the SNA operator `snaop5`. This can be started by issuing the following command:

```
/usr/lpp/SNA_AA/bin/snaop5
```

At the `snaop5` prompt, enter `dis sa4unix`. You will get this display:

```

rs600012-> dis sa4unix
          DISPLAY NET,ID=SA4UNIX,SCOPE=ALL
SA4UNIX   Control Point   Active
UNIX      Logical Unit    Active/Contacted
SNAPT     Logical Unit    Active/Contacted
RS12AATR  Link                Active
RS12AA    Link Station     Active
RS12AA02 Logical Unit    Active

```

3. Verify that the SNA Passthru client application of SNA Application Server is started; at the `snaop5` prompt, enter `dis appls`.

```

rs600012-> dis appls
          DISPLAY NET,APPLS,SCOPE=ALL
SA4UNIX   Control Point   Active
UNIX      Logical Unit    Active
SNAPT     Logical Unit    Active/Contacted

```

When the SNA Passthru manager `ptMgr` starts successfully, the status of `SNAPT` is `Active/Contacted`.

4. Verify the SDLC connection to the host. At the AIX command line, enter `snaop`.

At the `snaop` prompt, enter `info ln all`.

```
SNA_DLU Controller
->info ln all
(1) info ln * all

Cnt  GSNAPROFILE          DEVICE          STATUS
  1    RS12              /dev/gsna/RS12  ACTIVE

Cnt  LUNAME  LOCADDR  TYPE   POOL   STATUS  AVAIL   ADDRESS
  1  RS12D06     6     2  PUBLIC  ACTIVE  Yes    0.0.0.0
  2  RS12D07     7     2  PUBLIC  ACTIVE  Yes    0.0.0.0
```

Note: The command `sna -d s123` will not show these active secondary LUs (SLUs).

5. SNA Passthru virtual LUs have been configured in a query mode. Choose option `SNAPT` from the SNA Server for AIX menu. See Figure 11 on page 23 for an example.

```
Release 1.0                                     01/27/95

***** Welcome to the SNA Passthru Facility *****

Select Command from:
  connect  (c)   Connect to Virtual LU
  alternates (a) Display Alternate Virtual LUs
  logoff   (1)   Logoff from application
Command ==> c

Virtual LU Selection Attributes:

SNA Host Name      SA25
LU Name            RS12D06
Service Name       default

Login: RAPAN

Copyright (c) 1994 Brixton Systems Inc.
```

Figure 36. SNA Passthru Initial Menu

6. Enter `C` to connect to virtual LU `RS12D06`. Also, type in the system name to which you want to connect. We used `RAPAN` in our test.

2.6 Configuring the TN3270 Access

The TN3270 access, which is part of SNA Application Access for AIX, enables SNA peripheral devices in the local domain to access applications that support the Telnet standard TN3270 protocol.

There are two components for TN3270 access:

- A single manager process `snatnMgr`, which listens for logon requests from an SNA peripheral device.
- A slave process `brxsnatnCld`, which handles the LU-LU session and the TN3270 connection.

There are four steps to establishing and configuring an SNA TN3270 access:

- Establish SNA peripheral device connectivity.
- Establish SNA network connectivity.
- Configure TN3270 Access.
- Attach to the SNA host application using TN3270.

It is assumed that there is no IP connectivity from the tn3270 client RS600020 to the host. Client RS600020 has an SNA link to RS600012.

RS600012 provides tn3270 access to RS600020 through SNA Application Server. This section shows RS600012, which is being used to provide tn3270 access to RS600020 using SNA Application Server.

RS600012 also functions as a tn3270 server to the host using SNA Client Access for AIX when the host does not support tn3270 connections.

Figure 37 shows the SNA link between tn3270 client and the system running SNA Application Access for AIX and providing tn3270 access. The SDLC host link is also shown in the diagram.

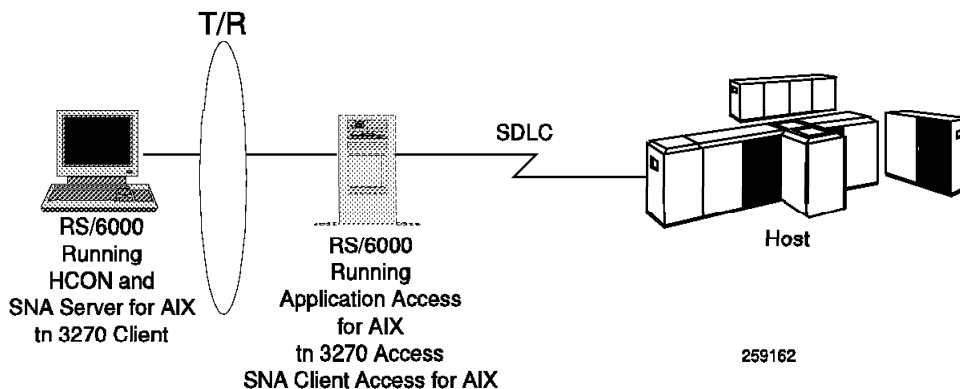


Figure 37. Diagram for tn3270 Access

2.6.1 Local Domain Configuration

Follow the steps below to configure SNA Application Access for AIX on RS600012 for a local domain token-ring configuration.

- 2.2.1, “Configuration File Local-Domain Example” on page 10
- 2.2.2, “Control Point Definition Local-Domain Example” on page 10
- 2.2.3, “Applications Definition Local-Domain Example” on page 11
- 2.2.4, “Peripheral Devices Definition Local-Domain Example” on page 12
- 2.2.5, “Starting SNA Application Server Local-Domain Example” on page 14

Follow the steps below to configure SNA Server for AIX on RS600020.

- 2.2.7.1, “Configuration of Control Point” on page 17
- 2.2.7.2, “SNA DLC Profile Configuration” on page 17
- 2.2.7.3, “Configuration of Link Station Profile” on page 17
- 2.2.7.4, “Configuration of LU 2 Session Profile” on page 18

Follow the steps below to configure HCON on RS600020.

- 2.2.8, “HCON Configuration on SNA Application Access for AIX Client” on page 18

If the host supports TN3270 connections, then you should be able to test the above configuration at this point. If the host does not support TN3270 connections, then you may use SNA Client Access for AIX to provide that function. We show both cases in this section. The steps below are only needed to configure SNA Client Access for AIX to provide a TN3270 access to the host.

Follow the steps below to configure SNA Client Access for AIX on RS600012, which will allow TN3270 access to the host.

- 3.4.1, “Control Point Definition” on page 84
- 3.4.2, “SNA DLC Profile” on page 84
- 3.4.3, “SNA Client Access Configuration” on page 84
- 3.4.5, “Starting SNA Server for AIX Server” on page 87
- 3.4.6, “Starting SNA Client Access for AIX Server” on page 88

2.6.2 SNA TN3270 Access Definion

Add the snatn3270 application in the SNA Application Server.

1. At the AIX command line, enter `smitty snaaa_cfg_appl`.

Select the following:

```
Client Application Access

Move cursor to desired item and press Enter.

Add an Application Definition
Change/Show an Application Definition
Remove Application Definitions
Export Application Definitions
Verify Definitions
```

```

                                Add an Application Definition

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

* Application Name                                [Entry Fields]
  Name of control point owning the application    [TN3270]
  Desired status of application at startup         [SA4UNIX]
                                                    ACTIVE

```

This adds the following lines in the SNA Application Server configuration file, /usr/lpp/SNA_AA/bin/LOCALTR.config:

```

APPL    NAME = TN3270,
        CP_NAME = SA4UNIX,
        ISTATUS = ACTIVE;

```

2. Start the SNA Application with the following command:

```

cd /usr/lpp/SNA_AA/bin
snapu5 -f LOCALTR.config

```

2.6.3 Testing TN3270 Connectivity

Test various components used in this example separately. We tested the following blocks:

- SNA connectivity between RS600020 and RS600012
- Host connectivity from RS600012 on the SDLC link
- Application access from RS60020 to RS600012
- TN3270 access from RS600012

1. Start the TN3270 access with the following command:

```

cd /usr/lpp/SNA_AA/SNA_TN3270
snatnMgr

```

2. On the RS600020, select TN3270 from the following menu:

```

Welcome to SNA Application Access

Please select an application:

UNIX
TSO
TN3270
SNAPT

LOGON APPLID(<app1>) LOGMODE(<mode>) DATA(<data>)

app1 ==>

```

You will get this menu:

```
Release 1.006/01/94

***** Welcome to the SNA-TN3270 Client Utility *****

Select Command from:
  connect  (c)   Connect to a TN3270 Host
  logoff   (1)   Logoff from application
Command ==> C

TN3270 Host Selection Attributes

System Name:          rs600012
TCP/IP Port:          5068
Terminal Type:        IBM-3278-2

Escape Key:           PF24
```

Figure 38. Application Gateway Prompt Menu

3. We got the MSG10 screen from the host.
4. If the host accepts TN3270 connections on port 23, then there is no need to use SNA Client Access for AIX on rs600012. Refer to the following screen, which was used in this example to directly connect to the host using TN3270.

```
Release 1.006/01/94

***** Welcome to the SNA-TN3270 Client Utility *****

Select Command from:
  connect  (c)   Connect to a TN3270 Host
  logoff   (1)   Logoff from application
Command ==> C

TN3270 Host Selection Attributes

System Name:          9.12.14.1
TCP/IP Port:          23
Terminal Type:        IBM-3278-2

Escape Key:           PF24
```

2.7 SNA Application Server Clients

We tested the following products as clients to SNA Application Server:

- HCON running under SNA Server for AIX
- Personal Communications 3270 for OS/2 Version 4
- Communications Manager/2 Version 1.11
- Personal Communications 3270 for DOS Version 4

2.7.1 Configuring Personal Communications 3270 for OS/2

You have to configure a PU 2 in SNA Application Server for the Personal Communications 3270 for OS/2. You need the following information:

- The token-ring MAC address of the PS/2 adapter
- The range of LU addresses you want to use

You can configure the SNA Application Server using SMIT or creating a configuration file with an editor. Figure 39 is an example of the configuration file.

```
CP      NAME = RS5CP,  
        SA = 5,  
        NETWORK = USIBMRA;  
  
APPL   NAME = AIX,  
        CP_NAME = RS5CP,  
        ISTATUS = ACTIVE;  
  
TRLINE NAME = PCOMV4TR,  
        DEVICE = '/dev/tok0',  
        ISTATUS = ACTIVE,  
        FUNC_ADDRESS = x'c00000000000',  
        GROUP_ADDRESS = x'c00000000000',  
        LAN_RATE = RING_4Mbps,  
        MAXDATA = 4109;  
  
PU2    NAME = PCOMV4,  
        LINK_NAME = PCOMV4TR,  
        MAXDATA = 265,  
        OUTFRAME = 7,  
        MODULO = 128,  
        REPLY_TIMEOUT = 1,  
        RETRIES = 3,  
        ISTATUS = INACTIVE,  
        RMTMACADDR = x'400052005204',  
        RMTLSAP = x'04',  
        LCLLSAP = x'04',  
        GRPLSAP = x'05',  
        INFRAME = 7,  
        RESPONSE_TIMEOUT = 1,  
        RESPONSE_COUNT = 7,  
        DW_ACK_COUNT = 7,  
        DW_INCR = 1;  
  
LU     NAME = PCOMV401,  
        PU_NAME = PCOMV4,  
        LOCADDR = 1,  
        PACING = 1,  
        LOGMODE = L32782,  
        ISTATUS = INACTIVE,  
        MESSAGES = '/usr/lpp/SNA_AA/bin/messages',
```

Figure 39. Example of Configuration File

To configure Personal Communications 3270 for OS/2 you need to know the token-ring MAC address of the RS/6000 adapter.

You only have to specify this MAC address in the configuration windows as shown in Figure 42 on page 68.

From the Personal Communication 3270 initial window, you can configure the connection to SNA Server for AIX.

Click on **Communication** and select **Configure**. You will get the following window:

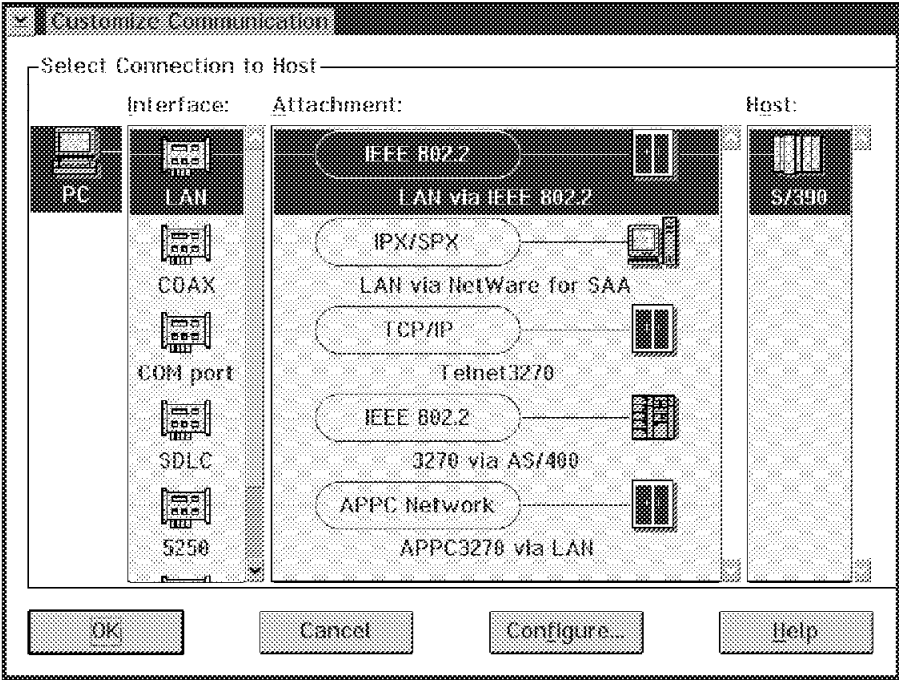


Figure 40. Customize Communication Menu

Click on **Configure**. You will get the following window:

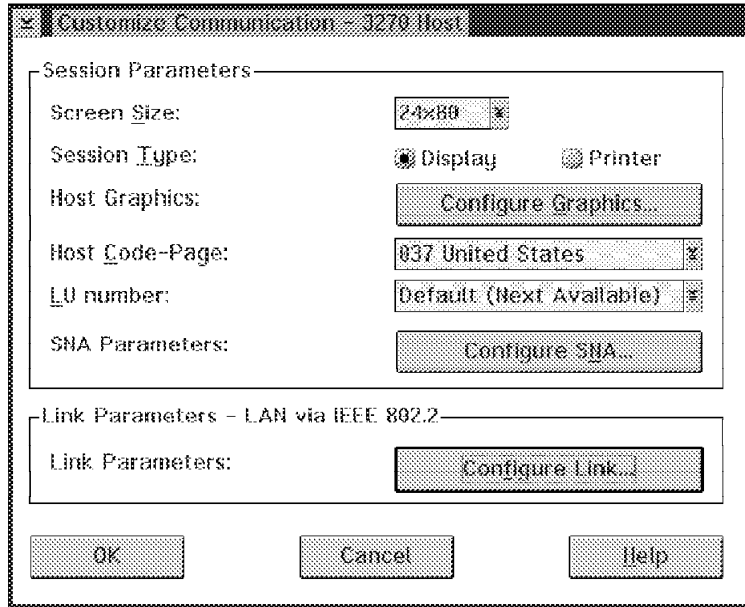


Figure 41. Customize Communications-3270 Host Window

Click on **Configure Link**. You will get the following window:

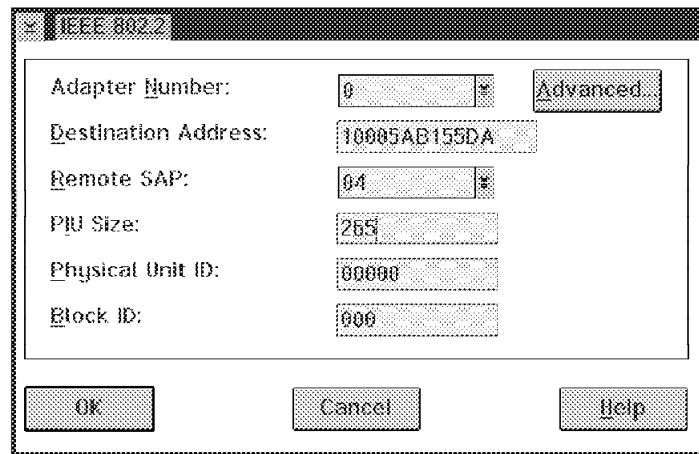


Figure 42. IEE 802.2 Window

Enter the RS/6000 MAC address in the Destination Address field; then save the configuration by clicking on **OK**. You can then start the connection to the RS/6000 by clicking on **Communication** and **connect**. You will connect to SNA Application Access for AIX on RS/6000 and obtain the SNA Application Server initial menu.

You can enter UNIX to log on to the AIX system.

2.7.2 Configuring Communications Manager/2

We use the same configuration file created for SNA Application Server and PC3270 for OS/2.

We configure a 3270 emulation through token-ring in the communication manager setup. You only have to specify the token-ring MAC address of the RS/6000 as shown in Figure 43 in the LAN Destination Address field.

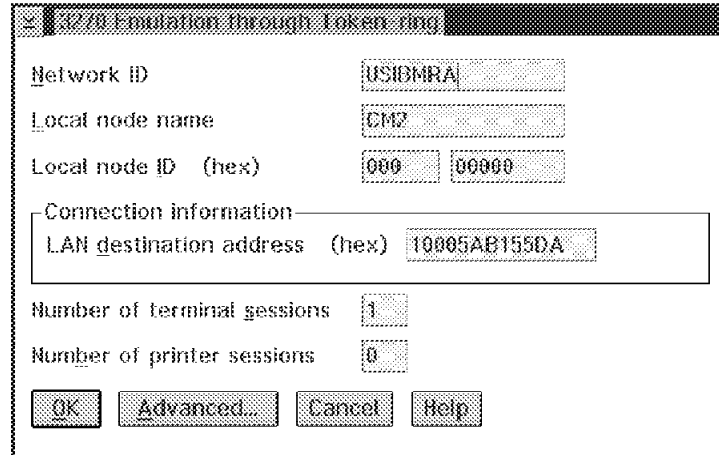


Figure 43. Communications Manager/2 3270 Emulation Setup

Start the SNA 3270 session.

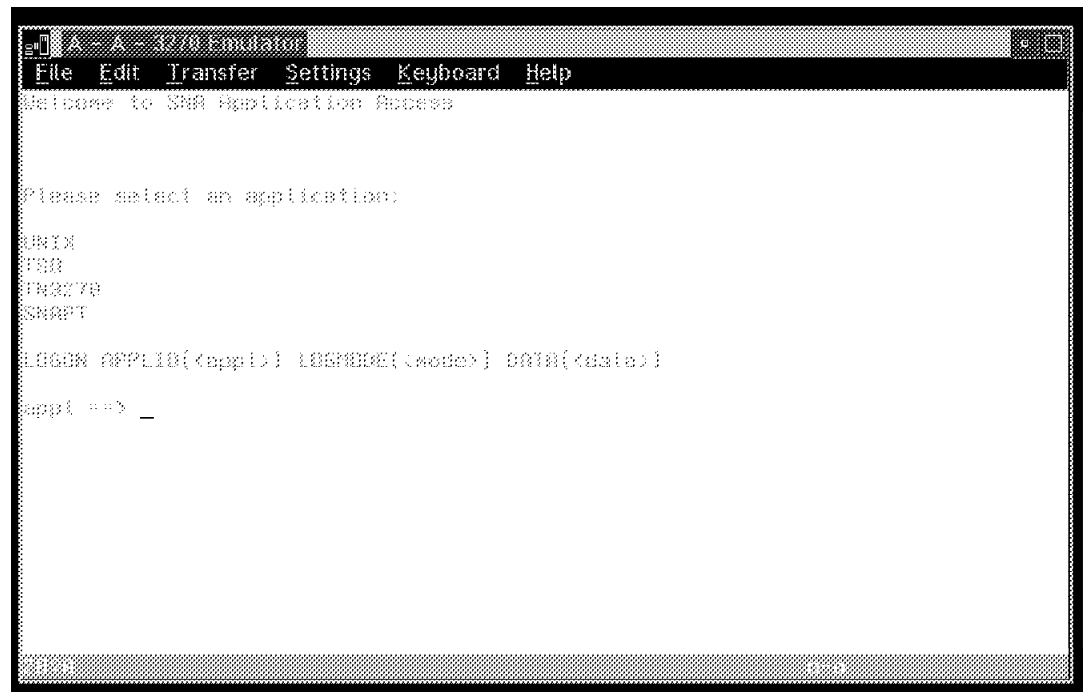


Figure 44. Communications Manager/2 3270 Emulation

2.7.3 Configuring Personal Communications 3270 for DOS

Use the config utility of PC3270 to configure the connection to the RS/6000; it will create a configuration file named PC3270.BAT, as shown in Figure 45.

```
@echo off
set CMGR.CONFIG=C:\PC3270\
set CMGR.QUIET=-q
set CMGR.TRACE=00
:strt
if x%1 == x/v goto qt1
if x%1 == x/V goto qt1
if x%1 == x/t goto trc
if x%1 == x/T goto trc
if x%1 == x goto exit
echo CFG36 Parameter specified is incorrect
GOTO exit1
:qt1
set CMGR.QUIET=
shift
goto strt
:trc
set CMGR.TRACE=%2
shift
shift
goto strt
:exit
C:\PC3270\LOGO
C:\PC3270\TQDOS %CMGR.QUIET%
if ERRORLEVEL 1 GOTO exit1
C:\PC3270\PCSCCP C:\PC3270\PCSCONV.TXT 0037 %CMGR.QUIET%
C:\PC3270\PCSDOS 2 a=24*80 b=24*80 -f -ef %CMGR.QUIET%
C:\PC3270\PCSSNA B=02500 L=2 %CMGR.QUIET%
C:\PC3270\PCSTKR LU=03,04 A=0 n=snalantrace1 G=10005AB14FCB RS=1033
LS=1 I=00000000 XS=1033 DS=04 SS=04 T=%CMGR.TRACE% %CMGR.QUIET%
C:\PC3270\PCSLATE %CMGR.QUIET% /037437
C:\PC3270\PCSLDTBL %CMGR.QUIET% /037437
C:\PC3270\PCSBKEY %CMGR.QUIET% %CMGR.CONFIG%3270DISP.TDF
C:\PC3270\PCSBKEY %CMGR.QUIET% %CMGR.CONFIG%PC3270.KDF
C:\PC3270\PCSCOPY %CMGR.QUIET%
rem YN 2,2,1,1,1,3,1,1,1,1,2,2,2,1,2,2,1,1,0,1,2
rem PC3270 Version 4.00
C:\PC3270\PCSUTIL BATCH DOS
:exit1
set CMGR.CONFIG=
set CMGR.QUIET=
set CMGR.TRACE=
```

Figure 45. Personal Communications for DOS Configuration File: PC3270.BAT

Chapter 3. SNA Client Access for AIX

SNA Client Access for AIX V1.2 provides TCP/IP and Internet users with easy access to IBM mainframes. This version has been enhanced to support the new industry-standard TN3270E clients. With TN3270E server capabilities, users are now able to print from mainframe applications to printers attached to their workstations or to printers in their TCP/IP networks.

3.1 Overview of SNA Client Access for AIX

SNA Client Access for AIX extends its fault-resilient capabilities by offering a robust load-balancing solution for controlling and balancing the workload across multiple RISC System/6000s. Clients are routed to a machine based on mainframe LU availability, link speed, client/mainframe connection load, overall system load and machine processor speed.

Additional highlights in this release include:

- Provides end-to-end response time monitoring
- Provides increased security and usability through enhanced configuration capabilities with new SMIT-based dialogs
- Uniprocessor (UP) and symmetric multiprocessing (SMP) support

SNA Client Access for AIX provides Telnet 3270E/3270/5250 server functions to the TN3270E/TN3270/5250 clients. It provides the functionality to convert Telnet client traffic to SNA format for communications to the host system and converts SNA traffic to Telnet format for communications to the clients. Release 2 extends 3270 Telnet support to include TN3270E, providing 3270 terminal and printer emulation to TCP/IP users (enabling locally attached printer support). Telnet 3270E clients have the ability to request specific host LUs. In addition, Client Access allows an administrator to dedicate host LUs to specific Telnet 3270 and Telnet 3270E clients.

SNA Client Access for AIX, in combination with NetView Performance Monitor (5665-333), provides end-to-end response time measurements for both Telnet 3270E and standard Telnet 3270 clients.

SNA Client Access for AIX, in combination with the IBM LoadLeveler program (5765-145), provides a robust solution for controlling and balancing the workload across multiple RISC System/6000s running Client Access.

SNA Client Access for AIX has access to all of the communication protocol support that Communications Server for AIX provides and supports SNA LUs 0, 1, 2, 3 and APPC.

SNA Client Access for AIX supports multiple client functions across major vendor operating systems, providing enterprise SNA network access for TCP/IP clients. The following functions are supported:

- TN3270 Emulation (both standard and TN3270E)
- TN5250 Emulation
- 3270 Emulation
- 5250 Emulation

- APPC APIs
- 3770 remote job entry (RJE)
- 3287 Printer Emulation

The following clients are supported:

- IBM AIX 3270 Host Connection Program 1.3
- IBM AIX TCP/IP
- IBM AIX x3270
- IBM Connection Program/400 for UNIX Environment
- IBM Personal Communications/3270
- IBM DOS TCP/IP V2.1.1
- IBM OS/2 TCP/IP
- Brixton Brx3270
- Brixton Brx5250
- Brixton BrxTN3270 Client
- Brixton BrxTN5250 Client
- Brixton Brx3770
- Brixton BrxAPPC

In addition, any industry-standard Telnet 3270, Telnet 3270E and Telnet 5250 emulators are supported.

3.1.1 Components of SNA Client Access for AIX in a Hierarchical Network

Session Manager

The session manager is identified by *sna_sman*; this is its executable name. It listens to client connection requests from the SNA node. The connection requests can come from a TCP/IP client. The TCP/IP port used by *sna_sman* can be either the default port provided by the SNA Client Access for AIX or a user-defined port.

Upon connection, the *sna_sman* executable does the following:

1. Checks the client connection request against the user access definitions. If the client requests a specific resource, then that request is verified against the access definitions for the resource. If no resource is requested, then either a configured default or a resource from the public pool is assigned.
2. Based on the resource selected, *sna_sman* passes the connect request to an instance of the executable *sna_dlu*.

Dependent LU Server

The dependent LU server, which is identified by *sna_dlu* (its executable name), acts as a broker for dependent sessions. Based on resource availability, *sna_dlu* establishes a dependent session with the host.

3.1.1.1 Components of SNA Client Access for AIX in Peer-to-Peer Network

- Telnet 5250 Server

The Telnet 5250 Server, *sna_tnet52*, listens on a TCP/IP port for tn5250 client connections requests. *sna_tnet52* converts the Telnet protocol into APPC. This program converts valid connection requests to an APPC request to allocate a conversation. *sna_tnet52* passes that request to the *sna_ilu*.

- Independent LU 6.2 Server

The Independent LU 6.2 Server, *sna_ilu*, gets the request from the *sna_tnet52*. *sna_ilu* calls SNA Server for AIX.

SNA Server for AIX establishes a session with another node on the SNA network, if one is not already active. The 5250 data stream is then passed back and forth from the TCP/IP client to the AS/400 target application. Figure 46 shows an overview of SNA Client Access for AIX.

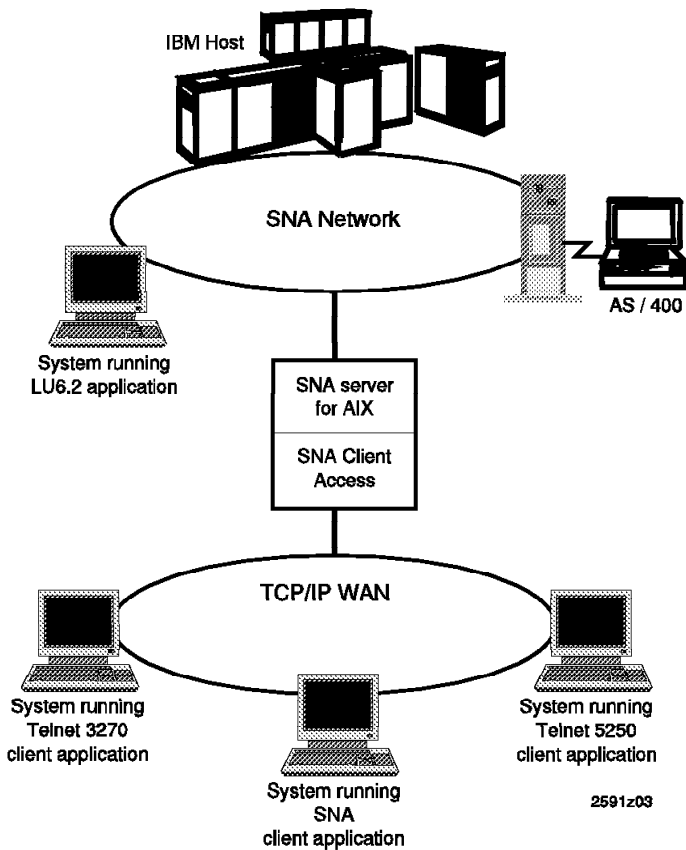


Figure 46. SNA Client Access for AIX Overview

3.2 Installing SNA Client Access for AIX

SNA Client Access for AIX V1.2.1 has the following prerequisites:

- AIX V4.1.4 (or later)
- SNA Server for AIX V3.1 (or later)
- Please refer to the document *SNA Client Access User's Guide*, SC31-8085 for full details of hardware, software and memory requirements.

Note

Please see 10.1, "SNA Profiles Maintenance" on page 211 regarding the procedure for backing up and restoring SNA profiles, before installing SNA Client Access for AIX software.

Follow these installation steps:

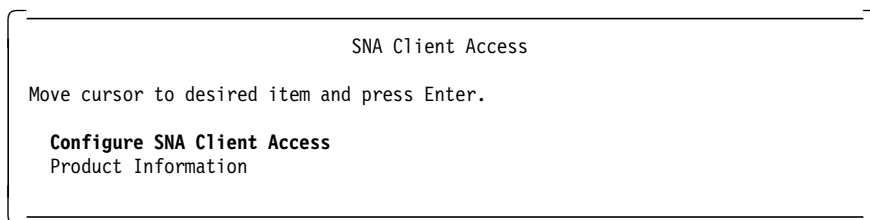
1. Log on as root.
2. Enter `smit install` on the AIX command line to start the SMIT installation utility.
3. Follow the path shown below.

```
Install and Update Software
Install / Update Selectable Software (Custom Install)
Install Software Products at Latest Level
```

4. Identify and select INPUT device / directory for software.
5. Select the following filesets and install them:
 - SNA_CA.cfg - SMIT configuration interface
 - SNA_CA.rte - SNA_CA base product
 - SNA_CA.msg.en_US.cfg - SNA_CA messages
6. View the SMIT screen or `smit.log` and check whether the installation was successful.
7. The file `/etc/services` will be saved as `/etc/services.SNA_CA`. The installation of SNA Client Access for AIX then adds additional lines in the `/etc/services` file as shown below:

```
# The following lines added by SNA_CA installation
brxlu62_serv 5022/tcp
sna_tnet52 5024/tcp
brxftp 5027/tcp
sna_telnet 5068/tcp
```

8. Read the product information that is relevant to the current release. This can be read by selecting the Product Information from SMIT menu, which is obtained by issuing the SMIT fast path command `smit snaca`.



3.3 Dependent LU Server Configuration Token-Ring

The dependent LU server `sna_dlu` along with SNA Server for AIX supports dependent LU sessions between TCP/IP-connected, SNA client applications and SNA hosts. The `sna_sman` process listens for SNA client connections, either locally from the `sna_telnet` server, or across the local network. When an SNA client connects, `sna_dlu` starts a dependent LU session through SNA Server for AIX to the SNA host.

This section provides a configuration example for a dependent LU server using a token-ring connection to the host. It is assumed that you do not have any user-defined SNA profiles at this point. Figure 47 shows a diagram for this example.

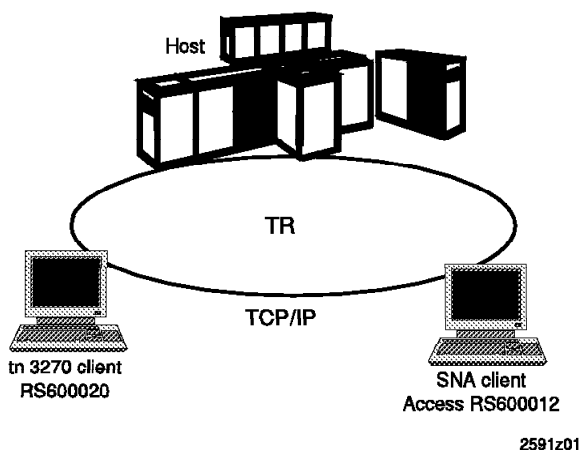


Figure 47. tn3270 Client Using SNA Client Access for AIX

3.3.1 Control Point Definition

Define a control point for the RS/6000 used for SNA Client Access for AIX. We used the command `chsnaobj -t'control_pt' -e 'USIBMRA' -e 'RA6012CP' node_cp` to change the control point profile on RS/6000. The name of the control point RA6012CP was determined by the VTAM definition.

3.3.2 SNA DLC Profile

Add an SNA DLC profile for the token-ring. We added an SNA DLC profile with the following command:

```
mksnaobj -t'sna_dlc_token_ring' RS12
```

3.3.3 SNA Client Access Configuration

The steps in this section show how to configure a dependent LU server.

1. Start the SNA Client Access for AIX configuration by issuing the following SMIT fast path command:

```
smit snaca
```

2. Select the following:

```

                                Configure SNA Client Access
Move cursor to desired item and press Enter.

Dependent LU Resources
Telnet 5250 Connections

SNA Server Configuration and Management
```

3. Select the following:

```

                                Dependent LU Resources
Move cursor to desired item and press Enter.

Add a Dependent LU Server
Change/Show a Dependent LU Server
Remove Dependent LU Servers

User Access
```

4. Enter a server name. We gave the name as RS12.

```

                                Dependent LU Server Name
Type or select a value for the entry field.
Press Enter AFTER making all desired changes

* Enter a new Dependent LU Server name.      [RS12]
```

5. Choose the link station type you will use.

```

                                Link Type
Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

* Select a network link station type.          [Entry Fields]
                                                token_ring
```

6. Enter the details of Dependent LU Configuration as shown:


```

                                Dependent LU Configuration

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

                                'Entry Fields'
Dependent LU Server name      RS12
* PU name                     [RA6012]
Link Station                  token_ring
Link address                  [40000207000]
Local SAP address             [4]
Calling link station?         yes
XID Node ID                   [*]

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                          [6-7]
LU 3                          [ ]

```

Server Name

This configuration adds a token-ring SNA DLC, token-ring Link Station and Generic LU address registration using the server name. This step will create the configuration file as /etc/aixsnaca/RS12_dlu.cfg.

PU name

This is the PU name.

Link Address

This is the MAC address of the host communication controller token-ring adapter as shown in Figure 50 on page 82.

SAP address

SAP address is 04 by default. Use multiples of 4 if this conflicts with other applications.

XID

Specify XID node ID defined in VTAM (see Figure 48 on page 82).

LU addresses

Give the range of the LU address that is defined on the host.

7. You will get the following messages:

COMMAND STATUS

Command: OK stdout: yes stderr: no

Before command completion, additional instructions may appear below.

[TOP]

Creating Dependent LU Server 'RS12'.....done.

Creating Host PU 'RA6012'...

 Configuring SNA profiles...done.

 Building Dependent LU resources....done.

Verifying SNA profiles...

Normal verification being performed since SNA is not running.

/usr/bin/verifysna command OK.

All profiles verified and updated.

Verifying SNA CA profiles...

/usr/bin/verifysrv command OK.

Dependent LU Server configuration succeeded.

The dependent LU server configuration creates the following SNA Server for AIX profiles:

- Token-ring Link Station profile named RA6012
- Generic LU Address Registration profile named RA6012

The following SNA Server for AIX profiles were created on RS600012:

```
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.std"
    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    = "RA6012CP"
    control_pt_name          = "RA6012CP"
    control_pt_node_type     = appn_end
    max_cached_trees         = 500
    max_nodes_in_topology_database = 500
    route_addition_resistance = 128
    comments                 = ""
```

```

link_station_token_ring:
    prof_name                = "RA6012"
    use_control_pt_xid       = yes
    xid_node_id              = "*"
    sna_dlc_profile_name     = "RS12"
    stop_on_inactivity       = no
    time_out_value           = 0
    LU_registration_supported = yes
    LU_registration_profile_name = "RA6012"
    link_tracing              = no
    trace_format              = long
    access_routing_type      = link_address
    remote_link_name         = ""
    remote_link_address      = 0x400002070000
    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 = no
    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 = no
    restart_on_abnormal_deactivation = no
    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     = 1an
    TG_user_defined_1        = 128
    TG_user_defined_2        = 128
    TG_user_defined_3        = 128
    comments                  = ""

```

```

sna_dlc_token_ring:
    prof_name           = "RS12"
    datalink_device_name = "tok0"
    force_timeout       = 120
    user_defined_max_i_field = no
    max_i_field_length  = 30729
    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 = no
    trace_base_listen_link_station = yes
    trace_base_listen_link_station_format = long
    dynamic_lnk_solicit_sscp_sessions = no
    dynamic_lnk_cp_cp_sessions_supported = no
    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
    comments            = ""

lu_reg:
    prof_name           = "RA6012"
    lu_address_registered_list = {6,7}
    comments            = ""

```

We use the following host VTAM definitions for this configuration; the physical unit is named RA60012, and the two logical units are named RA600126 and RA600127.

The VTAM listing of the PU RA60012 is shown in Figure 48; the XID node ID is obtained by combining the IDBLK and IDNUM from the VTAM listing (in our example, it is 07100012).

```

RA60012 PU   ADDR=13,
              IDBLK=071,
              IDNUM=00012,
              CPNAME=RA6012CP,
              MODETAB=AMODETAB,
              MAXPATH=2,
              MAXDATA=265,
              MAXOUT=7,
              PACING=7,
              ANS=CONTINUE,
              PASSLIM=7,
              PUTYPE=2,
              DISCNT=(NO),
              ISTATUS=ACTIVE,
              VPACING=8
  
```

Figure 48. VTAM Listing of PU RA60012

The VTAM listing of the two LUs used in this example is shown in Figure 49.

```

RA600126 LU  LOCADDR=6,USSTAB=US327X,SSCPFM=USSSCS,MODETAB=AMODETAB,
              DLOGMOD=M2SDLCQ
RA600127 LU  LOCADDR=7,USSTAB=US327X,SSCPFM=USSSCS,MODETAB=AMODETAB,
              DLOGMOD=M2SDLCQ
  
```

Figure 49. VTAM Listing of LUs RA600126, RA600127

You can obtain the host controller's token-ring address from your NCP programmer. Figure 50 shows an NCP definition.

```

*****
* TOKENRING ADAPTER 1093, CCU-B , 3745 BASE 4-16 MB/S *
*****
EL071093 LINE ADDRESS=(1093,FULL), *
              ADAPTER=TIC2,          TYPE OF ADAPTER *
              LOCADD=400002070000,    LOCAL ADMINISTERED ADDRESS *
              MAXFRAME=4060,          EQUAL TO MAXTSL *
              DATABLK=2048,          TRANS-UNIT FOR COMRATE *
  
```

Figure 50. NCP Definition

Figure 51 on page 83 shows the sna_dlu.config file created by the configuration of the dependent LU server. This file is stored under the directory /etc/aixsnaca. The file name in our example is RS12_dlu.cfg.

```

GSNA_PROFILE
    NAME=RA6012
    DEVICE=' / dev/gsna/RA6012'
;
POOL
    NAME = PUBLIC
;
SERVICES
    PU2_ADMIN = RS12-adm
    PU2_ESPD = brx_pu2_espd;
LU
    NAME = RA601206
    PROFILE_NAME = RA6012
    LUTYPE = 2
    LOCADDR = 6
    POOL_NAME = PUBLIC
    PACING = 0
    TCP_KA = ACTIVE
    PU21_KA_TO = 0
    PU21_KA_RETRIES = 0
    PU21_KA_RETRIES = 0
    IN_SESS_TO = 0
    OUT_SESS_TO = 0;
LU
    NAME=RA601207
    PROFILE_NAME = RA6012
    LUTYPE = 2
    LOCADDR = 7
    POOL_NAME = PUBLIC
    PACING = 0
    TCP_KA = ACTIVE
    PU21_KA_TO = 0
    PU21_KA_RETRIES = 0
    PU21_KA_RETRIES = 0
    IN_SESS_TO = 0
    OUT_SESS_TO = 0;

```

Figure 51. /etc/aixsnaca/RS12_dlu.cfg File

3.4 Dependent LU Server Using SDLC Link

The purpose of this example is to configure a dependent LU server on RS600012 to support TN3270 clients from a TCP/IP network.

This section provides configuration steps for a dependent LU server for SNA Client Access for AIX using an SDLC link. It is assumed that you do not have any user-defined SNA profiles at this point.

Figure 52 shows a diagram of this example.

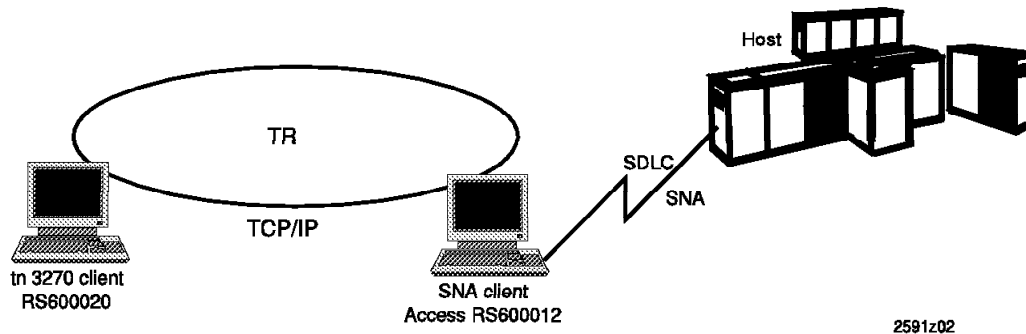


Figure 52. tn3270 Example for SNA Client Access for AIX

3.4.1 Control Point Definition

Define a control point for the RS/6000 used for SNA Client Access for AIX. We used the command `chsnaobj -t'control_pt' -e 'USIBMRA' -a 'RS12' node_cp` to change the control point profile on RS/6000.

3.4.2 SNA DLC Profile

Add an SNA DLC profile for the SDLC link. We used a non-switched EIA 232 SDLC link in our example. We added an SNA DLC profile with the following command:

```
mksnaobj -t'sna_dlc_eia232d' RS12
```

3.4.3 SNA Client Access Configuration

The steps in this section show how to configure a dependent LU server for SNA Client Access for AIX.

1. Start the SNA Client Access for AIX configuration by issuing the following SMIT fast path command:

```
smit snaca
```

2. Follow the path shown below:

```
Configure SNA Client Access
  Dependent LU Resources
    Add a Dependent LU Server
```

3. Select a name for the dependent LU server.


```

                                Dependent LU Server Name

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

                                [Entry Field]
* Enter a new Dependent LU Server name.          [RS12CA]

```

This will create a dependent LU configuration file with the pathname /etc/aixsnaca/RS12CA.cfg.

4. Select non-switched EIA 232D SDLC line for the link.

```

                                Link Type

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

                                [Entry Fields]
* Select a network link station type.          SDLC(eia232d)_nonswitc> +

```

5. Fill in the parameters for the dependent LU server as per the screen.

```

                                Dependent LU Configuration

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

                                *Entry Fields*
Dependent LU Server name          RS12
* PU name                          [RS12]
Link Station                      SDLC(eia232d)_nonswitc>
Local secondary station address   [193]
#
Calling link station?             yes
XID Node ID                      [*]

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                               [6-7]
LU 3                               

```

6. The above step resulted in the following message:

```
Creating Dependent LU Server 'RS12CA'.....done.
Creating Host PU 'RS12'...
    Configuring SNA profiles....done.
    Building Dependent LU resources....done.

Verifying SNA profiles...

NOTE: The following profile refreshes will take effect when referenced next.

Profile type 'link_station_eia232d' name 'RS12' ADDED.
Profile type 'lu_reg' name 'RS12' ADDED.

/usr/bin/verifysna command OK.
The profiles listed above have been dynamically updated successfully.

Signaling AnyNet to read verified database.

Verifying SNA CA profiles...
/usr/bin/verifysrv command OK.

Dependent LU Server configuration succeeded.
```

7. The following SNA profiles are added:

- Link Station Profile RS12
- Generic LU Address Registration Profile RS12

3.4.4 Contents of Dependent LU Server Configuration File

The contents of the configuration file are shown in Figure 53 on page 87.

```

rs600012:/usr/lpp/SNA_CA/bin > cat /etc/aixsnaca/RS12CA_dlu.cfg

GSNA_PROFILE
    NAME = RS12
    DEVICE = '/dev/gsna/RS12';

POOL
    NAME = PUBLIC
;

SERVICES
    PU2_ADMIN = RS12CA-adm
    PU2_ESPD = brx_pu2_espd;

LU
    NAME = RS1206
    PROFILE_NAME = RS12
    LUTYPE = 2
    LOCADDR = 6
    POOL_NAME = PUBLIC
    PACING = 0
    TCP_KA = ACTIVE
    PU21_KA_TO = 0
    PU21_KA_RETRIES = 0
    IN_SESS_TO = 0
    OUT_SESS_TO = 0;

LU
    NAME = RS1207
    PROFILE_NAME = RS12
    LUTYPE = 2
    LOCADDR = 7
    POOL_NAME = PUBLIC
    PACING = 0
    PACING = 0
    TCP_KA = ACTIVE
    PU21_KA_TO = 0
    PU21_KA_RETRIES = 0
    IN_SESS_TO = 0
    OUT_SESS_TO = 0;

```

Figure 53. DLU Configuration File

3.4.5 Starting SNA Server for AIX Server

1. Verify SNA profiles with the following command:

```
verifysna -U
```
2. Start SNA Server for AIX with the following command:

```
sna -s
```
3. The link station is configured to start on SNA startup. Check that the SDLC link station to the host is active with the command `sna -d 1`.

```
rs600012:/usr/lpp/SNA_CA/bin > sna -d l
Link      Adjacent  Node   Device  # of local  In
station  CP name   type   name    sessions   use
-----
RS12     USIBMRA.RAP  NN    mpq0    Active      2 Yes
```

3.4.6 Starting SNA Client Access for AIX Server

Use the command `snaca` to start, stop and manage SNA Client Access for AIX resources.

```
cd /usr/lpp/SNA_CA/bin
snaca
```

The above command should list the usage of the command.

```
Usage:
snaca -start  component start_options - ? - (? lists start_options)
snaca -stop   component [ -f dlu_config | -s tnet52_side | -p -ns -js ]
snaca -display component
Valid components are: dlu,sman,dlu_sman,ilu,tnet52,all 1

Restrictions: -js is only valid with component tnet52
              -ns is only valid with components dlu and dlu_sman

Examples:
snaca -stop dlu_sman      - stops all DLU servers, sman, and SNA links
snaca -stop dlu -ns      - stops all DLU servers, but not SNA links
snaca -stop dlu -p        - Issues a prompt prior to stopping DLU serve
snaca -stop dlu -f my.cfg - Stops DLU server with config filename 'my.c
snaca -stop tnet52 -s side - Stops all tnet52 servers and sessions with
                          info filename 'side'
snaca -stop tnet52 -js    - Stops only tnet52 servers, but not sessions
snaca -display all       - Displays the status of all components
snaca -start dlu ?       - Display usage information for starting the
```

Note:

1 The following components can be started or stopped using the `snaca` command: `dlu`, `sman`, `dlu_sman`, `ilu`, `tnet52`, `all`:

- **dlu** Dependent LU server
- **sman** Session Manager
- **dlu_sman** sna_tn3270 server
- **ilu** Independent LU 6.2 server
- **tnet52** telnet server for 5250 clients
- **all** All these servers

Start SNA Client Access for AIX by issuing the following command:

```
rs600012:/usr/lpp/SNA_CA/bin > snaca -start dlu -f /etc/aixsnaca/RS12CA_dlu.cfg
```

You will get the following message:

```
PU200001 : Initializing sna_dlu LU0 SNA Server
PU200002 : Initialization complete
SMAN0004 : Connection port 161 opened.
```

Check proper running of SNA Client Access for AIX by issuing the command `snacl -d all`.

```
rs600012:/usr/lpp/SNA_CA/bin > snacl -d all
Display all request is in progress.....

User  PID  PPID  STIME  Process
-----
root 36884    1 04:58:42 sna_dlu -f /etc/aixsnaca/RS12CA_dlu.cfg
root 52758 36884 04:58:42 sna_sman -f /etc/aixsnaca/RS12CA_dlu.cfg
```

3.4.7 Testing of SNA Client Access for AIX Dependent LU Support

1. Start the SNA operator by issuing the following command:

```
cd /usr/lpp/SNA_CA/bin
snaop
```

```
rs600012:/usr/lpp/SNA_CA/bin > snaop

Attempting connection to rs600012, RS12-adm...
Unable to connect to rs600012, RS12-adm (errno = 79)

Attempting connection to rs600012, RS12CA-adm...
Connection opened to rs600012, RS12CA-adm

Attempting connection to rs600012, brxadmin_pu2...
Connection opened to rs600012, brxadmin_pu2
SNA_DLU Controller
->
```

2. Use the command `info ln all` to display the sessions.

```
SNA_DLU Controller
->info ln all
(1) info ln * all

Cnt  GSNAPROFILE      DEVICE      STATUS
  1      RS12          /dev/gsna/RS12  ACTIVE

Cnt      puname      pulinkname      purole      puaddr
  1      RS12          RS12              3            00

Cnt  LUNAME  LOCADDR  TYPE  POOL  STATUS  AVAIL  ADDR
  1  RS1206    6      2  PUBLIC  ACTIVE  Yes   0.0.0.0 1
  2  RS1207    7      2  PUBLIC  ACTIVE  Yes   0.0.0.0

Msg from rs600012, RS12a-adm at 05/20/96 05:06:47
```

Note: **1** The LUs need to be ACTIVE before you can attempt a tn3270 connection.

3. Use the command `netstat -a` to check the status of the `sna_telnet` IP server.

```
rs600012:/usr/lpp/SNA_CA/bin > netstat -a | grep sna_
tcp      0      0 *.sna_telnet      *.*          LISTEN
tcp      0      0 *.brx_sna_        *.*          LISTEN
tcp      0      0 *.brx_sna_        *.*          LISTEN
```

4. Examine the contents of the file `/etc/services` for the IP port number to be used for a tn3270 connection.

```
# The following line added by SNA_AA installation
sna_telnet 5068/tcp
```

5. Start a tn3270 client on rs600020 by issuing the following command:

```
tn3270 rs600012 5068
```

This command could be started on any RS/6000 that has an IP connectivity to the IP host rs600012.

6. We got our host screen ussmsg10 displayed on the client screen, which tested the dependent LU server.
7. When we had an active session, we had the following displays.

```
SNA_DLU Controller
->info ln all
Cnt      LUNAME  LOCADDR  TYPE    POOL    STATUS  AVAIL    ADDRESS
  1      RS1206    6        2      PUBLIC  ACT/ATT Yes      9.24.104.124
  2      RS1207    7        2      PUBLIC  ACT/ATT Yes      9.185.76.78
```

```
rs600012:/usr/lpp/SNA_CA/bin > netstat -a | grep sna_
tcp      0      0  rs600012.itso.ra.sna_t swamytp.au.ibm.c.4400 ESTABLISHED 1
tcp      0      0  rs600012.itso.ra.sna_t rs600012.itso.ra.1887 ESTABLISHED 2
tcp      0      0  rs600012.itso.ra.1887 rs600012.itso.ra.sna_t ESTABLISHED
tcp      0      0  *.sna_teln          *.*                LISTEN
tcp      0      0  *.brx_sna_          *.*                LISTEN
tcp      0      0  *.brx_sna_          *.*                LISTEN
```

Note: **1** IP host name of a PC running Personal Communications V4.1.
2 IP host name of RS600012.

3.4.8 3270 Clients

This section lists some of the TCP/IP clients that were used to test the tn3270 function provided by SNA Client Access for AIX.

- DOS TCP/IP

Enter the following command:

```
tn3270 -p 5068 RS60012
```

- OS/2 TCP/IP

Enter the following command:

```
tn3270 -p 5068 RS60012
```

- AIX 3.2.5 or AIX 4.1.4

Enter the following command:

```
tn3270 rs60012 5068
```

3.5 Configuring the Telnet 5250 Server

Unlike 3270 emulator sessions, 5250 sessions communicate using LU 6.2. The Telnet 5250 server connects with the LU 6.2 server to establish a session with an Application System/400 (AS/400). The purpose of the example in this section is to configure the tn5250 server on RS600012 for client access to AS/400 RALYAS4A. It is assumed that you do not have any user-defined SNA profiles at this point. Figure 54 shows the network used in this example.

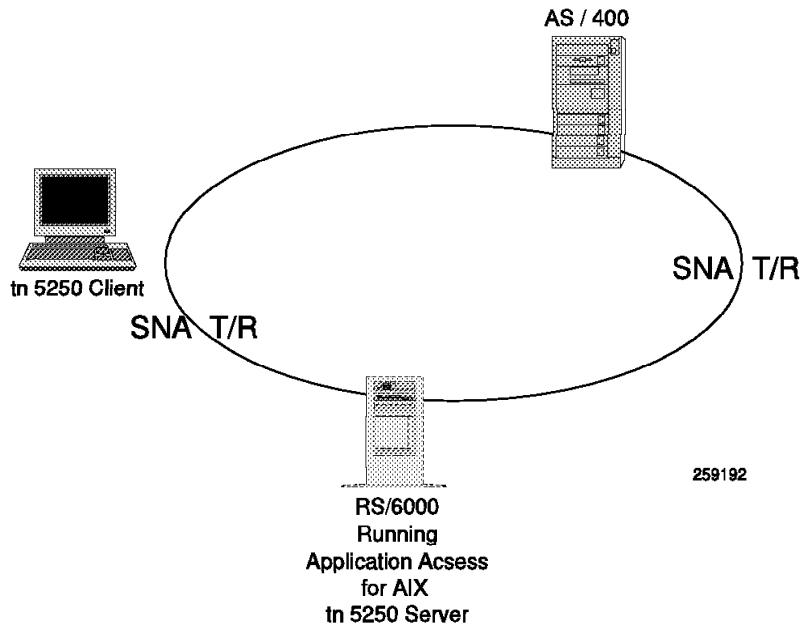


Figure 54. tn5250 Client for AS/400

3.5.1 Control Point Definition

Define a control point for the RS/6000 used for SNA Client Access for AIX. We used the command `chsnaobj -t'control_pt' -e 'USIBMRA' -e 'RS12' node_cp` to change the control point profile on RS/6000.

3.5.2 SNA DLC Profile

Add an SNA DLC profile for the token-ring. We added an SNA DLC profile with the following command:

```
mksnaobj -t'sna_dlc_token_ring' RS12
```

3.5.3 TN5250 Client Access Quick Configuration

SNA Client Access for AIX provides a quick configuration method to establish 5250 communications.

1. Enter the fast path command `smit snaca`.
2. Select the following:

```

                                Configure SNA Client Access

Move cursor to desired item and press Enter.

Dependent LU Resources
Telnet 5250 Connections

SNA Server Configuration and Management

```

3. Select the highlighted option:

```

                                Telnet 5250 Connections

Move cursor to desired item and press Enter.

Add an AS/400 Connection for Telnet 5250 Clients
Change/Show an AS/400 Connection
Remove AS/400 Connections

```

4. Select token-ring.

```

                                Link Type

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

* Select a default network link station type.           [Entry Fields]
                                                         token_ring

```

5. Configure the AS/400 Connection for Telnet 5250 Clients.

```

                                Add an AS/400 Connection for Telnet 5250 Clients

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

* Connection name                                     [Entry Fields]
                                                         [AS4A]
Link Station                                           token_ring
Calling link station?                                 yes
Link address                                           [400010020001]
Local SAP address                                     [4]
XID Node ID                                           [*]

* Fully qualified partner LU name                     [USIBMRA.RALYAS4A]
Fully qualified owning CP name                       [USIBMRA.RALYAS4A]
* Mode name                                           [QPCSUPP]

Security                                               NONE

If program,
User ID                                               []
Password                                              []

```

Connection name

The following profiles will be created, using this connection name:

- Token-ring DLC
- Token-ring link station
- LU 6.2 Partner LU
- Partner LU 6.2 Location

This step will also create a side file with the AIX pathname `/etc/aixsnaca/AS4A.side`.

Link address

Enter the MAC address of the target AS/400 token-ring adapter here.

Partner LU name

This is composed by the Network ID and the local location of the AS/400.

CP name

This is composed by the Network ID and the control point of the AS/400. See 3.5.7, "TN5250 Client Access AS/400 Parameters" on page 94 to get these parameters from AS/400.

3.5.4 TN5250 Client Access Configuration Messages

You will get the following message:

```
COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

Configuring SNA profiles...
  creating PLU Profile...
  changing PLOC Profile...
done.

Building SNA Client Access Telnet 5250 configuration...
done.

Verifying SNA profiles...
Normal verification being performed since SNA is not running.
/usr/bin/verifysna command OK.
All profiles verified and updated.

Signaling AnyNet to read verified database.
SNA Client Access Telnet 5250 configuration COMPLETE.
```

3.5.5 TN5250 Side File

The above step would have created a config file or a side file in the directory `/etc/aixsnaca` with the name `AS4A.side`.

```
PTNR_LU_NAME = RALYAS4A
MODE_NAME    = QPCSUPP
SECURITY     = NONE
#USER_ID     =
#PASSWORD    =
```

Figure 55. `/etc/aixsnaca/AS4A.side`

3.5.6 Adding SNA Client Access for AIX Independent LU 6.2 Support

To operate with the `sna_ilu` server, we have to add a transaction program definition for it in the SNA Server for AIX configuration database; to import this profile, enter the following command:

```
importsna -f /usr/lpp/SNA_CA/SNA_ILU/sna_ilu.tp.profile
```

You will get the following message:

```
Profile type 'local_tp' name 'sna_ilu' ADDED.  
Configuration file '/usr/lpp/SNA_CA/SNA_ILU/sna_ilu.tp.profile' imported.
```

Verify and update the SNA profiles with the command `verifysna -U`.

3.5.7 TN5250 Client Access AS/400 Parameters

Run the command `DSPNETA` on the AS/400:

```
Display Network Attributes  
System: RALYAS4A  
Current system name . . . . . : RALYAS4A  
Pending system name . . . . . :  
Local network ID . . . . . : USIBMRA  
Local control point name . . . . . : RALYAS4A  
Default local location . . . . . : RALYAS4A  
Default mode . . . . . : BLANK  
APPN node type . . . . . : *NETNODE  
Data compression . . . . . : *NONE  
Intermediate data compression . . . . . : *NONE  
Maximum number of intermediate sessions . . . . . : 200  
Route addition resistance . . . . . : 128  
Server network ID/control point name . . . . . : *LCLNETID *ANY
```

3.5.8 TN5250 Client Access Profiles

```
control_pt:  
  prof_name = "node_cp"  
  xid_node_id = "*"   
  network_name = "USIBMRA"  
  control_pt_name_alias = "RS12"  
  control_pt_name = "RS12"  
  control_pt_node_type = appn_end  
  max_cached_trees = 500  
  max_nodes_in_topology_database = 500  
  route_addition_resistance = 128  
  comments = ""  
  
partner_lu6.2:  
  prof_name = "AS4A"  
  fq_partner_lu_name = "USIBMRA.RALYAS4A"  
  partner_lu_alias = "RALYAS4A"  
  session_security_supp = no  
  parallel_session_supp = yes  
  conversation_security_level = none
```

```

        comments = ""

partner_lu6.2_location:
    prof_name = "AS4A"
    fq_partner_lu_name = "USIBMRA.RALYAS4A"
    partner_location_method = owning_cp
    fq_partner_owning_cp_name = "USIBMRA.RALYAS4A"
    local_node_is_network_server_for_len_node = no
    fq_node_server_name = ""
    local_lu_name = ""
    link_station_profile_name = ""
    comments = ""

local_tp:
    prof_name = "sna_ilu"
    tp_name = ""
    tp_name_in_hex = no
    pip_data_present = no
    pip_data_subfields_number = 0
    command_line_parameters_present = no
    command_line_parameters = ""
    conversation_type = either
    sync_level = none/confirm
    resource_security_level = none
    resource_access_list_profile_name = ""
    full_path_tp_exe = "/usr/lpp/SNA_CA/SNA_ILU
/sna_ilu"
    multiple_instances = no
    user_id = 100
    server_synonym_name = ""
    restart_action = once
    communication_type = signals
    ipc_queue_key = 0
    standard_input_device = "/dev/console"
    standard_output_device = "/dev/console"
    standard_error_device = "/dev/console"
    comments = ""

```

```

link_station_token_ring:
    prof_name                = "AS4A"
    use_control_pt_xid       = no
    xid_node_id              = "*"
    sna_dlc_profile_name     = "RS12"
    stop_on_inactivity       = no
    time_out_value          = 0
    LU_registration_supported = no
    LU_registration_profile_name = ""
    link_tracing             = yes
    trace_format             = long
    access_routing_type      = link_address
    remote_link_name         = ""
    remote_link_address      = 0x400010020001
    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 = no
    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 = no
    restart_on_abnormal_deactivation = no
    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      = 1an
    TG_user_defined_1        = 128
    TG_user_defined_2        = 128
    TG_user_defined_3        = 128
    comments                  = ""

```

```

sna_dlc_token_ring:
    prof_name           = "RS12"
    datalink_device_name = "tok0"
    force_timeout       = 120
    user_defined_max_i_field = no
    max_i_field_length  = 30729
    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 = no
    trace_base_listen_link_station = yes
    trace_base_listen_link_station_format = long
    dynamic_lnk_solicit_sscp_sessions = no
    dynamic_lnk_cp_cp_sessions_supported = no
    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
    comments             = ""

mode:
    prof_name           = "AS4A"
    mode_name           = "QPCSUPP"
    max_sessions        = 8
    min_conwinner_sessions = 4
    min_conloser_sessions = 0
    auto_activate_limit = 0
    max_adaptive_receive_pacing_window = 16
    receive_pacing_window = 7
    max_ru_size         = 1024
    min_ru_size         = 256
    class_of_service_name = "#CONNECT"
    comments             = ""

```

3.5.9 TN5250 Client Access Starting the Server

1. Start SNA Server for AIX with the command `sna -s`.
2. To start the tn5250 server, enter:

```
rs600012:/ > cd /usr/lpp/SNA_CA/bin
rs600012:/usr/lpp/SNA_CA/bin > snaca -start tnet52 -s /etc/aixsnaca/AS4A.side
```

You will get the following messages:

```
Warning: The sna_ilu server is not active. Would you like to start it?

Type 'no' and press enter to quit now. Any other response will
start the sna_ilu server and then the tnet52 server.

Starting the sna_ilu server....

LU620005 : Initialization Started
LU620006 : Initialization Complete

Executing command:  sna_tnet52  -s /etc/aixsnaca/AS4A.side
```

3. Display the status of tnet52 server by issuing the command `snaca -d all`.

```
rs600012:/usr/lpp/SNA_CA/bin > snaca -d all
Display all request is in progress.....
User  PID  PPID  STIME  Process
-----
root 52810   1 05:05:33 sna_dlu -f /etc/aixsnaca/RS12a_dlu.cfg
root 36428 52810 05:05:34 sna_sman -f /etc/aixsnaca/RS12a_dlu.cfg
root 52112   1 05:43:39 sna_ilu
root 56980   1 05:43:39 sna_tnet52 -s /etc/aixsnaca/AS4A.side
```

4. Check the status of IP server by issuing the command `netstat -a`.

```
rs600012:/usr/lpp/SNA_CA/bin > netstat -a | grep sna
tcp      0      0 *.sna_tnet          *.*                LISTEN
tcp      0      0 rs600012.itso.ra.sna_t swamytp.au.ibm.c.4400 ESTABL
tcp      0      0 *.sna_teln         *.*                LISTEN
tcp      0      0 *.brx_sna_         *.*                LISTEN
tcp      0      0 *.brx_sna_         *.*                LISTEN
```

5. Examine the contents of the file `/etc/services` for the IP port number to be used for a tn5250 connection.

```
# The following line added by SNA_CA installation
sna_tnet52 5024/tcp
```

3.5.10 TN5250 Client Examples

- DOS TCP/IP Version 2.1.1

Enter the following command:

```
tn5250 RS60012 5024
```

- OS/2 TCP/IP Version 2.0 with CSD UN64092

Enter the following command:

```
tn5250 RS60012 -p 5024
```

Then you are connected to the AS/400 using the SNA Client Access for AIX and SNA Server for AIX.

- Connection Program/400 for UNIX Environments (E5250)

Enter the following command:

```
e5250 rs60012
```

```

                                     Sign On
                                     System . . . . . : RALYAS4A
                                     Subsystem . . . . . : QINTER
                                     Display . . . . . : QPADEV0001

User . . . . .
Password . . . . .
Program/procedure . . . . .
Menu . . . . .
Current library . . . . .

(C) COPYRIGHT IBM CORP. 1980, 1994.
06-53   SA       MW       IM       II       RALYAS4A       KB
```

Note: You have to change the TCP port number for inbound connections to 23 in the `sna_ca.start` file and the `/etc/services` file; this is so clients who do not have a port parameter can connect to the Telnet 5250 server. See Appendix F, "TCP/IP Service Names" in the *SNA Client Access for AIX: User's Guide*, SC31-8085.

Figure 56 shows the sessions established between RS600012 and the AS/400; enter the following command:

```
sna -d s
```

CGID	Local LU name	Partner LU name	Mode name	Link station	State
5	USIBMRA.RS600012	USIBMRA.RALYAS4A	QPCSUPP	AS4A	Allocated
5	USIBMRA.RS600012	USIBMRA.RALYAS4A	QPCSUPP	AS4A	Allocated
4	USIBMRA.RS600012	USIBMRA.RALYAS4A	SNASVCMG	AS4A	Available
2	USIBMRA.RS600012	USIBMRA.RALYAS4A	CPSVCMG	AS4A	Available
1	USIBMRA.RS600012	USIBMRA.RALYAS4A	CPSVCMG	AS4A	Available

Figure 56. Display of SNA Sessions

Figure 57 on page 100 shows the active Internet connections; it is the output of the following command:

```
netstat -A
```

```

Active Internet connections
PCB/ADDR Proto Recv-Q Send-Q Local Address      Foreign Address    (state)
5591214 tcp      0      0 localhost.0..brxlu localhost.0..1202  ESTABLISHED
5585b14 tcp      0      0 localhost.0..1202 localhost.0..brxlu ESTABLISHED
5590914 tcp      0      0 rs600012.sna_tnet5 os2tcp.1058      ESTABLISHED
5592014 tcp      0      0 rs600012.sna_tnet5 rs60005.3899     ESTABLISHED

```

Figure 57. Display of Active Internet Connections

Figure 58 shows the sessions on the AS/400; it is the output of the following command:

```
WRKCFGSTS *LIN L41TR
```

```

                                Work with Configuration Status                RALYAS4A
                                                                04/12/95 14:51:36
Position to . . . . .           Starting characters

Type options, press Enter.
  1=Vary on  2=Vary off  5=Work with job  8=Work with description
  9=Display mode status ...

Opt  Description      Status                -----Job-----
     L41TR            ACTIVE
     RS600012         ACTIVE
     RS600012         ACTIVE
     QPCSUPP          ACTIVE/TARGET        RS600012  QUSER    017024
     QPCSUPP          ACTIVE/TARGET        RS600012  QUSER    017025

```

Figure 58. Display of Active Sessions on AS/400

Chapter 4. APPC over TCP/IP and AIX Sockets over SNA

This chapter gives configuration examples to test the APPC over TCP/IP and AIX Sockets over SNA functions of AnyNet for AIX.

4.1 AnyNet Product Family

The AnyNet product family enables existing applications to run without any change over multiple transport networks. Using AnyNet functions, the number of transport networks is reduced.

The AnyNet product family consists of different products for use on the AIX, MVS and OS/2 platforms:

- AnyNet for AIX is designed for use in AIX environments.
- AnyNet/MVS is designed for use in MVS environments.
- AnyNet/2 is designed for use in OS/2 environments.

AnyNet for AIX is a feature of SNA Server for AIX V 3.1 and consists of two products:

- AnyNet for AIX APPC over TCP/IP
- AnyNet for AIX AIX Sockets over SNA

4.2 Overview of AnyNet for AIX APPC over TCP/IP

AnyNet for AIX enables APPC and CPI-C application programs to communicate with other APPC or CPI-C application programs over an IP network. In addition, LU 6.2 protocols for independent LUs are supported over a TCP/IP network.

The AnyNet product family makes it easy to add new applications that can communicate over different transport networks and across interconnected networks. Using the AnyNet product family, you can use an already existing network independent of the transport layer. This makes it possible to reduce the number of transport networks and makes it easier to manage these networks.

AnyNet for AIX can communicate with similar products such as AnyNet/2 and AnyNet/MVS, which gives the user a large variety of possible configurations.

4.2.1 APPC over TCP/IP Principle

APPC over TCP/IP uses protocols that bypass the lower transport layers of the SNA architecture. Instead of encapsulating the entire SNA path information unit (PIU) within a TCP transmission frame, APPC over TCP/IP converts the PIU into a unique transmission frame that TCP can accept from APPC over TCP/IP when sending and receiving data. The process of building the unique transmission frame is transparent to the APPC application program. The application program passes the data to one of the supported API services of SNA Server for AIX (CPI-C or APPC-API).

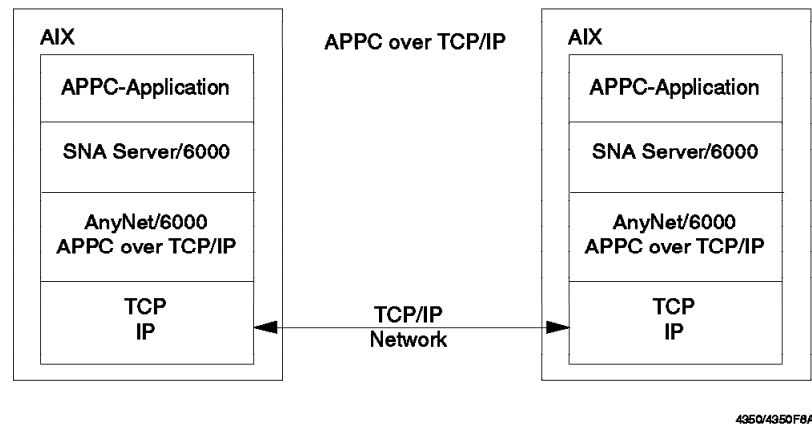


Figure 59. APPC over IP Principle

This data is presented to APPC over TCP/IP. When SNA Server for AIX initiates a session for an application program, the SNA routing information is translated into IP routing information. This means that the fully qualified LU name is translated into an IP address.

The configuration of APPC over TCP/IP determines whether to route the data using SNA transport or IP transport. The configuration also determines the IP address associated with the fully qualified LU name.

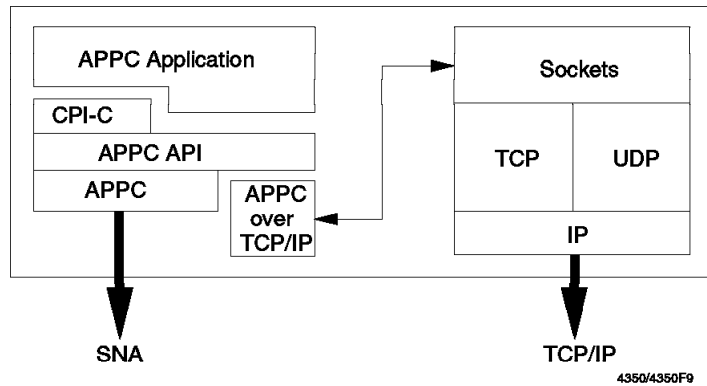


Figure 60. Structure of APPC over TCP/IP

The fully qualified LU session partner name appended by the SNA domain name will be used for the routing information. This enables the data to be forwarded to the TCP/IP layers where the connection to the partner can now be established.

At the receiving end, the received routing information identifies APPC over TCP/IP as the partner. The data will be forwarded to the appropriate application.

To identify the IP host names used for APPC over TCP/IP, the SNA fully qualified name together with an SNA domain name suffix builds the mapping table. This will be done in the following format:

`Tu_name.network_name.domain_name`

In the examples used in this chapter, the IP host address looks like `RS12.USIBMRA.SNA.IBM.COM`. This needs to be defined in the `/etc/hosts` file or registered to a domain name server to resolve this to an IP dotted address.

Since MPTN is a well-defined architecture, the session partner could either be AnyNet for AIX, AnyNet/2 or AnyNet/MVS running APPC over TCP/IP.

4.3 Installation of AnyNet for AIX Sockets over SNA

AnyNet for AIX V3.1.1 has the following prerequisites:

- AIX V4.1.4 (or later)
- SNA Server for AIX V3.1 (or later)

Please refer to the document *SNA Server for AIX AnyNet Guide to Sockets over SNA*, SC31-8217 regarding the full details of hardware, software and memory requirements.

Note

Please see 10.1, "SNA Profiles Maintenance" on page 211 regarding the procedure for backing up and restoring SNA profiles, before installing APPC over TCP/IP software.

Follow these installation steps:

1. Log in as root.
2. Install SNA Server for AIX V3.1 before starting the installation of AnyNet for AIX.
3. If you are installing AnyNet for AIX over an existing SNA Server for AIX installation, export SNA profiles before installing AnyNet for AIX. Stop your existing SNA applications and stop SNA Server for AIX.
4. Enter `smit install` on AIX command line to start SMIT installation utility.
5. Follow the path shown below:

```

Install and Update Software
Install/Update Selectable Software (Custom Install)
Install Software Products at Latest Level
Install New Software Products at Latest Level

```

6. Identify and select INPUT device / directory for software.
7. Select AnyNet Base and AnyNet APPC over TCP/IP filesets and install them.
8. View the SMIT screen or `smit.log` file and check whether the installation was successful.

When the installation has finished, the following programs should be installed on the system.

```

rs600020:/ > ls1pp -l | grep any
sna.anynet.base          3.1.1.0  COMMITTED  AnyNet Base
sna.anynet.snaip         3.1.1.0  COMMITTED  AnyNet APPC over TCP/IP
sna.msg.en_US.anynet.rte 3.1.1.0  COMMITTED  AnyNet Messages - U.S.En

```

9. In addition, install `sna.toolkit.basic`, which will provide a sample APPC program `aping`. When you install `sna.toolkit.basic`, a corresponding transaction program profile `APINGD` is automatically imported and verified.

Run `verifysna -U` after installing AnyNet for AIX to confirm that your old profiles are still valid and functional.

You will get an additional message Signaling AnyNet to read verified database, which indicates that you have AnyNet for AIX installed now.

4.4 Sample Configuration of AnyNet for AIX APPC over TCP/IP

This section provides steps to configure and test the APPC over TCP/IP function of AnyNet for AIX. The purpose of this example is to run APPC program `aping` from RS/6000 node with the IP host name RS600020 to RS/6000 node RS600012 over an existing token-ring IP network.

It is assumed that you do not have any user-defined SNA profiles at this point. Figure 61 on page 105 shows the network used in this example. It is assumed that there is an IP connection between these two RS/6000s. You need to install AnyNet for AIX on both systems.

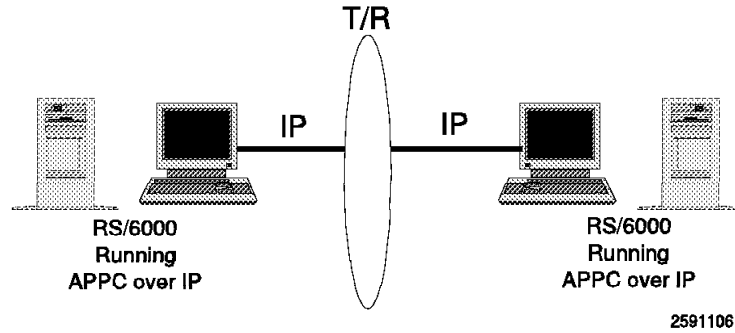


Figure 61. APPC over TCP/IP Example

4.4.1 Control Point Configuration

We used the following command on RS600012 to configure the control point:

```
chsnaobj -t'control_pt' -e 'USIBMRA' -a 'RS12' node_cp
```

We only needed to define the control point on RS600012 and start SNA Server for AIX and AnyNet for AIX on RS600012 to test this example.

Configure SNA Server for AIX Control Point if you have not already done so. We used the following command on RS600020 to configure the control point:

```
chsnaobj -t'control_pt' -e 'USIBMRA' -a 'RS20' node_cp
```

The additional configuration steps in this section were done on RS600020, which will initiate the APPC sample program aping.

4.4.2 APPC/IP Environment Settings

To set the SNA domain name suffix, enter `smit sna` and select the following:

```

Configure SNA Profile
Advanced Configuration
AnyNet APPC over IP
APPC/IP Environment Settings

```

Enter the SNA domain name suffix to be used to create an IP address.

```

Change/Show APPC/IP Environment Settings Profile

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

                                     [Entry Fields]
* Profile name                       env_values
  SNA domain name suffix             [SNA.IBM.COM]   1

  Connection retry duration          [300]
  Connection wait time limit         [30]
  Remote node inactivity poll interval [120]
  Well-known port for MPTN (397, 2001-65535) [397]   2
  Unacknowledged datagram retry interval [30]
  Unsent datagram retry interval      [3]

```

Note: **1** Normally it is enough to change the value of the SNA domain name suffix. The default settings for the other environment values are adequate for most installations.

2 Do not change this value; otherwise you may not be able to set up a connection with other AnyNet nodes. The well-known port number must be the same at all nodes.

4.4.3 APPC/IP Routing Protocol Preference

When an APPC application program initiates a session, the routing protocol preference profile determines the transport protocol used for each partner LU. The transport protocol could either be SNA or TCP/IP. The default routing preference is SNA. If you want a session to use TCP/IP, you must define a profile for that session.

Note: If the selected route is unavailable, the session cannot be re-routed to the other transport layer.

To add a profile for the routing preference for a session, start the SNA profile configuration with the command `smit sna` and follow this path.

```

Configure SNA Profile
Advanced Configuration
AnyNet APPC over IP
APPC/IP Routing Protocol Preference

```

```

Add APPC/IP Routing Protocol Preference Profile

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

                                     [Entry Fields]
* Profile name                       [TORS12]
  Fully qualified partner LU name     [USIBMRA.RS12]
  Protocol                            [tcpip]   +
  Comments                             []

```

If you have multiple application programs with similar LU names you may use a wildcard (*), such as USIBMRA.RS*.

4.4.4 IP Hostname Resolution

1. Edit the /etc/hosts file when not using a domain name server.

Add all IP addresses and LU partner session names in the following format:

```
ip.address      lu_name.network_name.snasuffix
9.24.104.124    RS12.USIBMRA.SNA.IBM.COM
```

You need to add IP addresses for every session partner.

2. When using a domain name server you could do the following:
 - a. Set up one workstation as the domain name server. Add an entry for each session partner.
 - b. Set up all other workstations to use the domain name server.

Note: Some information on how to set up a TCP/IP domain name server is found in the SMIT help files. This could be accessed by smitty servernet. Select Nameserver (information only).

4.4.5 Testing AnyNet for AIX APPC over TCP/IP

1. Verify SNA profiles to make them effective with the command `verifysna -R`.
2. Start SNA Server for AIX with the command `sna -s`.
3. You can start or stop the AnyNet for AIX daemon by using the `sna` command:

```
sna -start anynet      # This will start the AnyNet daemon
sna -stop anynet       # This will stop the AnyNet daemon
```

4. Start AnyNet for AIX on RS600020 and RS600012 with the command `sna -start anynet`.
5. We shall use the program `aping`, which is supplied along with `sna.toolkit.basic`.

```
rs600020:> /usr/lpp/sna/samples/bin/aping USIBMRA.RS12
IBM APING version 2.43.3c APPC echo test with timings.
Licensed Materials - Property of IBM
(C) Copyright 1994,1995 by IBM Corp. All rights reserved.

Allocate duration:      575 ms
Program startup and Confirm duration:      880 ms

Connected to a partner running on: AIX
Duration Data Sent Data Rate Data Rate
(msec)      (bytes)      (KB/s)      (Mb/s)
-----
          10          200          19.5          0.156
           8          200          24.4          0.195
Totals:     18          400          21.7          0.174
Duration statistics: Min = 8 Ave = 9 Max = 10
```

6. To display the sessions and the routing, you may use some of the SNA display commands:

```
rs600020:> sna -d s
```

CGID	Local LU name	Partner LU name	Mode name	Link station	State
2	USIBMRA.RS20	USIBMRA.RS12	#INTER	[anynet]	Available
1	USIBMRA.RS20	USIBMRA.RS12	SNASVCMG	[anynet]	Available

- To see more about AnyNet for AIX sessions, use the command `sna -d anynet` as shown below:

```
rs600020:> sna -d anynet
APPC over TCP/IP      2 connection(s)
-----
```

AnyNet ID	Local	Partner	State
5	USIBMRA.RS20	USIBMRA.RS12	Connected
6	USIBMRA.RS20	USIBMRA.RS12	Connected

4.4.6 Diagnose APPC over TCP/IP

You may follow the steps in this section to diagnose some of the problems in AnyNet for AIX APPC over TCP/IP.

- Test IP connectivity:

Issue a ping command from RS600020 to check whether you have IP connectivity to the other IP host RS600012:

```
rs600020:/ > ping RS12.USIBMRA.SNA.IBM.COM
```

```
PING RS12.USIBMRA.SNA.IBM.COM: (9.24.104.124): 56 data bytes
64 bytes from 9.24.104.124: icmp_seq=0 ttl=255 time=11 ms
64 bytes from 9.24.104.124: icmp_seq=1 ttl=255 time=11 ms
----RS12.USIBMRA.SNA.IBM.COM PING Statistics----
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 11/11/11 ms
```

- Check that the IP name can be resolved by either using `/etc/hosts` or a domain name server:

```
rs600020:/ > host RS12.USIBMRA.SNA.IBM.COM
RS12.USIBMRA.SNA.IBM.COM is 9.24.104.124
```

- Check whether AnyNet for AIX is running:

```
rs600020:/ > sna -d anynet
```

```
APPC over TCP/IP      2 Connection(s)
-----
```

AnyNet ID	Local	Partner	State
2	USIBMRA.RS20	USIBMRA.RS12	Connected
3	USIBMRA.RS20	USINBRA.RS12	Connected

- Check AnyNet by using the following command:

```
/usr/lpp/anynet/bin/anycheck lu_name
```



```

rs600020:/usr/lpp/anynet/bin > anycheck RS12
(This command may take several minutes to complete...)
AnyNet APPC over TCP/IP is active.
Fully qualified LU name: USIBMRA.RS12
sna is currently using this LU (for details, run "sna -d s").
AnyNet is currently using this LU (for details, run "sna -d anynet").

Protocol Preference:      tcpip
If communication with "USIBMRA.RS12" should be via TCP/IP then your
routing protocol preference is correct. Otherwise, run "smit _snasnaip"
and examine/change the Routing Protocol Preference profiles.

SNA domain name suffix:  SNA.IBM.COM
Fully qualified DNS name: RS12.USIBMRA.SNA.IBM.COM
IP Address:              9.24.104.124
TCP/IP access to partner: OK
Partner AnyNet:          Active (apparently)

Session with partner:     Started
Stop session:             OK
Access to USIBMRA.RS12 seems to be working fine.

If you have an application that cannot communicate with RS12,
then perhaps the partner transaction program profile
has not been set up properly. To check that,
run "smit _snatpn" on the partner system.
Also, perhaps the application needs the fully qualified
LU name "USIBMRA.RS12" rather than just "RS12"?

```

5. Check the TCP/IP network statistics by issuing the following command:

```

rs600020:> netstat -a |grep 397
tcp      0      0 rs600020.itso.ra.1078 rs600012.itso.ra.397 ESTABLISHED
tcp      0      0 rs600020.itso.ra.1077 rs600012.itso.ra.397 ESTABLISHED
tcp      0      0 *.397                *.*                  LISTEN
udp      0      0 *.397                *.*

```

6. You can start a session manually and check the results.

```

rs600020:/ > sna -s session -pn USIBMRA.RS12 -mode '#inter'
Session started: Session ID = E54FDCD27D98E9FC, Conversation group ID = 10
rs600020:/ > sna -d s

```

CGID	Local LU name	Partner LU name	Mode name	Link station	State
10	USIBMRA.RS20	USIBMRA.RS12	#INTER	[anynet]	Available
8	USIBMRA.RS20	USIBMRA.RS12	#INTER	[anynet]	Available
7	USIBMRA.RS20	USIBMRA.RS12	SNASVCMG	[anynet]	Available

Please refer to Chapter 10, "Guidelines to Problem Determination" on page 211 for some additional information on how to diagnose problems with APPC over TCP/IP.

4.5 AnyNet/2

In the following we show the definitions for AnyNet/2, how it will be installed, and how to run AnyNet sessions. The TCP/IP setup is not shown in the example.

In this example, the installation and customization for AnyNet/2 Version 2 "SNA over TCP/IP" is shown.

4.5.1.1 Installation AnyNet/2 Version 2

The following software is installed on the PS/2:

- OS/2 Version 2.11
- CM/2 Version 1.11
- TCP/IP for OS/2 Version 2.0

To install AnyNet/2 Version 2, you have to select the AnyNet support as a feature when installing the Communications Manager/2 Version 1.11:

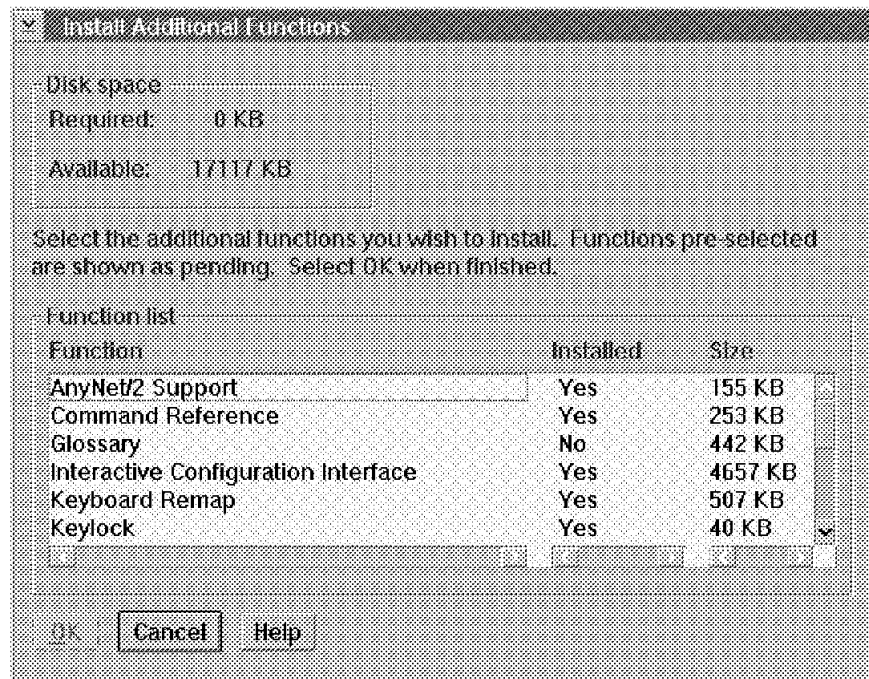


Figure 62. CM/2 Select AnyNet/2 Feature

After installing the CM/2 or the AnyNet/2 support feature of CM/2, you have to reboot your machine in order to activate the new software.

To install the AnyNet/2 itself, place your installation diskette number 1 in the diskette drive and enter `a:install`. You should get the following picture:

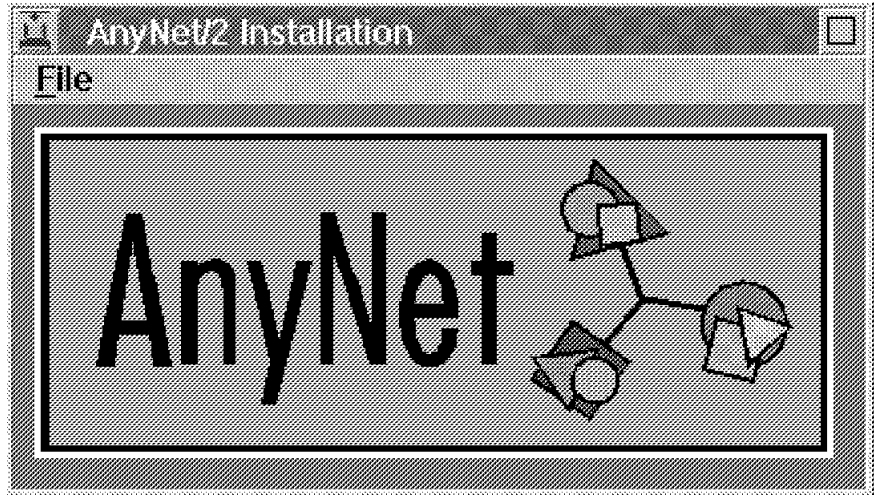


Figure 63. AnyNet/2 Installation Title

A new window will appear and you have to select which of the different AnyNet/2 products you would like to install. The AnyNet/2 family consists of:

- APPC over TCP/IP (only on CM/2 Version 1.0)
- SNA over TCP/IP (only on CM/2 Version 1.11)
- Sockets over SNA

In our case we selected SNA over TCP/IP and we got further customization panels:

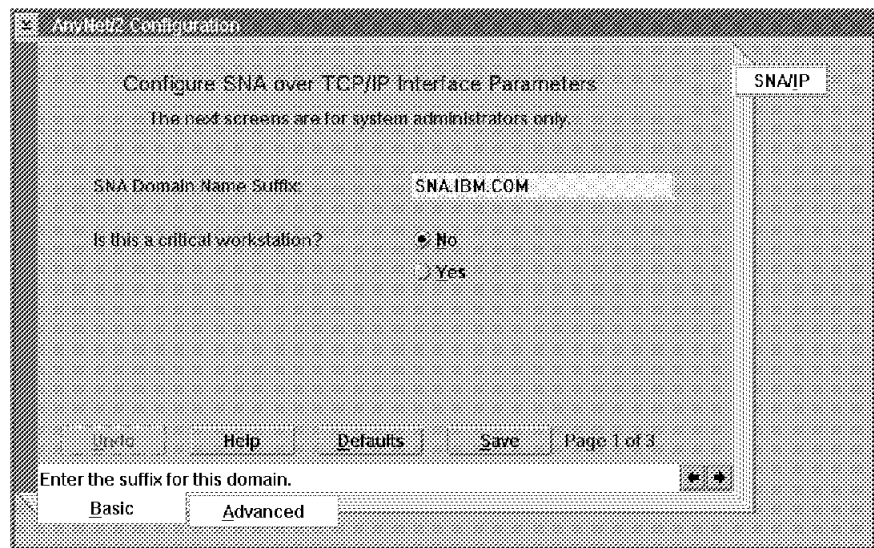


Figure 64. AnyNet/2 SNA Domain Name Definition

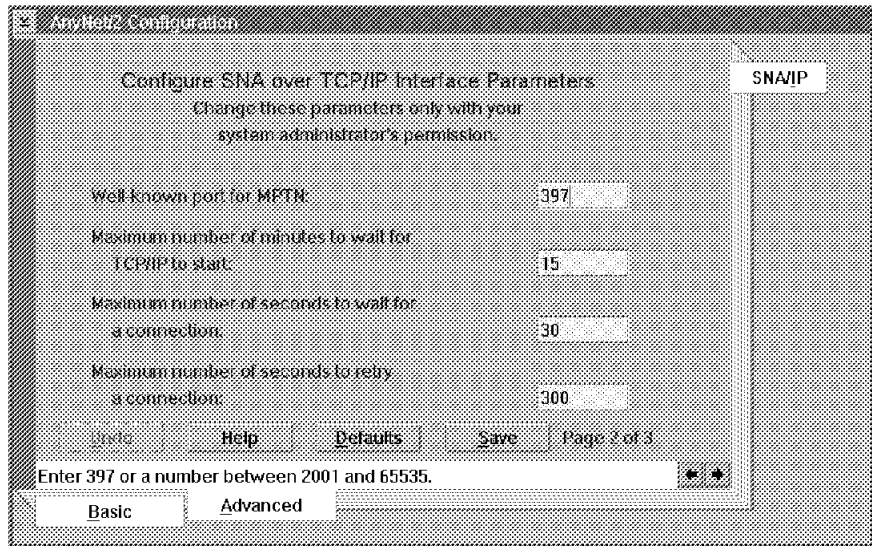


Figure 65. AnyNet/2 Well-Known Port Definition

These panels look the same as on AnyNet for AIX and should match those definitions. Save the information and exit this panel.

The last panel you get will be the preference routing table. You may either select the TCP/IP path (NON-NATIVE) for all applications or for specific LU names only. In that case, you have to add all the LU names that you want to change from the default setting. In our example, we chose for the LU R4N to use SNA routing (NATIVE) instead of TCP/IP.

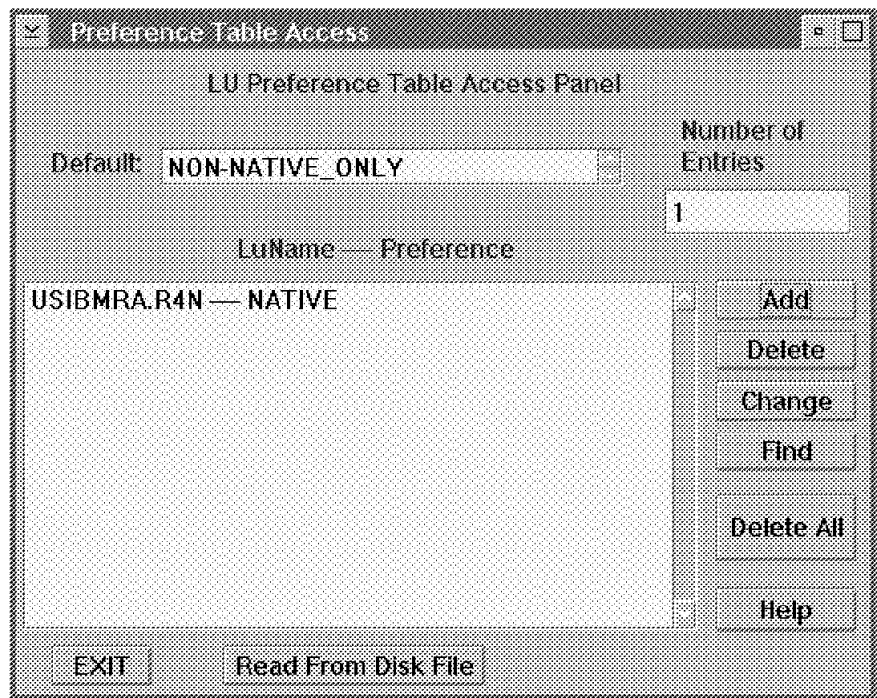


Figure 66. AnyNet/2 Routing Preference

- This last step shows a very important difference from AnyNet for AIX in that you can select four different routings for each application:

1. NATIVE_ONLY, which means applications run over SNA.
 2. NON-NATIVE_ONLY, which means applications run over TCP/IP.
 3. NON-NATIVE, which means applications try TCP/IP first. If that path is not available, the session will try the SNA path.
 4. NATIVE, which means applications try SNA first. If that path is not available, the session will try the TCP/IP path.
- Exit this panel and reboot your machine. AnyNet/2 is now ready to work.

4.5.2 Run AnyNet/2 Version 2 Applications

To run applications over AnyNet/2 is no different than to run them over native SNA.

AnyNet/2 has a facility to dynamically display or change the setup. The `lulist` command allows you to display the preference table, add new LUs, change the LU name, or change the default.

```
usage: lulist {a|r|l|p|f|c|d|u|h} argument(s).
Arguments by function:
a netid.luname flag ( ADD LUNAME   ).
r netid.luname     ( REMOVE LUNAME ).
l netid.luname     ( LOOKUP LUNAME ).
p                   ( PRINT TABLE ).
f                   ( FLUSH TABLE ).
c netid.luname flag ( CHANGE LUNAME ).
d                   ( PRINT DEFAULT ).
d flag             ( SET DEFAULT   ).
u                   ( UPDATE TABLE ).
h                   ( HELP         ).
flag: 0=Native, 1=Non-Native, 2=Native Only, 3=Non-Native Only.
```

For example, you may change the default preference routing from the customized value `NON-NATIVE_ONLY` to `NON-NATIVE` by entering `lulist d 1`.

Note: The setting must always match the opposite side. In the case of AnyNet for AIX, there are fixed definitions and you cannot change only one side. You also have to change the preference setting in AnyNet for AIX and start the session again.

4.6 AIX Sockets over SNA Principle

AIX Sockets over SNA is part of AnyNet for AIX and enables sockets applications to use an SNA connection.

It presents a TCP/IP sockets interface to the applications programs, but uses SNA as the underlying network transport. Sockets over SNA allows organizations that currently have SNA networks the use of TCP/IP sockets applications over the same network. This program allows the communication of sockets applications running on other platforms such as OS/2 or MVS when using the appropriate Sockets over SNA program at these platforms.

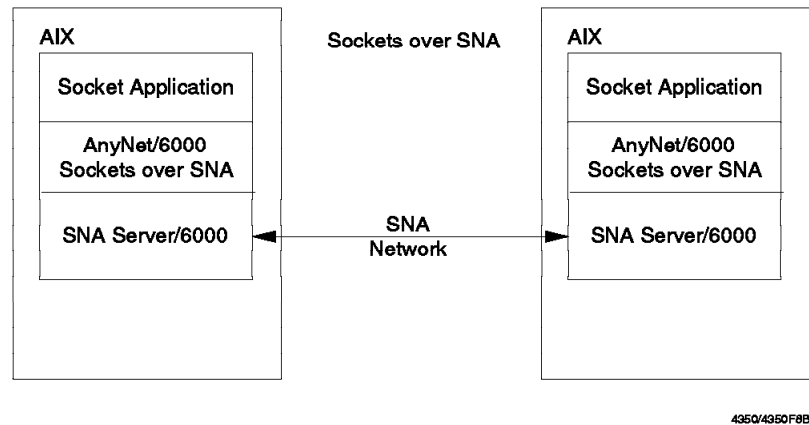


Figure 67. Sockets over SNA Principle

The Sockets over SNA feature is implemented using the Multiprotocol Transport Networking (MPTN) Architecture. Figure 68 shows an example of the AIX Sockets over SNA.

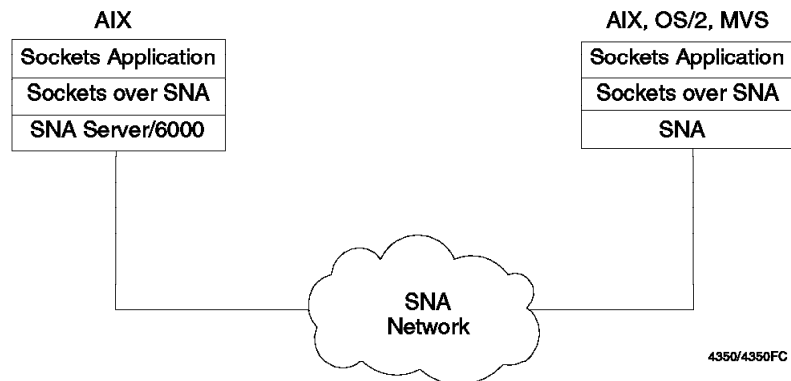


Figure 68. Sockets over SNA Sample

AnyNet for AIX AIX Sockets over SNA also enables sockets applications to talk to sockets applications at native TCP/IP nodes when using a gateway function in between. For example, when using AnyNet/2 Sockets over SNA Gateway, the connection can be as shown in Figure 69 on page 115.

Note: The gateway function forwards the data stream from one transport layer to the other transport layer without affecting the data.

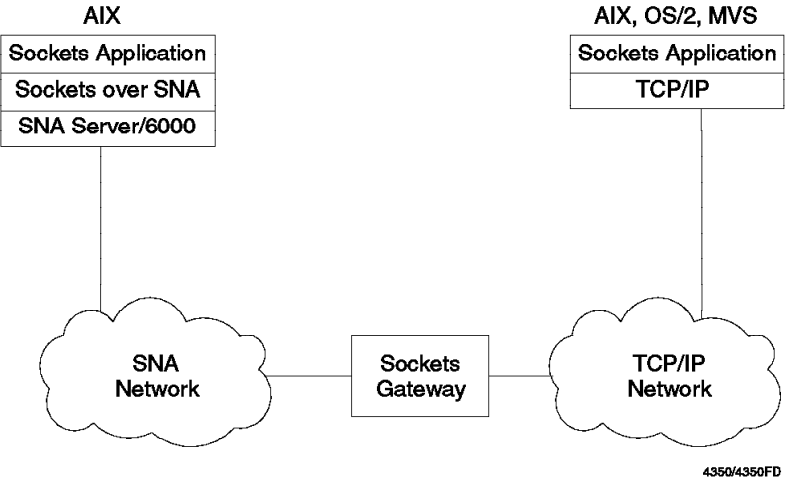


Figure 69. Using a Sockets over SNA Gateway Node

As shown in the figures above, AIX Sockets over SNA offers a wide range of possible configurations and possible applications.

AIX Sockets over SNA presents a sockets interface to sockets application programs. When an application program attempts to open a stream or datagram connection to another application, using AIX Sockets over SNA, the AIX Sockets over SNA generates an LU 6.2 call to respond to the application.

The principle is shown in Figure 70 on page 116.

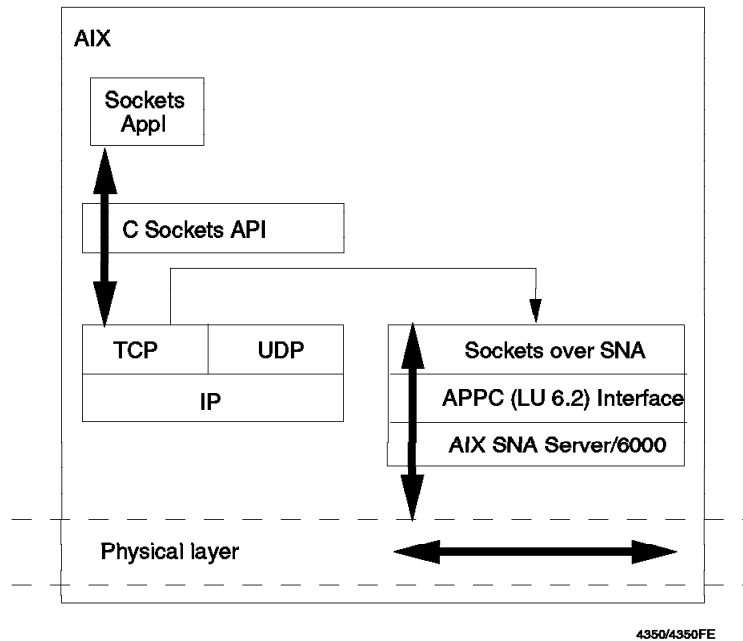


Figure 70. Structure of AIX Sockets over SNA

Since TCP/IP communication uses IP addresses to reach the destination, the addresses have to be mapped to SNA fully qualified names in order to find the destination. This mapping will be done within AIX Sockets over SNA. For every IP address that identifies a node, there must be a corresponding SNA fully qualified LU name. When AIX Sockets over SNA receives the destination IP address from a local application program, it will do the following:

- Map the address to an SNA fully qualified LU name
- Allocate a conversation to the destination LU
- Include its own local IP address in the connection request

When AIX Sockets over SNA receives a connect request, it performs the following actions:

- Maps the fully qualified LU name of the connect request to an IP address using the internal IP-LU mapping table
- Allocates another conversation to the sending LU to get a full-duplex connection such as in TCP/IP

4.6.1 How AIX Sockets over SNA Maps IP Addresses to SNA LU Names

AIX Sockets over SNA creates its own network interface `sna0`. The configuration steps specify the IP address and the address mask for this interface. The configuration also specifies how IP addresses are to be mapped into LU names. The IP address used for AIX Sockets over SNA needs to be different than the one used for your own TCP/IP network.

This IP address needs to be a valid IP address assigned by your network administrator.

AIX Sockets over SNA uses the following process to map an IP address to a fully qualified SNA LU name:

- AIX Sockets over SNA receives an IP address for a destination that can be reached using the SNA network.
- AIX Sockets over SNA queries the IP - LU mapping table to determine the following:
 - The portion of the IP address to map to an SNA network name
 - What SNA network name maps to the masked portion of the IP address
 - The LU name template to be used in calculating the SNA LU name
 - The portion of the IP address to use to calculate the remainder of the SNA LU name

Using the information provided in the IP - LU mapping table, AIX Sockets over SNA passes the SNA network name and the SNA LU name of the destination (fully qualified name) to SNA Server for AIX.

4.6.2 TCP/IP Address Classification and Address Mask

Let us briefly look at TCP/IP address classes and the effect of mask on IP network and host addresses.

First Byte Address	TCP/IP Address Class	Network Part / Host Part
1-127	A	N. h. h. h
128-191	B	N. N. h. h
192-255	C	N. N. N. h

The "N" part is the network ID and the remaining bytes "h" is the host ID.

A subnet mask can be used to further divide the network ID. Please see the following example:

IP address is 9.24.104.25
 IP mask is 255.0.0.0

This is a class A address, because the first byte is < 128.

9 is the network address
 24.104.25 is the host address.

A different mask will change the IP network and IP host address.

IP address 9. 24.104.25
 subnet mask 255.255.255.000

 9.24.104 is the IP network address
 25 is the IP host address

IP address 9. 24.104.25
 subnet mask 255.255.240.000

Expand the IP address and the mask into binary bits:

		9	24	104	25
Address	0000	1001.0001	1000.0110	1000.0001	1001
Mask	1111	1111 1111	1111 1111	0000 0000	0000

 NNNN NNNN NNNN NNNN NNNN hhhh hhhh hhhh

9.24.96 is the network ID
 8.25 is the host ID

4.6.3 IP - LU Algorithmic Mapping Principles

The address mapping process has two steps:

1. The network address portion of the IP address is mapped to an SNA network name and an LU name template.
2. The remainder, which is the IP host ID, is used to generate the remainder of the LU name not defined by the LU name template. This step is called algorithmic mapping.

The following screen gives some examples of IP-LU name conversion based on IP address, address/LU mask and the template.

```

rs600020:/ > sxmap convert 9.24.105.0 9.24.105.40 255.255.255.0 ral
9.24.105.0 RAL00000
9.24.105.1 RAL00001
9.24.105.2 RAL00002
9.24.105.3 RAL00003
9.24.105.4 RAL00004
9.24.105.5 RAL00005
9.24.105.6 RAL00006
9.24.105.7 RAL00007
9.24.105.8 RAL00008
9.24.105.9 RAL00009
9.24.105.10 RAL0000A
9.24.105.11 RAL0000B
9.24.105.12 RAL0000C
9.24.105.13 RAL0000D
9.24.105.14 RAL0000F
9.24.105.15 RAL0000G
9.24.105.16 RAL0000H
9.24.105.17 RAL0000J
9.24.105.18 RAL0000K
9.24.105.19 RAL0000L
9.24.105.20 RAL0000M
9.24.105.21 RAL0000N
9.24.105.22 RAL0000P
9.24.105.23 RAL0000Q
9.24.105.24 RAL0000R
9.24.105.25 RAL0000S
9.24.105.26 RAL0000T
9.24.105.27 RAL0000V
9.24.105.28 RAL0000W
9.24.105.29 RAL0000X
9.24.105.30 RAL0000Y
9.24.105.31 RAL0000Z
9.24.105.32 RAL00010
9.24.105.33 RAL00011
9.24.105.34 RAL00012
9.24.105.35 RAL00013
9.24.105.36 RAL00014
9.24.105.37 RAL00015
9.24.105.38 RAL00016
9.24.105.39 RAL00017
9.24.105.40 RAL00018

```

In the example above, a IP host ID of 25 results in an LU mapping of RAL0000S. This is because the letters E, I, R and U are skipped.

The IP - LU mapping table contains the SNA network name, LU name template, IP address and IP address mask. See the following screen for an example of an IP - LU mapping table.

```

rs600020:/ > sxmap get
Address      Mask          Network Name  LU Template
-----
9.24.105.0  FFFFFFF0     USIBMRA      RAL

```

IP - LU mapping is used only in forward direction in AIX Sockets over SNA. In the reverse direction the mapping table is not used. The data is directly routed to the application listening at the sna0 interface. An incoming SNA request

already has the destination and source IP address, so the listening application knows the partner at the destination.

4.6.3.1 Algorithmic IP - LU Mapping Usage

This method could be used when you have more than a few nodes. Using algorithmically generated names simplifies the administration associated with IP-LU mapping.

To generate LU names algorithmically, use the following procedure:

1. Define the IP address of the local node.
2. Use the SNA network name and the template, which should be the same across all nodes in the network.
3. Specify the address mask used for the AIX Sockets over SNA network. Do not use an address mask of 255.255.255.255 here.
4. Define the local LU name to your normal SNA local LU profiles (this will be done automatically by AIX Sockets over SNA).

Individual mappings for remote destinations do not have to be defined on the local node. AIX Sockets over SNA generates the entire LU name using the unmasked bits of the IP address and the LU name template.

4.6.4 Defining the LU Names Explicitly

This method could be used when you have a small number of SNA nodes using AIX Sockets over SNA. This defines a fixed IP - LU mapping.

1. Define an IP address and LU name for the local host. Use an address mask of 255.255.255.255.
2. Define an IP address and LU name for each remote destination. Also use the address mask 255.255.255.255. This creates an explicit mapping of the IP address to the SNA network name and the LU name.
3. Add a local LU 6.2 profile, if needed. If you add a minimum configuration profile through SMIT, this is not needed.
4. If you only have LEN connectivity, define a partner LU and partner LU location profile for each session partner.

If you add a node to an existing network, you need to update the information in all of the nodes.

4.6.5 AIX Sockets over SNA Supported Sockets Applications

AIX Sockets over SNA supports application programs using the IBM TCP/IP AF_INET sockets interface to send and receive information over an SNA network. Application programs designed to use the IBM TCP/IP AF_INET interface can generally use AIX Sockets over SNA with no modifications. AIX Sockets over SNA supports both streams and datagram sockets.

Given below is a partial list of IBM TCP/IP applications supported by AIX Sockets over SNA:

- DCE
- DSOM
- FTP, FTPPM, TFTP
- Telnet

- TALK
- REXEC
- RSH
- NFS
- SNMP
- NetView/6000

Note: For a complete list of all supported and unsupported programs, please refer to *SNA Server for AIX AnyNet Guide to Sockets over SNA*, SC31-8217.

4.6.6 AIX Sockets over SNA Limitations

The following restrictions apply to AIX Sockets over SNA V3.1.1:

- AIX Sockets over SNA does not support applications that use broadcasting.
- AIX Sockets over SNA V3.1.1 does not act as an AIX Sockets over SNA gateway.

A RISC System/6000 workstation running AIX Sockets over SNA can also be directly connected to a TCP/IP network, and applications running on the RISC System/6000 can communicate with partners on both the SNA and TCP/IP networks. However, AIX Sockets over SNA V3.1.1 does not enable the application on the TCP/IP network to reach an application on the SNA network through the RISC System/6000 workstation.

4.7 AIX Sockets over SNA Installation

AnyNet for AIX AIX Sockets over SNA V3.1.1 has the following prerequisites:

- AIX V4.1.4 (or later)
- SNA Server for AIX V3.1 (or later).
- Maximum processes per user must be increased to 200. You can change this parameter using the SMIT option menu "Change/Show Characteristics of the Operating System" by the root user. You need to reboot the RS/6000 for this to take effect.

Please refer to the document *SNA Server for AIX AnyNet Guide to Sockets over SNA*, SC31-8217 regarding the full details of hardware, software and memory requirements.

Note

Please see 10.1, "SNA Profiles Maintenance" on page 211 regarding backing up SNA profiles and restoring them, before installing AIX Sockets over SNA software.

To install AIX Sockets over SNA, perform the following steps:

1. Log in as root.
2. Make sure that the LANG environment variable is set to en_US if you are selecting English messages.
3. Enter `smit install` on the AIX command line to start the SMIT installation utility.
4. Follow the path shown below:

```

Install and Update Software
Install/Update Selectable Software (Custom Install)
Install Software Products at Latest Level
Install New Software Products at Latest Level

```

5. Identify and select INPUT device / directory for software.
6. Select the AnyNet base and AnyNet AIX Sockets over SNA filesets and install them.
7. View the SMIT screen or smit.log and check whether the installation was successful.

Attention!

The installation process for AIX Sockets over SNA will stop SNA. You need to stop the applications running on SNA Server for AIX.

When the installation has finished, you should have the programs installed as shown in the following figure:

```

rs600020:/ > ls|pp -l | grep any
sna.anynet.base          3.1.1.0  COMMITTED  AnyNet Base
sna.anynet.snaip         3.1.1.0  COMMITTED  AnyNet APPC over TCP/IP
sna.anynet.socksna       3.1.1.0  COMMITTED  AnyNet Sockets over SNA
sna.msg.en_US.anynet.rte 3.1.1.0  COMMITTED  AnyNet Messages - U.S. En

```

4.8 AIX Sockets over SNA Sample Configuration Algorithmic Mapping

The purpose of this example is to configure and test AIX Sockets over SNA between two RS/6000s over a token-ring SNA network. RS600020 and RS600012 were used for this example. RS600020 was configured as an APPN network node and RS600012 was configured as an APPN end node.

Figure 71 shows the network used in this example.

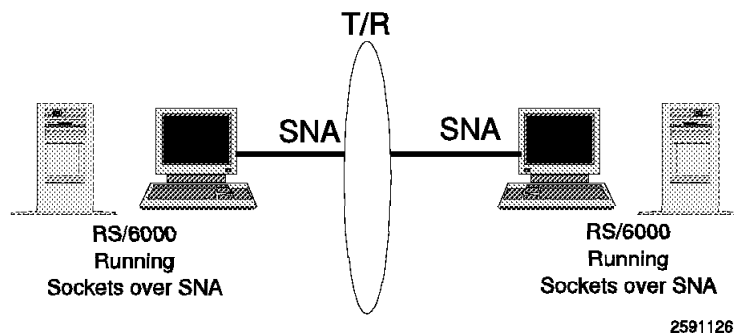


Figure 71. AIX Sockets over SNA Example

Since we used the APPN SNA network, we used algorithmic IP - LU mapping, which simplified our AIX Sockets over SNA configuration.

4.8.1 Control Point Configuration

Configure SNA Server for AIX Control Point if you have not already done so. We used the following command on RS600020 to configure the control point:

```
chsnaobj -t'control_pt' -e 'USIBMRA' -a 'RS20' -A 'RS20' -N  
'appn_network_node' node_cp
```

We used the following command on RS600012 to configure the control point:

```
chsnaobj -t'control_pt' -e 'USIBMRA' -a 'RS12' node_cp
```

4.8.2 SNA Link between Test Nodes

You need to configure and establish an SNA connection between the test nodes.

1. Use the command `mksnaobj -t'sna_dlc_token_ring' RS20` on RS600020 to add an SNA DLC profile, if this has not been done already.
2. Use the command `mksnaobj -t'sna_dlc_token_ring' -J 'no' RS12` on RS600012 to add an SNA DLC profile, if not already done. We do not want dynamic listening link stations on RS600012. We will use an explicitly defined listening link station on RS600012.
3. Add a link station profile in RS600020 to call and make an SNA link connection. We used the following command:

```
mksnaobj -t'link_station' -w'token_ring' -y 'RS20' -d '10005AB14FCB'  
TORS12
```

In this command, 10005AB14FCB is the token-ring address for RS600012. We will name this profile TORS12, which is the destination for this link.

4. Add a listening link station profile on RS600012 by issuing the following command:

```
mksnaobj -t'link_station' -w'token_ring' -y 'RS12' -d '10005AC95035' -0  
'no' TORS20
```

The value 10005AC95035 is the token-ring address for RS600020. We will name this profile TORS20, which is the destination for this link.

4.8.3 AnyNet Sockets over SNA SMIT Main Menu

Use the SMIT fast path command `smit _snockets` to directly access the AnyNet Sockets over SNA configuration menu as shown below.

```
AnyNet Sockets over SNA  
  
Move cursor to desired item and press Enter.  
  
Minimum Configuration (required)  
Remote Address Mapping  
SNA Mode to Socket Port Assignment  
Static Route to Sockets over SNA Gateway
```

4.8.4 AIX Sockets over SNA Minimum Configuration Profile

You need to add a minimum configuration profile for RS600020 and RS600012.

1. The following screen shows the mandatory minimum configuration profile for RS600020.

```

                                Add Minimum Configuration Profile

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

                                [Entry Fields]
* Profile name                                RS20

Local information (required):
* IP address                                1 [9.24.105.241]
* Subnet mask                               2 [255.255.255.0]
* Mode name                                 3 [SNACKETS]
Maximum send buffer size                   4 [8300]
Datagram conversation timeout                30
Connection start timeout                    90

LU mapping information (required):
LU name template                           5 [RAL]
LU mapping mask                             6 [255.255.255.0]

```

Note:

1 Enter the local IP address. Obtain this address from your network administrator. The IP address is a unique address, which should be different from other IP addresses in your subnet or IP network.

2 This address mask will be assigned by your network administrator, with consideration to your IP - LU mapping. This value will be used to divide the IP address into a network ID and an IP host ID.

The IP address and subnet mask are assigned to the sna0 interface.

3 Select the default mode to be used for all sessions initiated by AIX Sockets over SNA. If you specify a different mode other than SNACKETS, then this needs to be known on every node in your network.

4 Enter the maximum size (in bytes) of the logical records that AIX Sockets over SNA sends over an SNA conversation. In most cases, the default value of 8300 does not need to be changed.

5 Enter either a template for algorithmic IP - LU mapping or an explicit LU name.

- The length of the template depends on the address mask. An address mask of 255.255.255.255 means that all eight characters are specified. This is defining an explicit LU name and SNA network name corresponding to the IP address. An address mask of 255.255.255.0 defines up to six characters in the template. Use a name prefix that fits with the SNA LU name scheme used in your network. Ensure that the template and the mask will not generate any duplicate mapped LU names.

In our example the IP address is 9.24.105.241 for RS600020. The LU mapping mask is 255.255.255.0. The template is RAL, which means that the last 8 bits of the IP address (241) will be used to generate an SNA LU name that begins with RAL. The following screen shows this mapping:


```
rs600020:/ > sxmap convert 9.24.105.241 255.255.255.0 RAL
0105-3128 9.24.105.241 maps to LU name RAL0007J
rs600020:/ > sxmap convert 9.24.105.124 255.255.255.0 RAL
0105-3128 9.24.105.124 maps to LU name RAL0003W
```

- In the case of explicit addressing, enter a complete local LU name in the LU template field.

6 This field determines how various template values could be used to map LU names. This field should be the same as the value in the Subnet Mask field unless you are using explicit mapping.

Enter 255.255.255.255 if you are using explicit IP address to SNA LU name mapping.

2. The following screen shows the mandatory minimum configuration profile for RS600012.

```

                                Add Minimum Configuration Profile

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

                                [Entry Fields]
* Profile name                                RS12

Local information (required):
* IP address                                [9.24.105.124]
* Subnet mask                              [255.255.255.0]
* Mode name                                [SNACKETS]
Maximum send buffer size                    [8300]
Datagram conversation timeout                30
Connection start timeout                    90

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

4.8.5 Testing of Sample Configuration Algorithmic Mapping

Follow these steps to test the configuration in this section.

4.8.5.1 Verify SNA Profiles and Establish Link

1. Verify the profiles on both the nodes by issuing the command `verifysna -U`.
2. Start SNA by issuing the command `sna -start` on both the nodes.
3. Start the listening link station on RS600012 by issuing the command `sna -s 1 -p RS20`.
4. Start the calling link station on RS600020 by issuing the command `sna -s 1 -p RS12`.
5. Check the link by issuing the command `sna -d 1` on both machines.

```

rs600020:/ > sna -d l
Link      Adjacent  Node   Device  # of local  In
station   CP name   type   name    sessions   use
-----
@tok0.4
TORS12    USIBMRA.RS12  EN     tok0    Starting   0 No
          USIBMRA.RS12  tok0    Active   5 Yes

rs600012:/ > sna -d l
Link      Adjacent  Node   Device  # of local  In
station   CP name   type   name    sessions   use
-----
@tok0.4
TORS20    USIBMRA.RS20  NN     tok0    Starting   0 No
          USIBMRA.RS20  tok0    Active   5 Yes

```

4.8.5.2 Start AnyNet and Check SNA Network Interface sna0

1. Start AnyNet for AIX by issuing the command `sna -s anynet` on both of the machines.
2. Check the characteristics of the new TCP/IP interface `sna0` by the command `ifconfig sna0`.

```

rs600012:/> ifconfig sna0
sna0: flags=23<UP,BROADCAST,NOTRAILERS>
       inet 9.24.105.124 netmask 0xfffff00 broadcast 9.24.105.255

rs600020:/> ifconfig sna0
sna0: flags=23<UP,BROADCAST,NOTRAILERS>
       inet 9.24.105.241 netmask 0xfffff00 broadcast 9.24.105.255

```

4.8.5.3 Display SNA Directory Information

1. Before you test AIX Sockets over SNA, check that the session partners are registered on the node where you want to initiate the test. In our case, we defined RS600020 as an APPN network node. We will use RS600020 to test AIX Sockets over SNA connectivity to RS600012.

Use the following SNA commands to display various SNA resources.

```

rs600020:/ > sna -display directory
*****
          Directory Information
*****
Total directory entries           4
Network node entries             1
Local and adjacent node entries  0

1>Network node CP name           USIBMRA.RS20
   Number of associated LUs      4
1.1>LU name                      USIBMRA.RS20
   Owning CP name               USIBMRA.RS20
   LU entry type                 Home

1.2>LU name                      USIBMRA.RAL0007J 1
   Owning CP name               USIBMRA.RS20
   LU entry type                 Home

1.3>LU name                      USIBMRA.RS12 2
   Owning CP name               USIBMRA.RS12
   LU entry type                 Register

1.4>LU name                      USIBMRA.RAL0003W 3
   Owning CP name               USIBMRA.RS12
   LU entry type                 Register

```

Note:

- 1** RAL0007W is the local IP - LU algorithmic mapped name.
- 2** RS12 is the CP name of RS600012 registered over APPN.
- 3** RAL0003W is the remote IP - LU algorithmic mapped name registered over APPN. If this LU name is not registered and if you do not have APPN, then you need to define the remote LU explicitly.

2. Display the directory information of RS600012 as per the following:

```

rs600012: > sna -display directory
*****
          Directory Information
*****
Total directory entries           2
Network node entries             0
Local and adjacent node entries  1

1>Owning CP name                 USIBMRA.RS12
   Number of associated LUs      2

1.1>LU name                     USIBMRA.RS12
   LU entry type                 Home

1.2>LU name                     USIBMRA.RAL0003W
   LU entry type                 Home

```

4.8.5.4 Test AIX Sockets over SNA IP Connectivity

1. Run the following command on RS600020:

```

rs600020:/ > ping 9.24.105.124
PING 9.24.105.124: (9.24.105.124): 56 data bytes
64 bytes from 9.24.105.124: icmp_seq=0 ttl=255 time=81 ms
64 bytes from 9.24.105.124: icmp_seq=1 ttl=255 time=14 ms
----9.24.105.124 PING Statistics----
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 13/26/81 ms

```

2. Run the following command on RS600012:

```
rs600012:/ > ping 9.24.105.241
PING 9.24.105.241: (9.24.105.241): 56 data bytes
64 bytes from 9.24.105.241: icmp_seq=0 ttl=255 time=81 ms
64 bytes from 9.24.105.241: icmp_seq=1 ttl=255 time=14 ms
----9.24.105.241 PING Statistics----
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 13/26/81 ms
```

4.8.5.5 Display SNA Resources Associated with Example

It is interesting to see the SNA sessions associated with AIX Sockets over SNA connectivity.

1. The following display was taken on RS600020:

```
rs600020:/ > sna -display session
```

CGID	Local LU name	Partner LU name	Mode name	Link station	State
5	USIBMRA.RAL0007J	USIBMRA.RAL0003W	SNACKETS	TORS12	Available
4	USIBMRA.RAL0007J	USIBMRA.RAL0003W	SNACKETS	TORS12	Available
3	USIBMRA.RAL0007J	USIBMRA.RAL0003W	SNASVCMG	TORS12	Available
1	USIBMRA.RS20	USIBMRA.RS12	CPSVCMG	TORS12	Available
2	USIBMRA.RS20	USIBMRA.RS12	CPSVCMG	TORS12	Available

2. The following display was taken on RS600012:

```
rs600012:/ > sna -display session
```

CGID	Local LU name	Partner LU name	Mode name	Link station	State
7	USIBMRA.RAL0003W	USIBMRA.RAL0007J	SNACKETS	TORS20	Available 1
6	USIBMRA.RAL0003W	USIBMRA.RAL0007J	SNACKETS	TORS20	Available
5	USIBMRA.RAL0003W	USIBMRA.RAL0007J	SNASVCMG	TORS20	Available
4	USIBMRA.RS12	USIBMRA.RS20	CPSVCMG	TORS20	Available
3	USIBMRA.RS12	USIBMRA.RS20	CPSVCMG	TORS20	Available

Note: **1** This partner session was established by issuing ping from RS600020 to RS600012.

3. Test any sockets application. We used telnet which worked very well.

4.8.5.6 U-Shaped Sessions

On RS600020 use the command ping 9.24.105.241 to its own sna0 interface. This creates a U-shaped session, where local and partner LUs are the same. This is shown in the following:

```
rs600020:/ > sna -d s
```

CGID	Local LU name	Partner LU name	Mode name	Link station	State
6	USIBMRA.RAL0007J	USIBMRA.RAL0007J	SNACKETS	lu_own_s	Allocated
7	USIBMRA.RAL0007J	USIBMRA.RAL0007J	SNACKETS	lu_own_p	Allocated

4.8.5.7 Display AnyNet Resources Used in Example

Use the command `smit _snastatserv` to directly enter the SMIT menu to display SNA resources. Select various options to display SNA and AnyNet resources.

4.8.6 SNA Profiles for Network Node RS60020

This section lists the SNA profiles for the network node RS60020 as used in this example.

```
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    = "RS20"
  control_pt_name          = "RS20"
  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            = "RAL0007J"
  local_lu_alias           = "RAL0007J"
  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                = "TORS12"
  use_control_pt_xid       = yes
  xid_node_id              = "*"
  sna_dlc_profile_name     = "RS20"
  stop_on_inactivity       = no
  time_out_value           = 0
  LU_registration_supported = no
  LU_registration_profile_name = ""
  link_tracing             = no
```

```

trace_format = long
access_routing_type = link_address
remote_link_name = ""
remote_link_address = 0x10005ab14fcb
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 = no
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 = no
restart_on_abnormal_deactivation = no
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 = "RS20"
  datalink_device_name = "tok0"
  force_timeout = 120
  user_defined_max_i_field = no
  max_i_field_length = 30729
  max_active_link_stations = 100
  num_reserved_inbound_activation = 0
  num_reserved_outbound_activation = 0
  transmit_window_count = 127
  dynamic_window_increment = 1
  retransmit_count = 8
  receive_window_count = 1
  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       = 1an
dynamic_lnk_TG_user_defined_1         = 128
dynamic_lnk_TG_user_defined_2         = 128
dynamic_lnk_TG_user_defined_3         = 128
comments                               = ""

mode:
  prof_name                             = "DFLTMODE"
  mode_name                             = "DFLTMODE"
  max_sessions                          = 8
  min_conwinner_sessions                = 4
  min_conloser_sessions                 = 0
  auto_activate_limit                   = 0
  max_adaptive_receive_pacing_window    = 16
  receive_pacing_window                 = 7
  max_ru_size                           = 1024
  min_ru_size                           = 256
  class_of_service_name                 = "#CONNECT"
  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                             = "RS20"
  IP_address                            = "9.24.105.241"
  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                               = ""

mptn_env:
  prof_name                             = "env_values"
  sna_suffix                            = "SNA.IBM.COM"
  connection_retry                      = 300
  connection_wait                       = 30
  inactivity_timer                      = 120
  mptn_well_known_port                  = 397
  unacknowledged_dg_retry               = 30
  unsend_dg_retry                       = 3
  comments                              = ""

```

4.8.7 SNA Profiles for the APPN End Node RS60012

This section lists the SNA profiles for the APPN end node RS60012 as used in this example.

```
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    = "RS12"
    control_pt_name          = "RS12"
    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            = "RAL0003W"
    local_lu_alias           = "RAL0003W"
    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                = "TORS20"
    use_control_pt_xid       = yes
    xid_node_id              = "*"
    sna_dlc_profile_name     = "RS12"
    stop_on_inactivity       = no
    time_out_value           = 0
    LU_registration_supported = no
    LU_registration_profile_name = ""
    link_tracing              = no
    trace_format              = long
    access_routing_type      = link_address
    remote_link_name         = ""
    remote_link_address      = 0x10005ac95035
    remote_sap                = 0x04
```



```

call_out_on_activation           = no
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 = no
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   = no
restart_on_abnormal_deactivation = no
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                       = "RS12"
  datalink_device_name            = "tok0"
  force_timeout                   = 120
  user_defined_max_i_field        = no
  max_i_field_length              = 30729
  max_active_link_stations        = 100
  num_reserved_inbound_activation = 0
  num_reserved_outbound_activation = 0
  transmit_window_count           = 127
  dynamic_window_increment        = 1
  retransmit_count                 = 8
  receive_window_count            = 1
  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   = no
  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
comments                          = ""

mode:
  prof_name                        = "DFLTMODE"
  mode_name                       = "DFLTMODE"
  max_sessions                    = 8
  min_conwinner_sessions         = 4
  min_conloser_sessions          = 0
  auto_activate_limit            = 0
  max_adaptive_receive_pacing_window = 16
  receive_pacing_window          = 7
  max_ru_size                    = 1024
  min_ru_size                    = 256
  class_of_service_name          = "#CONNECT"
  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                        = "RS12"
  IP_address                      = "9.24.105.124"
  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                      = ""

mptn_env:
  prof_name                      = "env_values"
  sna_suffix                    = "SNA.IBM.COM"
  connection_retry              = 300
  connection_wait               = 30
  inactivity_timer              = 120
  mptn_well_known_port          = 397
  unacknowledged_dg_retry       = 30
  unsend_dg_retry               = 3
  comments                      = ""

```

4.9 Additional AIX Sockets over SNA Configuration Profiles

This section provides additional configuration menus that are available in AIX Sockets over SNA V3.1.1.

4.9.1 Remote Address Mapping Profile

The Remote Address Mapping Profile specifies mapping between an IP and a remote LU name. This profile needs to be defined only if any of the following conditions apply:

- You do not want AIX Sockets over SNA to use algorithmic mapping.
- You have no APPN network.
- Your IP network is communicating to another IP network with a different IP network ID.
- Your SNA network is communicating to another SNA network with a different SNA network name.
- You use a different LU name template in the other node.

Figure 72 shows the SMIT menu used to configure the Remote Address Mapping profile.

```

Add Remote Address Mapping Profile

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

* Profile name
Remote IP address
Subnet mask
LU name template
Network name
Comments

[Entry Fields]
[TORS12]
1 [9.24.105.124]
2 [255.255.255.255]
3 [RAL0003W]
[USIBMRA]
[]
```

Figure 72. AIX Sockets over SNA Remote Address Mapping Profile

Note:

- 1** IP address for the remote host.
- 2** LU mapping mask. This is set to 255.255.255.255 in our explicit addressing example.
- 3** Remote LU name obtained by issuing the command `sxmap convert 9.24.105.124 255.255.255.0 ral`.

4.9.2 SNA Mode to Socket Port Assignment

Figure 73 on page 136 shows the SMIT menu. This profile specifies a mode name to be used for sessions over a specific port. This mode overrides the default mode specified in the AIX Sockets over SNA Minimum Configuration Profile for sessions over this port.

```

Add SNA Mode to Socket Port Assignment Profile

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

* Profile name           [Entry Fields]
Mode name                []
TCP/IP port number      [0]
Comments                 []

```

Figure 73. Sockets over SNA Mode Profile

4.9.3 Minimum Configuration Using AIX Command Line

Instead of using the SMIT menu to add a mandatory minimum configuration, you may use the command `mksnaobj`.

When you configure the Minimum Configuration Profile using SMIT, AIX Sockets over SNA automatically creates (or changes) an SNA Server LU 6.2 Local LU profile for the local AIX Sockets over SNA node. If you use the commands `mksnaobj` or `chsnaobj`, you must create or change the Local LU profile yourself.

You should use the command `sxmap` to convert the local IP address, LU mapping mask and the template.

4.9.4 Configuring LEN Connectivity

In an SNA network that does not support APPN functions, or for sessions using a link station that does not support CP-CP sessions, you must explicitly configure the partner LU to the local node. In SNA Server for AIX, both of these situations are referred to as LEN connectivity.

Each partner LU to be accessed using a LEN connection must be defined in an LU 6.2 partner LU profile and a partner LU 6.2 Location profile.

4.9.5 Sockets over SNA OS/2 Example

Figure 74 on page 137 and Figure 75 on page 137 show the definitions for Sockets over SNA for OS/2. The remote nodes profile, as shown in Figure 75 on page 137 is a sample for an explicit definition.

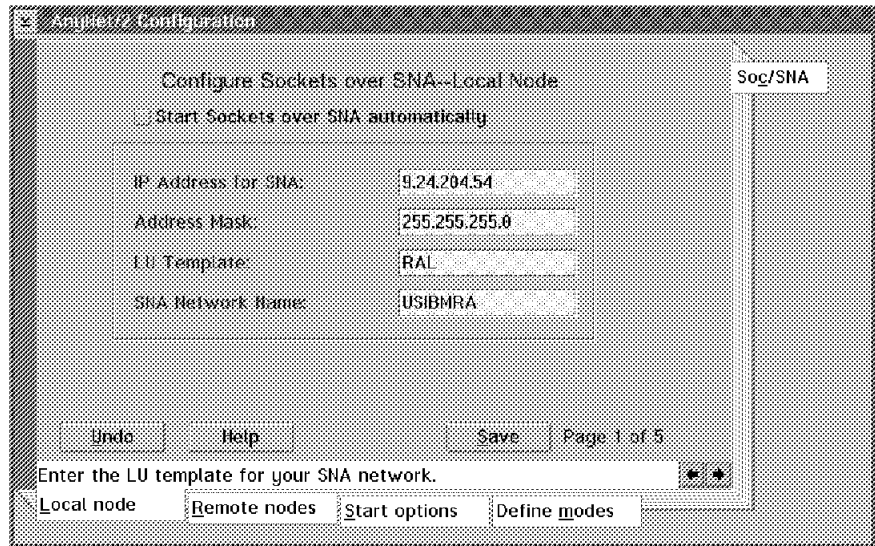


Figure 74. Sockets over SNA for OS/2 Local Definition

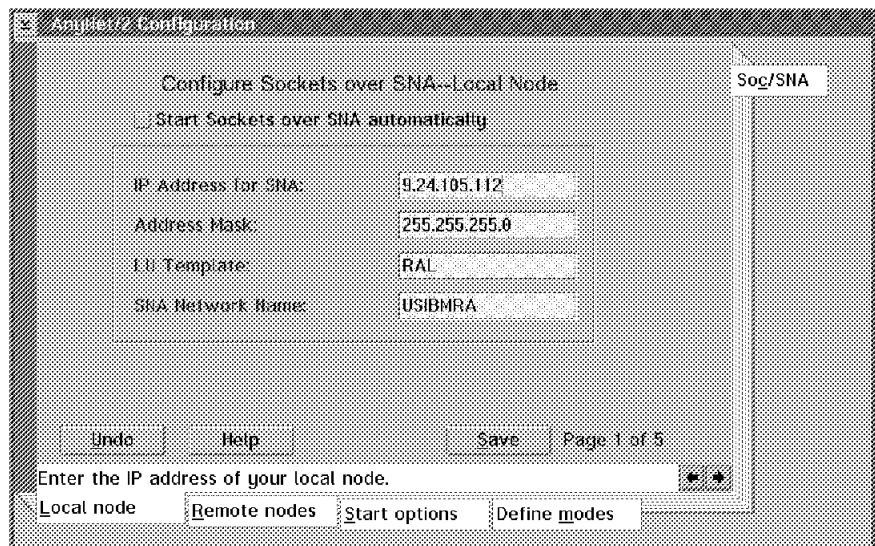


Figure 75. Sockets over SNA for OS/2 Remote Definition

The OS/2 version of Sockets over SNA also has a utility to add, delete, or show the IP-LU table. Figure 76 on page 138 shows the syntax and a sample.

```

sxmap: Version 2.00
usage: sxmap [-w] (add | delete | get | flush | convert | qmap) argument
       sxmap add ip_number mask netname template
       sxmap convert ip_number mask template
       sxmap convert startip endip mask template
       sxmap delete ip_number
       sxmap flush
       sxmap get
       sxmap qmap ip_number
       -w: optional parameter causing sxmap to delay until snackets is
           started. Waits up to 30 seconds. (Doesn't apply to convert.)
example: sxmap add 128.109.0.0 255.255.0.0 USIBMSER NR

```

```

[<AIXAGENT1>-C:\]sxmap get
Address      Mask          Network Name  LU Template
-----
9.24.105.0   FFFFFFF0      USIBMRA      RAL

```

Figure 76. OS/2 Utility SXMAP

Chapter 5. Block Multiplexer for SNA Channel for AIX and TCP/IP

SNA Channel for AIX is a feature of SNA Server for AIX that provides SNA DLC support for the block multiplexer adapter. The SNA channel for AIX enables this adapter to emulate an SNA PU 2.1 channel-attached control unit. This enables the RS/6000 workstation to access a host channel, providing a point-to-point connection between the RS/6000 workstation and the host.

SNA channel for AIX, along with SNA Server for AIX and SNA Gateway, can provide a high-speed link between downstream SNA devices and the host.

This chapter looks at an example of configuring the block multiplexer adapter for SNA channel for AIX. Additionally, there is an example for TCP/IP using block multiplexer.

5.1.1 Block Multiplexer Hardware Requirements

To install SNA Channel for AIX for the Block Multiplexer adapter, you must have the following hardware:

- Block Multiplexer Channel Adapter Card (Feature 2755)
- Block Multiplexer Channel Adapter Cable (Feature 2757)
- Block Multiplexer Channel Interface Assembly (Feature 2758)
- Channel Bus and Tag cables of the appropriate length (Cable Group 0185)
- RISC System/6000 POWERstation of POWERserver computer. The following RS/6000 models are currently supported:
 - 7011 model 250, which supports one adapter
 - 7012 and 7030, which support as many as two adapters
 - 7013 and 7009, which support as many as two adapters
 - 7015, which supports as many as eight adapters
 - 9076 (thin or wide node), which supports as many as two adapters
- One of the following host systems:
 - IBM 308X
 - IBM Enterprise System/3090 (ES/3090)
 - IBM Enterprise System/4381 (ES/4381)
 - IBM Enterprise System/9000 (ES/9000)

Block Multiplexer Adapter Microcode is available internally in IBM from AIXTOOLS as BLKMUX PACKAGE.

Please refer to *SNA Server for AIX Channel Connectivity User's Guide*, SC31-8216 for supported hardware configurations.

5.1.2 Block Multiplexer Software Requirements

To install SNA Channel for AIX for a Block Multiplexer adapter, you must have the following software:

- IBM AIX Version 4.1.4 or later
- SNA Server/6000 Version 3 Release 1 or later
- One of the following operating systems on the host:
 - MVS with VTAM Version 3 Release 4 or higher
 - VM with VTAM Version 3 Release 3 or higher and the following authorized program analysis reports (APARs):
 - VM45562
 - VM45886
 - VM45911
 - VSE with VTAM Version 3 Release 3 or higher

Please refer to *SNA Server for AIX Channel Connectivity User's Guide*, SC31-8216 for supported software configurations.

5.2 Installing SNA Channel for AIX

Note

Please refer to 10.1, "SNA Profiles Maintenance" on page 211 regarding the procedure for backing up and restoring SNA profiles before installing the new software.

To install SNA Channel for AIX on your system use the following procedure:

1. Log in as root.
2. Export any current SNA Server for AIX profiles.
3. Ensure that SNA Server for AIX is not active.
4. Use the `ifconfig` command to stop any channel TCP/IP interfaces. You cannot load the new device driver if the old one is in use.
5. Run the `rmdev` command on any existing channel devices.
6. Enter the `smit install` command on the AIX command line.
7. Select the following from the screen below.

```
Install / Update Software
Install / Update Selectable Software (Custom Install)
Install Software Products at Latest Available Level
```

8. Identify and select the input device / directory for software.
9. You can get the Block Multiplexer Channel Adapter Microcode from IBM AIXTOOLS disk.
10. Select the filesets for `dlchannel`, block multiplexer microcode and the block multiplexer device driver and install them.
11. View the SMIT screen or `smit.log` and check whether the installation was successful.

12. If the installation is successful, the following products would have been installed.

sna.dlcchannel	2.1.0.1	APPLIED	Channel Data Link Control
blkmuxmc.mc	3.2.0.11	COMMITTED	370 Parallel Channel Adapter
devices.mca.fe92.blkmux	4.2.0.2	APPLIED	BLKMUX Adapter (fe92)
devices.mca.fe96.blkmux	4.2.0.2	APPLIED	

Note: The version numbers are subject to change depending on the code level that may be available at that time.

5.3 Block Multiplexer Configuration for SNA

This section provides the necessary host definitions, block multiplexer configuration and SNA Channel for AIX configuration.

5.3.1 Host Definitions for SNA Channel for AIX Block Multiplexer

Please see Figure 77 on page 142, which shows the relation between VTAM and host definitions and RS/6000 definitions.

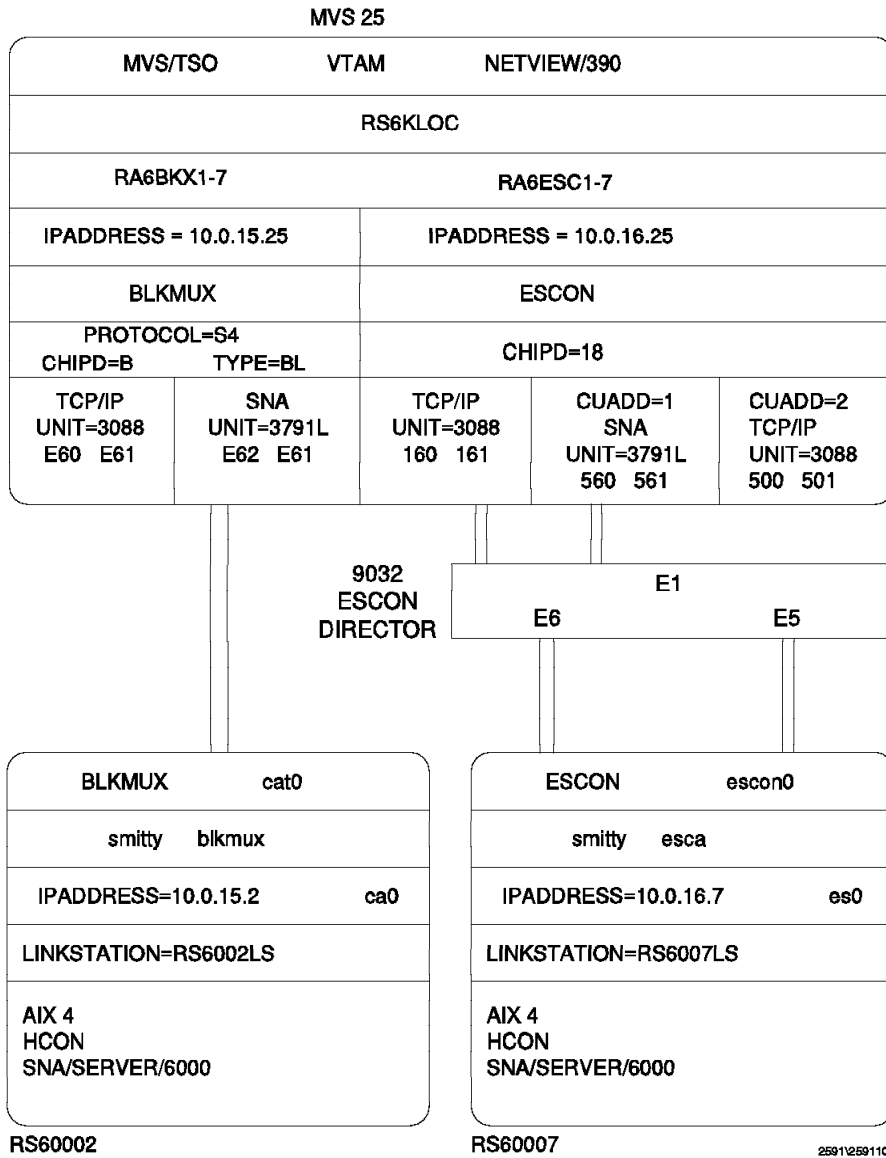


Figure 77. AIX Channel for AIX Host and RS/6000 Definitions

The IODEVICE UNIT type is vital to the configuration of the BLKMUX adapter and must be coded correctly in the IOCP GEN before proceeding; otherwise, the channel will not vary ONLINE and a new IOCP GEN will have to be done.

Note: UNIT types are as follows for the different emulation types:

- For TCP/IP use UNIT=CTC in the IOCP GEN and CLAW in the subchannel definitions.
- For CTC use UNIT=3088 in both the IOCP GEN and subchannel definition.
- For SNA use UNIT=3791L or 3174 in the IOCP GEN and 3174-SNA in the subchannel definitions.

The IOCP definitions used for this configuration is listed below for reference:

```

*IOCP*****
*IOCP*
      CHPID PATH=((0B)),TYPE=BL
*IOCP*
*IOCP*****
*IOCP OE6 RS/6K BLKMUX sna emulation, E60 ctc / tcpip *
*IOCP*****
      CNTLUNIT CUNUMBR=OE6,UNIT=3088,PATH=(0B),SHARED=N,
              UNITADD=((60,2)),PROTOCOL=S4
DEVOE6 IODEVICE UNIT=3088,ADDRESS=(E60,2),CUNUMBR=(OE6)
*IOCP*
      CNTLUNIT CUNUMBR=E62,UNIT=3791L,PATH=(0B),SHARED=N,
              UNITADD=((62,2)),PROTOCOL=S4
DEVE62 IODEVICE UNIT=3791L,ADDRESS=(E62,2),CUNUMBR=(E62)
*IOCP*
*IOCP*****

```

Figure 78. MVS IOCP Definitions for BLKMUX

Please see Figure 79, which shows the VTAM definition for the block multiplexer PU type 2.

```

RA6KLOC VBUILD TYPE=LOCAL
RA6KBKX PU CUADDR=E62, IODEVICE ADDRESS IN IOCPGEN
          XID=YES, PC 3274 EMULATOR
          PUTYPE=2,
          ISTATUS=ACTIVE,
          MODETAB=AMODETAB,
          DLOGMOD=M2SDLQC,
          MAXBFRU=8,
          DELAY=0,
          PACING=0,
          VPACING=0,
          USSTAB=US327X,
          SSCPFM=USSSCS,
          SECNET=NO
**
RA6KBKX1 LU LOCADDR=1
RA6KBKX2 LU LOCADDR=2
RA6KBKX3 LU LOCADDR=3
RA6KBKX4 LU LOCADDR=4
RA6KBKX5 LU LOCADDR=5
RA6KBKX6 LU LOCADDR=6
RA6KBKX7 LU LOCADDR=7

```

Figure 79. VTAM Definitions for Block Multiplexer PU

5.3.2 Configuration of Block Multiplexer for SNA Channel for AIX

This section outlines the configuration steps that are needed to use the block multiplexer for SNA Channel for AIX.

1. Start block multiplexer configuration with the following SMIT fast path command:

```
smit blkmux
```

2. Go into the SMIT menu Add a Subchannel.

Subchannel Set Name This is a required field and is the name of the subchannel set.

Subchannel Address The address field defines the address by which the path is used. The address is the value of the UNITADD parameter on the CNTLUNIT statement in the host IOCP.

Number of Addresses in Group If this subchannel is to be used for AIX SNA, then you must specify this field as "1".

Device-End Startup For SNA Channel for AIX set this parameter to no to indicate that no device-end should be issued by the RISC System/6000 to the mainframe during startup. For TCP/IP, this field should be set to yes.

Remote Host Name This is the remote name associated with this subchannel. The value of this field should match the label used in the VTAM PU definition for the host. For TCP/IP the value should be the host name in the host TCP/IP DEVICE statement.

Type of Emulation This field determines the type of emulation for the subchannel set. For SNA Channel for AIX, you must select 3174-SNA.

```

                                Add a SubChannel

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

* Subchannel Set Name                [HCON]
  Description (max 30 chars)         [UNIX subchanne]
* Subchannel Address.               [062]
  Number of addresses grouped together [1]
  Perform a device-end on startup?    [no]
  Local Name (Workstation)           [RS60002]
  Remote Host Name                   [MVS25]
  Type of emulation:                 [3174-SNA]

```

3. Go into the SMIT menu Attach a Cable.

Cable Label This is usually the name that is physically labeled on the cable.

Location (slot number) This is the Micro Channel slot number into which the adapter is installed. To check what location the adapter is in, you can issue the command `lsdev -C | grep cat` from the command prompt. We got the following message and we chose slot number 5 from a list.

```
# lsdev -C | grep cat
cat0          Available 00-05      370 Parallel Channel Adapter

```

Subchannel Set name This is the subchannel set name chosen earlier.

```

                                Attach a Cable

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

[Entry Fields]

[TOP]
* Cable label                        [cable1]
  Description (max 30 chars)         []
* Location (slot number)             [5]
* Subchannel-Set Name List (comma separated) [HCON]
[BOTTOM]

```

4. Now bring the adapter online, enter `smit blkmux` and select the following:

```

The BLKMUX Channel Attach Adapter .. Diagnostic and RAS Functions.
Change / Show the online/offline status of a BLKMUX Channel Attach Adapters
cat0

```

You will get the screen below, which will tell the current status of the adapter and any valid options.

```

Change / Show the online/offline status of a BLKMUX Channel Attach Adapter

      Pressing the "D0" key will TOGGLE the Online/Offline status

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

                                     [Entry Fields]
The Adapter Name                      cat0
Online/Offline status                  online
Online/Offline status ... force online [no]

```

If the adapter is successfully made online, you will get the following screen:

```

                                COMMAND STATUS

Command: OK          stdout: yes      stderr: no

Before command completion, additional instructions may appear below.

Unconfiguring the adapter cat0
cat0 Defined
Reconfiguring the adapter cat0
cat0 Available
The status of adapter cat0 is online

```

5. You could also run `cfgmgr`, so that the adapter becomes online with these configuration details.
6. To verify that the device driver and hardware are installed properly, vary on the I/O device address on the host.

Note: In some cases, it may be necessary to reboot the RS/6000 to make the changes effective. Please see the README file, which is part of the block multiplexer device driver, `/usr/lpp/devices.mca.fe92/README`.

5.3.3 Configuration of SNA Channel for AIX

1. Set up the initial node by using the following SMIT fast path command:
`smit _snainit`
2. Select channel for the field DLC type.
3. Enter the values as shown in the following screen.

```

                                Initial Node Setup

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

                                     [Entry Fields]

[TOP]
Control Point name                      [RA6002CP]
Control Point type                       appn_end_node
Local network name                       [USIBMRA]
XID node ID                              [*]

Optional link station information:

Link station type                         channel
Link station name                         [RS6002LS]
SubChannel name                           [HCON]
[BOTTOM]

```

4. The default for Initial Node Setup and Quick Config is to create an ESCON SNA DLC profile. You need to change this profile from ESCON to BLKMUX.
5. Modify the following fields in the Channel Linkstation profile to "yes":
 - Activate link station at SNA startup?
 - Restart on normal deactivation?
 - Restart on abnormal deactivation?

Setting these fields to "yes" allows the RS/6000 block multiplexer channel link station to become active, when VTAM PU 2 is varied on.

```

Add Channel Link Station Profile

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

[Entry Fields]

[TOP]
* Profile name                               []
  Use Control Point's XID node ID?           yes
    If no, XID node ID                       [*]
* SNA DLC Profile name                       []
  SubChannel name                            [Y]
  Stop link station on inactivity?           no
    If yes, Inactivity time-out (0-10 minutes) [10]
  LU address registration?                   no
    If yes,
    LU Address Registration Profile name      []
  Trace link?                                no
    If yes, Trace size                       long

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
  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 normal deactivation?             yes
  Restart on abnormal deactivation?          yes

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

Comments                                     []
[BOTTOM]

```

6. You need to add the LU 2 session profile to test the host connectivity. Use the SMIT fast path command `smit _snasess2mk` to add the LU 2 session profile.

5.3.4 Testing of Block Multiplexer for SNA

Once we have configured the block multiplexer and SNA Server for AIX to use this, then we can test that by following the steps in this section.

1. Verify and update the SNA profiles by issuing the command `verifysna -U`.
2. Ensure that the VTAM major node is inactive before you start the SNA channel link station.
3. Start SNA Server for AIX by issuing the command `sna -s`.
4. Ensure that the SNA channel link station is in a starting state.

```
# sna -d l
```

Link station	Adjacent CP name	Node type	Device name	State	# of local sessions	In Use
RS6002LS			blkmux	Starting	0	No

5. Now vary on the SNA major node on VTAM. The RS/6000 link station will become active as per the parameters in the link station profile. The LU 2 sessions that we had added will also become active and will be available for an HCON session.
6. Display the status of the PU 2 on a NetView screen, which is shown below.

```
* RAPAN D NET,E,ID=RA6KBKX
RAPAN IST097I DISPLAY ACCEPTED
' RAPAN
IST075I NAME = RA6KBKX , TYPE = PU_T2.1
IST486I STATUS= ACTIV--L--, DESIRED STATE= ACTIV
IST1043I CP NAME = RA6002CP, CP NETID = USIBMRA , DYNAMIC LU = YES
IST1105I RESOURCE STATUS TGN CP-CP TG CHARACTERISTICS
IST1106I RA6KBKX AC/R 21 YES 982D000000000000000017100808080
IST136I LOCAL SNA MAJOR NODE = RS6KL0C
IST077I SIO = 00096 CUA = 0E62
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST355I LOGICAL UNITS:
IST080I RA6KBKX1 ACT/S RA6KBKX2 ACTIV RA6KBKX3 NEVAC
IST080I RA6KBKX4 NEVAC RA6KBKX5 NEVAC RA6KBKX6 NEVAC
IST080I RA6KBKX7 NEVAC
IST080I RA6002CP ACT/S----Y
IST314I END
```

7. Add or modify an HCON session profile to use the block multiplexer channel LU. Start that HCON session to test the host connectivity.

5.3.5 Display of Block Multiplexer Statistics

Once you have an active session over the BLKMUX connection, you will be able to display statistics for the adapter. To do this you will need to select the following via the SMIT panels for the BLKMUX adapter.

```
The BLKMUX Channel Attach Adapter .. Diagnostic and RAS Functions.
Display statistics for BLKMUX Channel Adapter
```

You will get the following screen; if you require statistics on everything, then fill in the fields as highlighted below:

```
Display statistics for an BLKMUX Channel Attach Adapter

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

                                     [Entry Fields]
*The Adapter name ... Pres List to choose    [cat0]
Do you want performance indicators ?         [yes]
Do you want broad throughput statistics ?     [yes]
Do you want detailed throughput statistics    [yes]
(including subchannel statistics) ?
Do you want all of the above statistics ?     [yes]
```

From the above selection we got the following output.

Global parameters for all BLKMUX Adapters:-
 Control Block Anchor Address = 141e408
 Device Driver Version Number is 950621545
 Debug Mask is 0xFFFFFFFF
 PIO threshold ... read:- 1600(0x640) bytes
 PIO threshold .. write:- 1600(0x640) bytes
 kproc information .. pid = 4271(0x10AF). Timer Interval 5 seconds

RAS Numbers for Adapter cat0 (device #1F0001)
 Uptime = 7195 seconds

Interrupts			Off level Handler			
Adapter	WatchDog	Timer	Requests	Schedule	Punted	Spun
1592	0	0	1592	1577	0	1

read requests		write requests	
kernel	user	kernel	user
76	0	81	0

Write delays(spin delay interval 100 millisecs):-
 Waiting for buffers 0 requests spun 0 times
 Waiting for adapter 0 requests spun 0 times

Throughput statistics for adapter cat0 (device #1F0001)
 Channel Speed = 4.5 Mbytes/sec

Total bytes transferred		Throughput(bytes/sec)	
In	Out	Average	Peak
4859	3369	1	538

Histogram of transfer frequency by size of transfer (* = 4 transfers)
 from 0 - 65535 bytes(max allowed) in steps of 4K(4096) bytes.

bytes	transfer histogram	frequency
0	*****	157
4096		0
8192		0
12288		0
16384		0
20480		0
24576		0
28672		0
32768		0
36864		0
40960		0
45056		0
49152		0
53248		0
57344		0
61440		0

Figure 80 (Part 1 of 2). BLKMUX Adapter Statistics

Histogram of transfer frequency by size of transfer (* = 3 transfers)
 from 0 - 4095 bytes in steps of 100 bytes.

bytes	transfer histogram	frequency
0	*****	124
100	*****	33
200		0
300		0
400		0
500		0
600		0
700		0
800		0
900		0
1000		0
1100		0
1200		0
1300		0
1400		0
1500		0
1600		0
1700		0
1800		0
1900		0
2000		0
2100		0
2200		0
2300		0
2400		0
2500		0
2600		0
2700		0
2800		0
2900		0
3000		0
3100		0
3200		0
3300		0
3400		0
3500		0
3600		0
3700		0
3800		0
3900		0
4000		0

Throughput statistics for subchannels on adapter cat0 (device #1F0001)
 There are 2 active subchannel groups

su ch ad	g r p	# times suspe- nded	Total bytes transferred		Throughput(bytes/sec)	
			in	out	Average	Peak
62	1	0	4859	3369	1	538
64	2	0	0	0	0	0

Figure 80 (Part 2 of 2). BLKMUX Adapter Statistics

5.4 Block Multiplexer Configuration for TCP/IP

This section shows the configuration steps for block multiplexer to be used in TCP/IP. The descriptions of the fields are given in 5.3, "Block Multiplexer Configuration for SNA" on page 141.

Use the following procedure to configure TCP/IP over the BLKMUX adapter:

1. Log in as root.
2. Ensure that the BLKMUX adapter is offline.
3. It is advisable to have the HOST IOCP GEN at hand when configuring the BLKMUX adapter.
4. Add a subchannel definition using the following SMIT fast path command:

```
smit blkmux_addSUBD
```

```

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

* Subchannel Set Name                [ca0]
  Description (max 30 chars)         [TCP_EXAMPLE]
* Subchannel Address                 [064]
  Number of addresses grouped together [2]
  Perform a device-end on startup?   [yes]
Local Name (Workstation)             [RS60002]
Remote Host Name                     [MVS25]
Type of emulation:                   [CLAW]
```

5. Go into the SMIT menu Attach a Cable if it is a new adapter. If you are using an existing BLKMUX adapter then go into the SMIT menu Change a Cable.

In this example we are using the adapter for both SNA Channel and TCP/IP. Thus, we went into the Change a Cable menu and added (comma separated) to the Subchannel Set Name List.

```

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

                                     [Entry Fields]
* Cable label                        [Cable_Name]
  Description (max 30 chars)         [Cable to chipB]
* Location (slot number)             [5]
* Subchannel-Set Name List (comma separated) [HCON,ca0]
```

6. Use the SMIT fast path command `smit blkmux_cfgINET` and add a block multiplexer network interface.

```

                                     Add or Change an BLKMUX Network Interface
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                     [Entry Fields]
Network Interface Name               [ca0]
Name of the Local Machine (Work-station) [RS60002]
Local System Address (dotted decimal)  [10.0.15.2]
Name of Remote Host System           [MVS25]
Remote Address (dotted decimal or hostname) [10.0.15.25]
Network Mask (hexadecimal or dotted decimal) [255.255.255.0]
Interface State                      [up]
Apply the changes to the data-base only [no]
```

7. Run `cfgmgr` to make these changes effective. In some cases it may be necessary to reboot the system.
8. Bring the adapter online, enter `smit blkmux` and select the following:

```
The BLKMUX Channel Adapter .. Diagnostic and RAS Functions.
Change / Show the online/offline status of a BLKMUX Channel Attach Adapters
```

If you bring the adapter online using SMIT and if it was successful you should see the following screen.

```
Change / Show the online/offline status of a BLKMUX Channel Attach Adapter

Pressing the "D0" key will TOGGLE the Online/Offline status

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

                                     [Entry Fields]
The Adapter Name                       cat0
Online/Offline status                   online
Online/Offline status ... force online  [no]
```

If the adapter is offline and you toggle it online, a successful toggle will display the following screen:

```
COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

Unconfiguring the adapter cat0
cat0 Defined
Reconfiguring the adapter cat0
cat0 Available
The status of adapter cat0 is online
```

9. Now bring up the Network Interface if it is not up already by entering `ifconfig ca0 up` at the AIX command prompt.

5.5 Problem Determination

This section briefly describes the necessary diagnostics to take should you encounter a problem with the BLKMUX adapter. For more details please see Chapter 10, "Guidelines to Problem Determination" on page 211.

Tips

There is a new tool `/usr/lpp/devices.mca.fe92/tools/getchanpd`, which could be useful in channel problem diagnosis.

1. Check that the channel is online.
2. Check that the adapter is available.
3. A device driver trace may be taken and analyzed.
4. Make sure that the VTAM major node is *not* active before you start the link station. The VTAM Major Node *must* be activated while the link station is in the starting state.

- If the adapter comes online, but when you start the SNA Linkstation you get the following screen, check that the unit type is set to 3791L in the IOCP GEN.

```

COMMAND STATUS

Command: failed      stdout: no      stderr: yes

Before command completion, additional instructions may appear below.

The request timed out. The system is busy or in error; try your request later.

```

The NetView display for a wrong unit type is as follows.

```

* RAPAN  D NET,E,ID=RS6KLOC
RAPAN  IST453I  ID          PARAMETER VALUE INVALID
* RAPAN  V NET,ACT,ID=RS6KLOC
RAPAN  IST097I  VARY      ACCEPTED
RAPAN  IST1132I  RS6KLOC          IS ACTIVE, TYPE = LCL SNA MAJ NOD
' RAPAN
IST1139I  ACTLINK  FOR RA6KESC          FAILED - SENSE: 081C003C
IST1045I  NODE TYPE = PU_T2
IST314I  END
RAPAN  IST1133I  RA6KESC          IS NOW INACTIVE, TYPE = PU_T2

SENSE DATA:
CATEGORY - (08) Request not executable: The requested function can't be
MODIFIER - (1C) executed, because of a permanent error condition in
BYTE 2 - (00) receiver.
BYTE 3 - (3C) Note: For VTAM sense codes, the meaning of the data
bytes 2 and 3 is dependent upon the context of the s
code.

For Request Load (Conditional) and Request Load
(Unconditional) request units:
The communication controller unit control block
does not contain a valid value for the
channel-adapter-type field, or the channel
adapter address of the controller is not
correct in NCP GEN.
For Activate Link and Deactivate Link request
units:
During activation of a channel link, the device
specified by the channel device name was found
not to have been made available by the
operating system.

```

Figure 81. NetView/390 Failure Displays for Wrong Unit Type

- If you have problems starting SNA link station and you get the failure message 0105-2912 The remote initiated a disconnect, then check that the adapter speed is set correctly for the channel in the IOCP GEN. Use the SMIT fast path command `smiit blkmux_chg` to show/change the block multiplexer speed. Select the available adapter.

```

The BLKMUX Channel Attach Adapter .. Diagnostic and RAS Functions.
Change / Show Characteristics of a BLKMUX Channel Attach Adapters.
cat0 Available 00-05 370 Parallel Channel Adapter

```

You will be presented with this screen and you can change the speed if necessary.

Change / Show characteristics of a BLKMUX Channel Attach Adapter
These changes will apply to the data-base ONLY.
They will affect active adapters only after the next IPL.

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

	[Entry Fields]
Name of this BLKMUX Channel Adapter	cat0
Slot occupied by this adapter	00-05
* Channel SPEED for this adapter	4

The valid channel speeds for this adapter are as follows:

STRM27	0x02	/* Streaming 2.7 MBytes/second	*/
STRM45	0x04	/* Streaming 4.5 MBytes/second	*/

Note: The channel speed is dependent on the mainframe's channel speed.
Coordinate with the network programmer on this matter.

Chapter 6. ESCON Adapter for SNA Channel for AIX and TCP/IP

SNA Channel for AIX is a feature of SNA Server that provides SNA DLC support for the ESCON adapter. The SNA Channel for AIX feature enables the ESCON adapter to emulate an SNA physical unit (PU) 2.1 channel-attached control unit. This enables the RISC System/6000 workstation to access a host channel, providing a point-to-point connection between the RISC System/6000 workstation and the host.

SNA Channel for AIX includes utilities to support configuration for the AIX device driver and the SNA link station.

SNA Channel for AIX, in conjunction with SNA Server for AIX and its SNA Gateway feature, can provide a high-speed link between downstream SNA devices and the host.

This chapter provides an example on how to configure an ESCON adapter for SNA Channel for AIX. Additionally, there is an example on how to configure ESCON for host TCP/IP.

6.1.1 ESCON Hardware Requirements

To install SNA Channel for AIX for the ESCON adapter, you must have the following hardware:

- ESCON Adapter Card (Feature 2756)
 - ESCON fiberoptic cabling and connectors
 - One of the following RISC System/6000 or POWERserver
 - 7012 (Models 340 and greater) and 7030, which support one adapter
 - 7013 and 7009, which support as many as two adapters
 - 7015, which supports as many as four adapters
 - 9076 (thin node), which supports one adapter
 - 9076 (wide node), which supports as many as two adapters
- Note:** RISC System/6000 workstation 500-series models also require a cooling fan (Feature 6506).
- One of the following host systems:
 - IBM ES/3090 "J" models, which support channel speeds of up to 10 MBps
 - IBM ES/9000 Model 9021, which supports channel speeds of up to 17 MBps
 - IBM ES/9000 Models 9121 and 9221, which support channel speeds of up to 10 MBps
 - IBM 9672, which supports channel speeds of up to 17 MBps

The ESCON Adapter Microcode is available internally in IBM from AIXTOOLS as the ESCON PACKAGE.

Note: Please see *SNA Server for AIX Channel Connectivity User's Guide*, SC31-8219 regarding hardware requirements of recent levels of ESCON software.

6.1.2 ESCON Software Requirements

To install SNA Channel for AIX for the ESCON adapter, you must use the following software:

- IBM AIX Version 4.1.4 or later
- SNA Server for AIX Version 3 Release 1 or later
- ESCON Channel Connectivity for AIX Version 1 Release 1, which provides adapter and device driver support for SNA Channel Connectivity.
- One of the following operating systems on the host:
 - MVS with VTAM Version 3 Release 4 or higher
 - VM with VTAM Version 3 Release 3 or higher and the following authorized program analysis reports (APARs):
 - VM45562
 - VM45886
 - VM45911
 - VSE with VTAM Version 3 Release 3 or higher

Note: Please see *SNA Server for AIX Channel Connectivity User's Guide*, SC31-8219 regarding software requirements of recent levels of ESCON software.

6.2 Installation of SNA Channel for AIX ESCON Adapter

Use the following procedure to install SNA Channel for AIX on your system:

Note

Please refer to 10.1, "SNA Profiles Maintenance" on page 211 regarding the procedure for backing up and restoring SNA profiles before installing the new software.

1. Log in with root privileges.
2. Back up any existing SNA Server for AIX profiles.
3. Ensure that SNA Server for AIX is not active.
4. Enter `smit install` and follow the path:

```
Install / Update Software
Install / Update Selectable Software (Custom Install)
Install Software Products at Latest Available Level
```
5. Identify and select INPUT device / directory for software.
6. Select and install SNA Server for AIX V3.1 if this has not already been done.
7. Select and install ESCON device drivers and ESCON Control Unit.
8. Select and install `sna.dlcchannel`.
9. Enter `smit install` and follow the path:


```
Install / Update Software
Install / Update Selectable Software (Custom Install)
Install Software Products at Latest Available Level
Install Additional Device Software
```

10. Identify and select INPUT device / directory for software.
11. Select and install devices.mca.8fc3 for ESCON Channel.
12. View the SMIT screen or smit.log and check whether the installation was successful.
13. When the installation has finished, the following products are installed.

```
sna.dlcchannel      2.1.0.1  COMMITTED  Channel Data Link Control
escon.cuu           3.2.0.1  COMMITTED  370 ESCON Control Unit Channel
devices.mca.8fc3.rte 1.1.0.2  APPLIED   ESCON Adapter (8fc3) Software
devices.mca.8fc3.diag 4.1.4.0  COMMITTED ESCON Adapter Diagnostics
```

6.3 Configuration of ESCON Adapter for SNA

This section provides the host definitions, ESCON adapter configuration and the SNA Server for AIX configuration.

6.3.1 Host Definitions for SNA Channel for AIX ESCON Connection

Please see Figure 82 on page 158, which shows the relation between VTAM and host definitions and RS/6000 definitions.

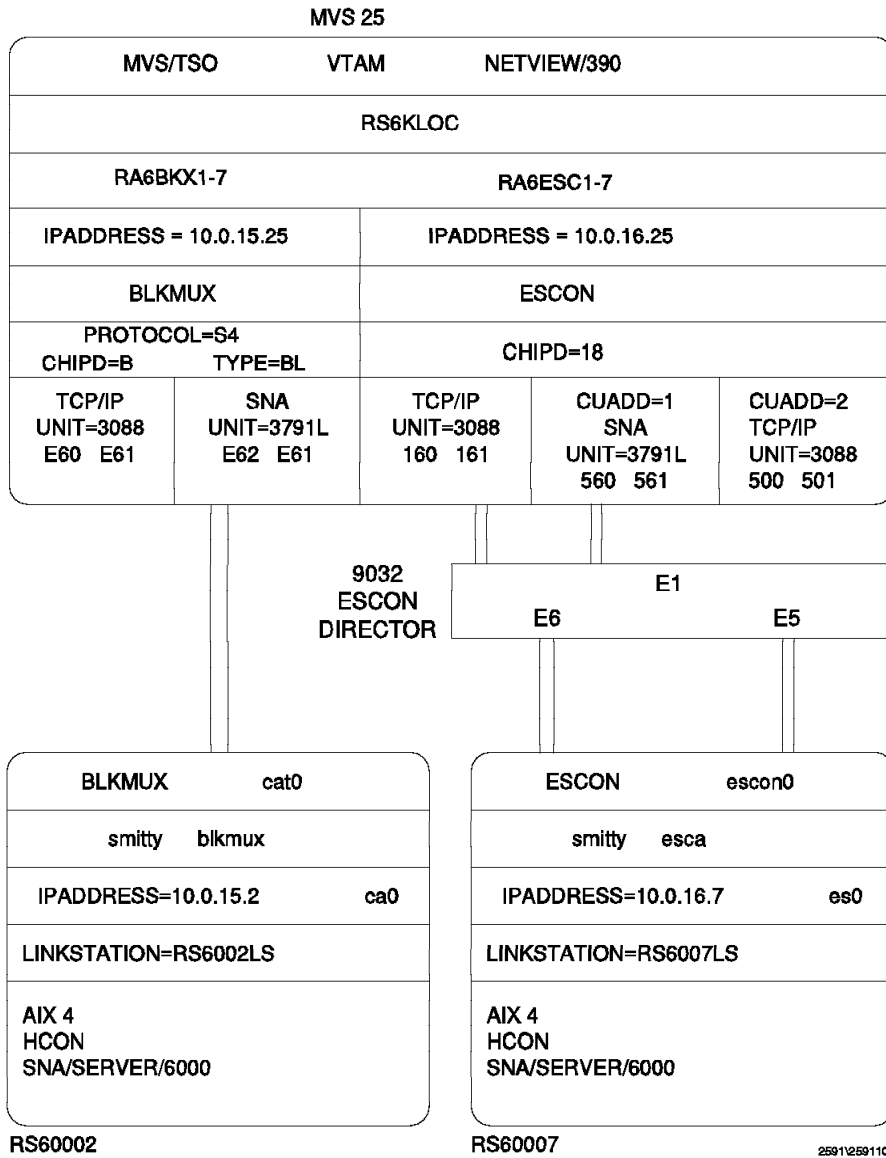


Figure 82. AIX Channel for AIX Host and RS/6000 Definition

1. The IODEVICE UNIT type is vital to the configuration of the ESCON adapter and must be coded correctly in the IOCP GEN before proceeding; otherwise, the channel will not vary ONLINE and a new IOCP GEN will have to be done.

Note: UNIT types are as follows for the different emulation types:

- For TCP/IP use UNIT=CTC in the IOCP GEN and UNIT=CLAW in the subchannel definitions.
- For CTC use UNIT=3088 in both the IOCP GEN and subchannel definitions.
- For SNA use UNIT=3791L or 3174 in the IOCP GEN and 3174-SNA in the subchannel definitions.

The IOCP definitions used for this configuration is listed below for reference:

```

*IOCP*****
      CHPID PATH=((18)),TYPE=CNC,SWITCH=E1
*IOCP*****
*IOCP 160 RS/6K ESCON sna emulation, 560 ctc / tcpip *
* must move cable between port e5 and e6 to change defs - only 1 rs6k!*
*IOCP*****
      CNTLUNIT CUNUMBR=560,UNIT=3791L,PATH=(18),
      CUADD=1,LINK=(E5),UNITADD=((60,32))
DEV560 IODEVICE UNIT=3791L,ADDRESS=(560,32),CUNUMBR=(560)
*
      CNTLUNIT CUNUMBR=160,UNIT=3088,PATH=(18),
      CUADD=1,LINK=(E6),UNITADD=((60,32))
DEV160 IODEVICE UNIT=3088,ADDRESS=(160,32),CUNUMBR=(160)
*
*IOCP*
*IOCP*
*IOCP*

```

Figure 83. MVS IOCP Definitions for ESCON

2. In the above IOCP GEN example, either SNA or TCP/IP can be run over the ESCON adapter. However, a cable move is required in the switch. If you require to run SNA and TCP/IP concurrently over the adapter, then the following IOCP GEN is advisable.

Note: For the following example, care must be taken when defining the subchannels as the CUADD values are not identical.

```

*IOCP*****
      CHPID PATH=((18)),TYPE=CNC,SWITCH=E1
*IOCP*****
*IOCP      RS/6K ESCON sna emulation *
*IOCP*****
      CNTLUNIT CUNUMBR=560,UNIT=3791L,PATH=(18),
      CUADD=1,LINK=(E5),UNITADD=((60,32))
DEV560 IODEVICE UNIT=3791L,ADDRESS=(560,32),CUNUMBR=(560)
*
      CNTLUNIT CUNUMBR=580,UNIT=3088,PATH=(18),
      CUADD=2,LINK=(E5),UNITADD=((80,32))
DEV580 IODEVICE UNIT=3088,ADDRESS=(580,32),CUNUMBR=(580)
*
*IOCP*
*IOCP*

```

Figure 84. MVS IOCP Definitions SNA & TCP/IP Concurrently

3. Please see Figure 85 on page 160, which gives the VTAM listing for an ESCON PU 2 definition.

```

RA6KLOC VBUILD TYPE=LOCAL
RA6KESC PU CUADDR=560,
           XID=YES,           PC 3274 EMULATOR
           PUTYPE=2,
           ISTATUS=ACTIVE,
           MODETAB=AMODETAB,
           DLOGMOD=M2SDLQC,
           MAXBFRU=8,
           DELAY=0,
           PACING=0,
           VPACING=0,
           USSTAB=US327X,
           SSCPFM=USSSCS,
           SECNET=NO

**
RA6KESC1 LU LOCADDR=1
RA6KESC2 LU LOCADDR=2
RA6KESC3 LU LOCADDR=3
RA6KESC4 LU LOCADDR=4
RA6KESC5 LU LOCADDR=5
RA6KESC6 LU LOCADDR=6

```

Figure 85. VTAM Definitions for ESCON PU

6.3.2 Configuration of the ESCON Adapter

This section provides the configuration steps for the ESCON adapter.

1. Use the SMIT fast path command `smit esca` to go directly to the SMIT menu for ESCON configuration.

```

                                ESCON Channel Adapter

Move cursor to desired item and press Enter.

The ESCON Channel Adapter .. Diagnostic and RAS Functions.
Subchannel Definitions
Fibre Definitions
ESCON Network Interface
Product Information

```

2. Always read the information regarding the current release under the Product Information menu. This would contain some installation notes.
3. Select the menu Subchannel Definitions.
4. Select the menu Add a Subchannel.
5. Add the subchannel definitions.

Subchannel Set Name

Subchannels may be grouped together into sets. The members of a set are connected by their name. A subchannel is uniquely identified by the set name and the local address. This name is referenced by the fiber definition, which defines the adapter by slot number.

Address (local)

The address fields define the addresses (both local and remote) by which the path is used. Usually the local and remote addresses will be the same.

Address (remote)

The remote address is the value of the UNITADD parameter on the CNTLUNIT statement in the IOCP.

Number of addresses

If this subchannel is to be used for AIX SNA, then you must specify this field as "1".

Path through switch

This field specifies the path through the fiberoptic cable that this subchannel will use to reach the remote host machine. This field comprises a three-digit HEX number, which consists of two separate parts:

The first two digits are the port number of the ESCD (switch) to which the host channel is attached.

The third hexadecimal digit is taken from the control unit macro (CUADD field) in the IOCP for the subchannel. The default value for CUADD is 0, so when it is not specified use the value "0" for the third (last) hexadecimal digit.

Type of Emulation

This field determines the type of emulation used by this subchannel. If this subchannel is to be used for AIX SNA then specify "3174-SNA" emulation.

```

                                Add a SubChannel

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

[TOP]                               [Entry Fields]
* Subchannel Set Name                [HCON]
* Address (local)                    [060]
Description (max 30 chars)          [SNA_EXAMPLE]
* Address (remote)                   [060]
Number of addresses in the group    [1]
Path through the Fibre               [E11]
Perform a device-end on startup?    [no]
Local Name (Workstation)             [RS60007]
Remote Name (390 Host)               [MVS25]
[BOTTOM]
```

6. Go into the SMIT menu for Add a Fibre Definition.

Fibre Label

This field is the unique name, which may be the one physically labeled on the fibre.

Location (slot number)

This is the Micro Channel slot number where the adapter is installed. To find out the adapter slot use the following command:

```
lsdev -C | grep escon
```

Subchannel-Set name

This field is a comma-separated list of the subchannel sets that are valid for this optical fiber connection. These Subchannel-Set names are those defined in the Subchannel definition previously.

```

Add a Fibre Definition

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

[Entry Fields]
* Fibre label [Fiber_Name]
  Description (max 30 chars) [Cable to chip18]
* Location (slot number) [5]
* Subchannel-Set Name List (comma separated) [HCON]

```

7. To verify that the device driver and hardware are installed properly, vary on the I/O device address on the host.

Note: Do not try to re-configure the ESCON adapter while the adapter is online.

6.3.3 Configuration of SNA Channel for AIX

This section provides the configuration steps for SNA Server for AIX to use the ESCON channel adapter.

1. Go into the SMIT menu to change Control Point Profile by issuing the fast path command `smit _snacpch`. We made changes as per the following screen.

```

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 [RS6007CP]
  Control Point alias [RS6007CP]
  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]

```

2. Add a SNA DLC profile by using the following SMIT fast path command:
`smit _snachannelinkmk`

```

Add Channel SNA DLC Profile

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

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

Link Recovery Parameters
  Retry interval (1-10000 seconds) [60]
  Retry limit (0 or 1-500 attempts) [20]

Comments []

```

3. Now add a SNA link station profile by using the following SMIT fast path command:
`smit _snachannelattcmk`

We recommend that the following parameters in the linkstation profile be set to "yes".

- Restart on normal deactivation?
- Restart on abnormal deactivation?

Setting these fields to "yes" will activate the RS/6000 ESCON channel link station, when the VTAM PU 2 is varied on.

```

                                Add Channel Link Station Profile

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

[TOP]                                [Entry Fields]
Profile name                          RS6007LS
Use Control Point's XID node ID?      yes
  If no, XID node ID                  [*]
* SNA DLC Profile name                 [ESCONDLC]
* Subchannel name                      [HCON]
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

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
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 normal deactivation?         yes
Restart on abnormal deactivation?       yes

Transmission Group COS Characteristics
Effective capacity                      [78643200]
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                                []

```

4. You need to add LU 2 session profile(s) to test the host connectivity. Use the SMIT fast path command `smit _snasess2mk` to add the LU 2 session profile.

```

Add LU 2 Session Profile

* Profile name                [HCON1]
  Local LU name                [HCON1]
* Local LU address (1-255)    [1]
  System services control point
  (SSCP) ID (*, 0-65535)      [*]
* Link Station Profile name    [RS6007LS]
  Network name                 []
  Remote LU name               []
  Maximum number of rows       [24]
  Maximum number of columns    [80]

```

6.3.4 Testing of ESCON SNA Channel for AIX

1. Verify the SNA profiles and do a normal update by issuing the following command:
`verifysna -U`
2. Now bring the adapter online, enter `smit esca` and select the following:

```

The ESCON Channel Adapter .. Diagnostic and RAS Functions.
Put an ESCON Channel Adapter online

```

If the ESCON configuration is correct and if you have the correct level of software, you will get a message similar to the following.

```

Running /etc/methods/ucfgescon -l escon0.
ucfgESCON: 05-018 Running unconfiguration method "/etc/methods/ucfgescu"
with args "-l escon0".
Unconfigure ran successfully
Running /etc/methods/cfgescon -l escon0. This could take some time.
Please be patient!
cfgESCON: 02-036 Running configuration method "/etc/methods/cfgescu"
with args "-l escon0".
cfgESCON: 03-064 Loading Microcode "/etc/microcode/c38f.00.00".
cfgESCON: 03-063 Loading CuTable "/etc/microcode/c38f.3174.s.00".
cfgESCON: 03-063 Loading CuTable "/etc/microcode/c38f.3174.r.00".
cfgESCON: 03-063 Loading CuTable "/etc/microcode/c38f.3174.n.00".
The adapter "escon0" has been re-configured and should be on-line.
Check the complete status using the RAS indicators panel in SMIT.

```

Note: It may be necessary in some cases to reboot RS/6000 in order to make configuration changes on ESCON effective. Please see the product information under SMIT `esca` for such cases.

3. You could also use the following command to bring the adapter online:
`cfgmgr`
4. Check to see whether the status of the SNA Major Node (RS6KLOC in our case) is inactive. Vary it off if it is active.

```

NCCF                                N E T V I E W      RAPAN SWAMY    05/22/96 20:56:58
* RAPAN      D NET,ID=RS6KLOC
  RAPAN      IST453I ID      PARAMETER VALUE INVALID
-----

```

5. Now start SNA Server for AIX with the command `sna -start`.
6. Ensure that the SNA ESCON channel link station is in a starting state before you activate the VTAM major node.


```
rs6007:/ > sna -d 1
Link      Adjacent   Node   Device   # of local  In
station   CP name    type   name     sessions   use
-----
RS6007LS                escon   Starting          0 No
```

7. Activate the SNA major node RS6KLOC.

```
NCCF          N E T V I E W   RAPAN SWAMY   05/22/96 21:03
* RAPAN      ACT RS6KLOC
C RAPAN      VARY NET,ACT,ID=RS6KLOC
  RAPAN      IST097I  VARY   ACCEPTED
  RAPAN      IST1132I  RS6KLOC           IS ACTIVE, TYPE = LCL SNA MAJ NOD
' RAPAN
  RAPAN      IST1086I  APPN CONNECTION FOR USIBMRA.RS6007CP IS ACTIVE - T
  21
' RAPAN
  RAPAN      IST1132I  RA6KESC           IS ACTIVE, TYPE = PU_T2.1
  RAPAN      IST1096I  CP-CP SESSIONS WITH USIBMRA.RS6007CP ACTIVATED
```

As seen in the above screen, activating the SNA major node activates the SNA link station as well, which is confirmed by the following screen.

```
rs6007:/ > sna -d 1
Link      Adjacent   Node   Device   # of local  I
station   CP name    type   name     sessions   u
-----
RS6007LS  USIBMRA.RAP  NN   escon   Active          4 Ye
```

8. Please see Figure 86, which shows a NetView display of the SNA major node.

```
* RAPAN      D NET,E,ID=RS6KLOC
  RAPAN      IST097I  DISPLAY ACCEPTED
' RAPAN
IST075I  NAME = RS6KLOC           , TYPE = LCL SNA MAJ NODE
IST486I  STATUS= ACTIV           , DESIRED STATE= ACTIV
IST084I  NETWORK NODES:
IST089I  RA6KESC  TYPE = PHYSICAL UNIT   , ACTIV--L-- ,CUA=0560
IST089I  RA6KESC1 TYPE = LOGICAL UNIT   , ACT/S
IST089I  RA6KESC2 TYPE = LOGICAL UNIT   , ACTIV
IST089I  RA6KESC3 TYPE = LOGICAL UNIT   , NEVAC
IST089I  RA6KESC4 TYPE = LOGICAL UNIT   , NEVAC
IST089I  RA6KESC5 TYPE = LOGICAL UNIT   , NEVAC
IST089I  RA6KESC6 TYPE = LOGICAL UNIT   , NEVAC
IST089I  RA6KESC7 TYPE = LOGICAL UNIT   , NEVAC
IST314I  END
```

Figure 86. NetView Display of Major Node for ESCON

9. Display the status of LU 2 sessions by issuing the command `sna -d s123`. We got the following message:

```
# sna -d s123
Local LU Session Session Local Host Link
ID type type profile name LU addr SSCP ID station State
-----
2 2 SSCP-LU HCON2 2 25 RS6007LS Active
1 2 SSCP-LU HCON1 1 25 RS6007LS Active
```

10. Once you have active LU 2 sessions, you can start the HCON session with the command `e789 a`. It is assumed that you are logged on as a valid HCON user with the correct profile for session a.

11. Please see Figure 87 on page 166, which shows the NetView display for the ESCON PU.

```
* RAPAN    D NET,E,ID=RA6KESC1
RAPAN     IST097I  DISPLAY  ACCEPTED
' RAPAN
IST075I   NAME = USIBMRA.RA6KESC1 , TYPE = LOGICAL UNIT
IST486I   STATUS= ACT/S           , DESIRED STATE= ACTIV
IST977I   MDLTAB=***NA*** ASLTAB=***NA***
IST861I   MODETAB=AMODETAB USSTAB=US327X LOGTAB=***NA***
IST934I   DLOGMOD=M2SDLCQ USS LANGTAB=***NA***
IST597I   CAPABILITY-PLU INHIBITED,SLU ENABLED ,SESSION LIMIT 00000001
IST136I   LOCAL SNA MAJOR NODE = RS6KLOC
IST135I   PHYSICAL UNIT = RA6KESC , CUA = 0560
IST1131I  DEVICE = LU
IST654I   I/O TRACE = OFF, BUFFER TRACE = OFF
IST171I   ACTIVE SESSIONS = 0000000001, SESSION REQUESTS = 0000000000
IST206I   SESSIONS:
IST634I   NAME      STATUS      SID      SEND REC V R TP NETID
IST635I   RAPAT03  ACTIV-P    F88F0164A0DD6BDD 0006 0014      USIBMRA
IST314I   END
```

Figure 87. NetView Display for ESCON PU

6.3.5 Display of ESCON Adapter Statistics

This section shows the statistics screen for the ESCON adapter. To display the ESCON adapter statistics, select the following from the SMIT menu, which is obtained by entering `smit esca`.

```
The ESCON Channel Adapter .. Diagnostic and RAS Functions.
Display statistics for an ESCON Channel Adapter
```

You will get the following screen and will need to fill in the fields as highlighted below:

```
Display statistics for an ESCON Channel Adapter

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

[Entry Fields]
* The Adapter name ... Press List to choose esca0
Do you want performance indicators ? yes
Do you want broad throughput statistics ? yes
Do you want detailed throughput statistics yes
(including subchannel statistics)?
Do you want all of the above statistics ? yes
```

From the above selection, we got the following output.

Global parameters for all ESCON Adapters, running the Control Unit image:
 Control Block Anchor Address = 1adb3b0
 Device Driver Version Number is 954411631
 Debug Mask is 0x 0
 kproc information .. pid = 51469(0xC90D). Timer Interval 5 seconds

Mbuf pools exhausted 0 times

Performance Numbers for Adapter esca0 (device #390001)
 Uptime = 357890 seconds

Interrupts			Off level Handler			
Adapter	WatchDog	Timer	Requests	Schedule	Punted	Spun
1997	0	0	1997	1997	0	1

read requests		write requests	
kernel	user	kernel	user
128	0	143	0

Write Requests waiting for buffers 0

Throughput statistics for adapter esca0 (device #390001)

Total bytes transferred		Throughput(bytes/sec)	
In	Out	Average	Peak
46547	3249	13	487

Histogram of transfer frequency by size of transfer (* = 9 transfers)
 from 0 - 65535 bytes(max allowed) in steps of 4K(4096) bytes.

bytes	transfer histogram	frequency
0	*****	271
4096		0
8192		0
12288		0
16384		0
20480		0
24576		0
28672		0
32768		0
36864		0
40960		0
45056		0
49152		0
53248		0
57344		0
61440		0

Figure 88 (Part 1 of 2). ESCON Adapter Statistics

Histogram of transfer frequency by size of transfer (* = 7 transfers)
 from 0 - 4095 bytes in steps of 100 bytes.

bytes	transfer histogram	frequency
0	*****	207
100	***	14
200		0
300	*	2
400	*	3
500	**	8
600	*	1
700	*	4
800		0
900	*	4
1000	*****	28
1100		0
1200		0
1300		0
1400		0
1500		0
1600		0
1700		0
1800		0
1900		0
2000		0
2100		0
2200		0
2300		0
2400		0
2500		0
2600		0
2700		0
2800		0
2900		0
3000		0
3100		0
3200		0
3300		0
3400		0
3500		0
3600		0
3700		0
3800		0
3900		0
4000		0

Throughput statistics for subchannels on adapter esca0 (device #390001)
 There are 1 active subchannel groups

su ch ad	g r p	# times suspe- nded	Total bytes transferred		Throughput(bytes/sec)	
			in	out	Average	Peak
60	1	0	46547	3249	13	487

Figure 88 (Part 2 of 2). ESCON Adapter Statistics

6.4 Configuration of the ESCON Adapter for TCP/IP

This section of the chapter shows the steps necessary to configure TCP/IP on the ESCON adapter. The descriptions of the fields are explained in 6.3, "Configuration of ESCON Adapter for SNA" on page 157.

Use the following procedure to configure TCP/IP over the ESCON adapter:

1. Log in with root privileges.
2. Ensure that any ESCON subchannels are stopped.
3. Ensure that the ESCON adapter is offline. Use the following command to put the ESCON adapter offline:

```
/usr/bin/OffEscon 'escon0'
```
4. It is advisable to have the HOST IOCP GEN at hand when configuring the ESCON adapter.
5. Add the subchannel definitions.
6. Use the SMIT fast path command `smit escaaddSubd` to add an ESCON subchannel.
7. Enter fields as per the following screen.

```

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

                                     [Entry Fields]
* Subchannel Set Name                 [es0]
* Address (local)                     [064]
  Description (max 30 chars)          [TCP_EXAMPLE]
* Address (remote)                    [064]
  Number of addresses in the group    [2]
  Path through the Fibre              [E12]
  Perform a device-end on startup?    [yes]
  Local Name (Workstation)            [RS60007]
  Remote Name (390 Host)              [MVS25]
  Type of emulation:                  [CLAW]
```

8. Add the Fibre definition if it is a new adapter; if you have an existing ESCON adapter, then CHANGE the Fibre definition.

In this example, we are using the adapter for both SNA Channel and TCP/IP (hence the CHANGE screen and the comma separated Subchannel-Set names).

```

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

                                     [Entry Fields]
* Fibre label                         [Fiber_Name]
  Description (max 30 chars)          [Cable to chip18]
* Location (slot number)              [5]
* Subchannel-Set Name List (comma separated) [HCON,es0]
```

9. Add the network interface.

```

                                Add a Network Interface

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

                                [Entry Fields]
Network Interface Name           [es0]
Name of the Local Machine (Work-station) [RS60007]
Local Machine Address (dotted decimal)  [10.0.16.7]
Name of the Remote Machine (390 Host)    [MVS25]
Remote Address (dotted decimal or hostname) [10.0.16.25]
Network Mask (hexadecimal or dotted decimal) [255.255.255.0]
State of Interface?               [up]

```

10. Now bring the adapter online, enter smit esca and select the following:

```

The ESCON Channel Adapter .. Diagnostic and RAS Functions.
Put an ESCON Channel Adapter online

```

If you bring the adapter online using SMIT, when it is successful you should see the following screen.

```

Running /etc/methods/ucfgescon -l escon0.
ucfgESCON: 05-018 Running unconfiguration method "/etc/methods/ucfgescu"
with args "-l escon0".
Unconfigure ran successfully
Running /etc/methods/cfgescon -l escon0. This could take some time.
Please be patient!
cfgESCON: 02-036 Running configuration method "/etc/methods/cfgescu"
with args "-l escon0".
cfgESCON: 03-064 Loading Microcode "/etc/microcode/c38f.00.00".
cfgESCON: 03-063 Loading CuTable "/etc/microcode/c38f.CLAW.s.00".
cfgESCON: 03-063 Loading CuTable "/etc/microcode/c38f.CLAW.r.00".
cfgESCON: 03-063 Loading CuTable "/etc/microcode/c38f.CLAW.n.00".
cfgESCON: 03-063 Loading CuTable "/etc/microcode/c38f.3174.s.00".
cfgESCON: 03-063 Loading CuTable "/etc/microcode/c38f.3174.r.00".
cfgESCON: 03-063 Loading CuTable "/etc/microcode/c38f.3174.n.00".
The adapter "escon0" has been re-configured and should be on-line.
Check the complete status using the RAS indicators panel in SMIT.

```

11. Now bring up the Network Interface if it is not up already by entering ifconfig es0 up from the command prompt.

Note: It may be necessary in some cases to reboot RS/6000 in order to make configuration changes on ESCON effective. Please see the product information under SMIT esca for such cases.

Chapter 7. SNA Server for AIX and SNA Gateway

This chapter provides a brief introduction to SNA Server for AIX V3.1. This chapter also provides a discussion about some of the new features available in SNA Gateway V3.1.

7.1 Installation of SNA Server for AIX, SNA Gateway and HCON

SNA Server for AIX V3.1, SNA Gateway V3.1 and HCON V2.1.3 have the following prerequisite:

- AIX V4.1.4 or later

Please refer to the document *SNA Server for AIX User's Guide*, SC31-8211 and *SNA Server for AIX Gateway User's Guide*, SC31-8216 regarding the full details of hardware, software and memory requirements.

Note

Please see 10.1, "SNA Profiles Maintenance" on page 211 regarding the procedure to backing up and restoring the SNA profiles, before installing the new software.

1. To install SNA Server for AIX, start the SMIT installation utility by issuing the following command:

```
smitty install
```

2. Follow the following path in SMIT:

```
Install / Update Software
  Install / Update Selectable Software (Custom Install)
    Install Software Products at Latest Level
      Install New Software Products at Latest Level
```

3. Identify and select the INPUT device / directory for software.
4. Select the filesets for SNA Server for AIX, and SNA Gateway and messages from the install media and install them.
5. Select the filesets for HCON and install them.
6. View the SMIT screen or smit.log and check that the installation was successful.
7. If the installation was successful, you will have the following products installed:

```
  sna.rte                3.1.1.0  COMMITTED  SNA Server Base (LU1, LU2
  sna.lu0                 3.1.1.0  COMMITTED  Logical Unit 0 (LU0)
  sna.msg.en_US.rte      3.1.1.0  COMMITTED  SNA Base Messages - U.S.English
  sna.gw                  3.1.1.0  COMMITTED  SNA Gateway
  hcon.rte                2.1.1.0  COMMITTED  3270 Host Connection Program
  hcon.msg.en_US         2.1.0.0  COMMITTED  3270 Host Connection Program
  hcon.terminfo.ibm.data 2.1.0.0  COMMITTED  3270 Host Connection Program
```

7.2 SNA Gateway V3.1

SNA Gateway supports communication between one or more host physical units (PUs) and one or more downstream workstations.

SNA Gateway provides the following benefits:

- Downstream workstations can access multiple hosts through a single link to the Gateway.
- A single host PU and adapter can communicate with LUs on multiple downstream workstations through the Gateway.
- All downstream workstations can use nearly identical configurations.
- Downstream workstation LUs can access alternative host connections in the event of a link outage to a host.
- Several downstream workstations can share the same group of host LUs.
- SNA Gateway supports the same DLC types and transmission protocols as SNA Server for AIX for both upstream and downstream links.

7.2.1 Minimized Link Usage Feature

Minimized link usage is a new feature of SNA Gateway V3.1.

Minimized Link Usage Enabled

For downstream LUs that connect with the associated hosts, Gateway presents the user with a prompt for connection. Once a downstream user presses Enter, Gateway activates a link and maintains SSCP-LU sessions for the associated host LUs. The first host screen (MSG10) is sent to the downstream user.

For downstream LUs referencing host groups that in turn reference multiple host definitions, Gateway first checks whether any host LUs are available on already active host links. If none available, Gateway tries to start a host link associated with the first host definition in the host group referencing an inactive link.

If a downstream LU attempts to connect via the prompt but no host LUs available or all link activation requests fail, the LU goes into an "Active - waiting for a partner" state. While waiting for a downstream user to press Enter on the prompt screen, the LU is in an "Active - waiting for user connection" state.

Time-outs of idle LUs occur if and only if the configured time-out period expires. If time-out is enabled for a downstream LU that is connected with a host LU and time-out occurs, no SSCP-LU session is re-established by the Gateway on the associated host link. This allows SNA Server for AIX to time out the associated link if enabled.

Minimized Link Usage Disabled

Gateway never presents the user with a prompt for connection if the user is connected over the associated link. The connection is made directly. No LUs defined on the associated host link are available to the Gateway unless the link is active, nor does Gateway ever attempt to start the associated link.

If no host LUs are available for a given downstream LU to connect to, the downstream LU goes into an "Active - waiting for partner" state. Gateway maintains SSCP-LU sessions for the host LUs defined on

that host, even if no downstream LUs are ready to connect. Time-outs of idle LUs occur if and only if the configured time-out period expires and another downstream LU is waiting to connect, which is configured to connect to the associated host LU. If time-out is enabled for a downstream LU that is connected with a host LU and a time-out occurs, an SSCP-LU session is re-established by the Gateway on the associated host link. This prevents the SNA Server for AIX from timing-out the associated link if so enabled.

Configuration Tips

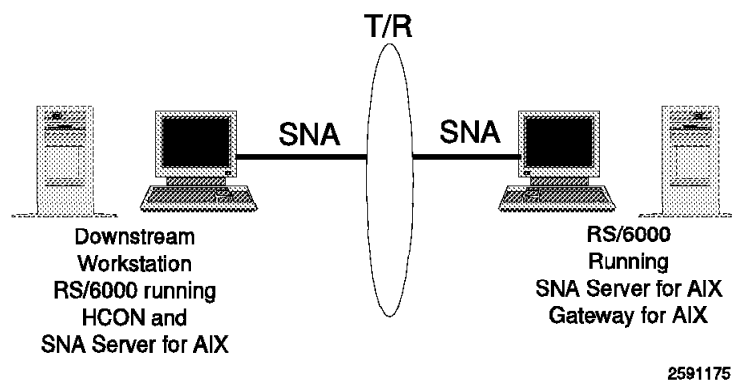
To reap full benefit of this option, the applicable hosts, host groups and downstream LUs should be configured with time-out enabled and the associated host link station should be configured as a calling link station, with time-out enabled, and "Activate link station" at SNA startup" set to "no". In host group definitions where minimize-usage host definitions and non-minimize-usage host definitions appear, place the minimize-usage host definitions after the non minimize-usage host definitions.

7.3 Configuration of SNA Gateway

This section contains the configuration steps for SNA Server for AIX using an SDLC link, SNA connection between the gateway and the downstream workstation and configuration steps for the downstream workstation.

RS600012 will be used to connect to a host PU type 2 using an SDLC link. RS600020 will have an SNA connection to RS600012. RS600012 will be used as the gateway to the host and RS600020 will function as a downstream workstation.

It is assumed that you do not have any user-defined SNA profiles at this point. Figure 89 shows the network used in this example. The SDLC link between the host and the gateway is not shown in this diagram, though it exists.



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Figure 89. SNA Gateway Example

7.3.1 SNA Server for AIX Configuration for an SDLC Connection to Host

This section describes how to configure SNA Server for AIX V3.1 on RS600012 for a host connection.

7.3.1.1 Control Point Definition

We used the following command to configure the control point on RS600012:

```
chsnaobj -t'control_pt' -e 'USIBMRA' -a 'RS12' node_cp
```

7.3.1.2 SNA DLC Configuration

We added an SNA DLC EIA232 on RS600012 with the following command:

```
mksnaobj -t'sna_dlc_eia232d' RS12S
```

7.3.1.3 Configuration of Link Station

We used the following command to add a link station on RS600012:

```
mksnaobj -t'link_station' -w'eia232d' -y 'RS12S'  
-f 'yes' -o '5' -b '193' RS12S
```

Note: The time-out is enabled and set to 5 minutes.
Local secondary station address is 193 as per VTAM listing.
Initiate call when link station is activated? is set to "yes".
Activate link station at SNA start up? is set to "no".

7.3.2 SNA Link Between Gateway and Downstream

SNA link needs to be configured and established between the Gateway and the downstream workstation.

7.3.2.1 Link Station Configuration to RS600020

Add a token-ring link station on RS600012 to call and connect to RS600020. We used the following command to add a link station profile:

```
mksnaobj -t'link_station' -w'token_ring' -y 'RS12'  
-d '10005AC95035' TORS20
```

The name of this link station is TORS20.
RS12 is the name of an existing SNA token-ring DLC.
10005AC95035 is the token-ring address for RS600020.

7.3.2.2 Link Station Configuration on RS600020

Add a token-ring link station on RS600020 to receive calls from RS600012. We used the following command to add a link station profile:

```
mksnaobj -t'link_station' -w'token_ring' -y 'RS20'  
-d '10005AB14FCB' -o 'no' TORS12
```

The name of this link station is TORS12.
RS20 is the name of an existing SNA token-ring DLC.
10005AB14FCB is the token-ring address for RS600020.

7.3.2.3 Configuration of LU 2 Session on Downstream Workstation

We used the following command on the downstream workstation to configure an LU 2:

```
mksnaobj -t'session' -u'lu2' -A '6' -a 'TORS12' DS6
```

The name of this LU 2 profile is DS6. This LU 2 will use the link station TORS12, which is the link station from the Gateway to the downstream workstation.

7.3.3 SNA Gateway Configuration

This section describes the configuration steps for SNA Gateway with minimized-link enabled.

7.3.3.1 Gateway Host Definition

Gateway Host definition profiles are used to identify a link station to a particular host and the LU addresses available for Gateway connections to that host. The minimized link usage for the host link is either enabled or disabled in this profile.

Use the SMIT fast path command `smit _snahgpoolmk` to get to this screen.

```

                                     Add Gateway Host Definition Profile
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[TOP]                               [Entry Fields]
* Profile name                        [GW1]
* Host Link Station Profile name      [RS12S]
Minimize link usage?                  yes   1
  1) Pool class name                  []
    First LU address in range         [0]
    Last LU address in range          [0]
    Inactivity time-out (0-1000 minutes) [0]
  2) Pool class name                  []
    First LU address in range         [0]
    Last LU address in range          [0]
[MORE...195]
```

Note: **1** Minimized link usage is a new feature in SNA Gateway V3.1. Selecting a value of "yes" in this field enables this feature. Selecting a value of "no" disables minimized link usage.

7.3.3.2 Gateway Host Group Definition

This definition is used to enable a group of host link stations and LUs to be used by one or more workstation LUs.

Add a Gateway host definition profile as per following screen. Use the SMIT fast path `smit _snahostgr` to get this screen.

```

                                Add Gateway LU Host Group Profile

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

[TOP]                                [Entry Fields]
* Profile name                        [HG1]
  LU type                              [1u2]
  1) Gateway Host Definition Profile name [GW1]
     LU pooling                         dedicated 1
     If pooled, Pool class name         []
     If dedicated,
       Local LU address as defined at host [6]
       Inactivity time-out (0-1000 minutes) [0]

  2) Gateway Host Definition Profile name []
     LU pooling                         pooled
     If pooled, Pool class name         []
     If dedicated,
       Local LU address as defined at host [1]
       Inactivity time-out (0-1000 minutes) [5] 2

[MORE...91]

```

Note:

1 We use dedicated LUs in this example. The local LU address is the LOCADDR of the LU defined as per VTAM definition.

2 This value is used along with the downstream workstation profile to determine the LU timeout.

7.3.4 Downstream Workstation LU Definition

You now need to configure the Gateway Downstream definition. This profile defines the link station over which the communication between the gateway and the downstream linkstation will take place. This is defined on the gateway.

```

                                Add Gateway Downstream Workstation LU Definition Profile

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

                                [Entry Fields]
* Profile name                    [DWS1] 1
  Downstream Link Station Profile name [TORS20] 2
  Downstream workstation PU name      [RS20] 3
* Downstream LU address             [6] 4
  Automatic logoff due to inactivity? yes 5
  Gateway LU Host Group Profile name [HG1] 6

  Comments                          []

```

Note:

1 DWS1 is the name of this profile.

2 TORS20 is the name of the calling link station profile to the downstream workstation RS600020.

3 RS20 is the name of the control point for the downstream workstation RS600020.

4 This is the LOCADDR for the downstream workstation.

5 A value of "yes" in this field specifies automatic termination of inactive sessions that use this LU. In order for the time-out to occur, you must enter "yes" in this field and specify a nonzero value in the "Inactivity time-out" field of the Gateway LU Host Group Profile (for a dedicated host LU) or the Gateway Host Definition Profile (for an LU pool class).

6 Name of the Gateway LU host group defined previously.

7.3.4.1 Testing of SNA Gateway Configuration

1. Start SNA Server for AIX on RS600020 by the command `sna -s`.
2. Start the listening link station on RS600020 by the command `sna -s 1 -p TPRS12`.
3. Start SNA Server for AIX on RS600012 by the command `sna -s`.
4. Start the link station TORS20 on RS600012 by the command `sna -s 1 -p TORS20`.
5. Check the connectivity on the downstream workstation RS600020.

```
rs600020:/ > sna -d 1
  Link      Adjacent      Node      Device      # of local  In
  station   CP name      type      name      State      sessions  use
-----
TORS12     USIBMRA.RS12  EN      tok0      Active      1      Yes
```

6. Check the connectivity on the Gateway RS600012.

```
rs600012:/ > sna -d 1
  Link      Adjacent      Node      Device      # of local  In
  station   CP name      type      name      State      sessions  use
-----
TORS20     USIBMRA.RS20  EN      tok0      Active      0      Yes
```

The host link from the Gateway is not active at this time. We will show how that is activated by a request from downstream workstation.

7. Check the status of the Gateway by the command shown below:

```
rs600012:/ > sna -d gw -o long -l TORS20
*****
          Gateway Information
*****
Number of gateway Link Stations          1

1>Configured Link Station                TORS20
   Active Link Station                   TORS20
   Node Type                             Workstation
   Control Point Name                    USIBMRA.RS20
   State                                  Active
   Maximum BTU size on the link          4046
   Total gateway LUs on this link        1

1.1>LU Address                           6 (0x06)
   State                                  Not Active
```

8. Start the HCON emulator on RS600020 by the command `e789 a`. We got the following screen.

```
IBM AIX SNA GATEWAY/6000
```

```
PRESS ENTER TO START A HOST CONNECTION
```

9. Display the LU 2 session on RS600020 at this time.

```
rs600020:/ > sna -d s123
Local LU Session      Session      Local  Host      Link
ID   type type      profile name  LU addr SSCP ID  station  Status
-----
1    2   SSCP-LU DS6                6      0      TORS12  Active
```

10. Display the status of the Gateway at this point.

```
rs600012:/ > sna -d gw -o long -l TORS20
*****
Gateway Information
*****
Number of gateway Link Stations      1

1>Configured Link Station            TORS20
Active Link Station                  TORS20
Node Type                            Workstation
Control Point Name                   USIBMRA.RS20
State                                 Active
Maximum BTU size on the link         4046
Total gateway LUs on this link       1

1.1>LU Address                       6 (0x06)
State                                 Active - Waiting for user connection
```

11. When we pressed Enter, we got the MSG10 screen.

12. With an active HCON session, display the status of SNA Gateway.

```
rs600012:/ > sna -d gw -o long -l TORS20
*****
Gateway Information
*****
Number of gateway Link Stations      1

1>Configured Link Station            TORS20
Active Link Station                  TORS20
Node Type                            Workstation
Control Point Name                   USIBMRA.RS20
State                                 Active
Maximum BTU size on the link         4046
Total gateway LUs on this link       1

1.1>LU Address                       6 (0x06)
State                                 Active - LU Enabled
Connected To
Link Station (Config/Active)         (RS12S/RS12S)
Control Point Name                   USIBMRA.RAP
LU Address                           6 (0x06)
```

13. We found that if the emulator screen is inactive for more than 5 minutes (as configured in this example), the session times out.

7.3.5 VTAM Listing of SDLC Link

```

*****
*          LINE MACRO SPECIFICATION          SDLC LINK 175  B. NUSBAUM          *
*****
L07175  LINE ADDRESS=(175,FULL),  FULL DUPLEX                               *
          ANS=CONTINUE,           DON'T BREAK CROSS DOMAIN SESSIONS        *
          ISTATUS=INACTIVE,                                               *
          DUPLEX=FULL,             RTS ALWAYS HIGH                         *
          OWNER=RAP,              SUBAREA 25                               *
          SPEED=9600
*****
*          PU/LU SPECIFICATIONS FOR 1STH PU          *
*****
P07175A PU ADDR=C1,              3270 ADDRESS='C' (EBCDIC)          *
          MAXDATA=521,           MAXIMUM AMOUNT OF DATA          *
          MAXOUT=7,              MAX SDLC FRAMES BEFORE RESPONSE  *
          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                   *
*
T07175A0 LU LOCADDR=0
T07175A1 LU LOCADDR=2,          *
          MODETAB=MODNDM12,      *
          DLOGMOD=AIXLGMD1
T07175A2 LU LOCADDR=3
T07175A3 LU LOCADDR=4
T07175A4 LU LOCADDR=5
T07175A5 LU LOCADDR=6,USSTAB=US327X,SSCPFM=USSSCS
T07175A6 LU LOCADDR=7,USSTAB=US327X,SSCPFM=USSSCS
T07175A7 LU LOCADDR=8,USSTAB=US327X,SSCPFM=USSSCS
T07175A8 LU LOCADDR=9,USSTAB=US327X,SSCPFM=USSSCS

```

7.3.6 NetView Display of SDLC PU

```
NCCF                                N E T V I E W    RAPAN SWAMY    05/22/96 02:08:26
* RAPAN    D NET,ID=P07175A,E
  RAPAN    IST097I DISPLAY ACCEPTED
' RAPAN
IST075I NAME = P07175A                , TYPE = PU_T2.1
IST486I STATUS= ACTIV--L--, DESIRED STATE= ACTIV
IST1043I CP NAME = RS12                , CP NETID = USIBMRA , DYNAMIC LU = YES
IST1105I RESOURCE STATUS TGN CP-CP TG CHARACTERISTICS
IST1106I P07175A AC/R    21 YES    982D0000000000000000000017100808080
IST1482I HPR = YES - OVERRIDE = N/A - CONNECTION = NO
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 T07175A1 INACT    T07175A2 INACT    T07175A3 NEVAC
IST080I T07175A4 NEVAC    T07175A5 ACTIV    T07175A6 INACT
IST080I T07175A7 NEVAC    T07175A8 NEVAC
IST080I RS12    ACT/S----Y
IST314I END
-----
```


7.3.7 Listing of SNA Profiles for the Gateway

```
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    = "RS12"
    control_pt_name          = "RS12"
    control_pt_node_type     = appn_end_node
    max_cached_trees         = 500
    max_nodes_in_topology_database = 500
    route_addition_resistance = 128
    comments                 = ""

link_station_token_ring:
    prof_name                = "TORS20"
    use_control_pt_xid       = yes
    xid_node_id              = "*"
    sna_dlc_profile_name     = "AS4A"
    stop_on_inactivity       = no
    time_out_value           = 0
    LU_registration_supported = no
    LU_registration_profile_name = ""
    link_tracing             = no
    trace_format              = long
    access_routing_type      = link_address
    remote_link_name         = ""
    remote_link_address      = 0x10005ac95035
    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 = no
    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 = no
    restart_on_abnormal_deactivation = no
```

```

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 = ""

link_station_eia232d:
  prof_name = "RS12S"
  use_control_pt_xid = yes
  xid_node_id = "*"
  sna_dlc_profile_name = "RS12S"
  stop_on_inactivity = yes
  time_out_value = 5
  LU_registration_supported = no
  LU_registration_profile_name = ""
  link_tracing = no
  trace_format = long
  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 = no
  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 = no
  restart_on_abnormal_deactivation = no
  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_token_ring:
  prof_name = "RS12"
  datalink_device_name = "tok0"
  force_timeout = 120
  user_defined_max_i_field = no
  max_i_field_length = 30729
  max_active_link_stations = 100
  num_reserved_inbound_activation = 0
  num_reserved_outbound_activation = 0
  transmit_window_count = 127

```

```

dynamic_window_increment = 1
retransmit_count = 8
receive_window_count = 1
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 = no
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
comments = ""

sna_dlc_eia232d:
  prof_name = "RS12S"
  data_link_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 = 20
  comments = ""

dwnstrm_lu:
  prof_name = "DWS1"
  downstream_link_station_prof_name = "TORS20"

```

```

downstream_PU_name           = "RS20"
downstream_lu_address        = 6
auto_logoff                  = yes
gateway_host_prof_name       = "HG1"
comments                     = ""

glhostgrp:
  prof_name                   = "HG1"
  lu_type                     = lu2
  comments                    = ""
  gateway_host_definition     = 1
  ghost_def_prof_name         = "GW1"
  lu_pooling                  = dedicated
  pool_class_name             = ""
  host_lu_address             = 6
  inactivity_timeout         = 5

ghostdef:
  prof_name                   = "GW1"
  host_link_station_prof_name = "RS12S"
  minimize_link_usage         = yes
  comments                    = ""

```

7.3.8 Listing of SNA Profiles of Downstream Workstation

```

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       = "RS20"
  control_pt_name             = "RS20"
  control_pt_node_type        = appn_end_node
  max_cached_trees            = 500
  max_nodes_in_topology_database = 500
  route_addition_resistance   = 128
  comments                    = ""

session_lu2:
  prof_name                   = "DS6"
  link_station_profile_name    = "TORS12"
  local_lu_name               = ""
  network_name                = ""
  remote_lu_name              = ""

```

```

        comments = ""
        local_lu_address = 6
        sscp_id = *
        max_rows = 24
        max_columns = 80
        comments = ""

link_station_token_ring:
    prof_name = "TORS12"
    use_control_pt_xid = yes
    xid_node_id = "*"
    sna_dlc_profile_name = "RS20"
    stop_on_inactivity = no
    time_out_value = 0
    LU_registration_supported = no
    LU_registration_profile_name = ""
    link_tracing = no
    trace_format = long
    access_routing_type = link_address
    remote_link_name = ""
    remote_link_address = 0x10005ab14fcb
    remote_sap = 0x04
    call_out_on_activation = no
    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 = no
    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 = no
    restart_on_abnormal_deactivation = no
    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 = "RS20"
    datalink_device_name = "tok0"
    force_timeout = 120
    user_defined_max_i_field = no
    max_i_field_length = 30729
    max_active_link_stations = 100
    num_reserved_inbound_activation = 0
    num_reserved_outbound_activation = 0
    transmit_window_count = 127
    dynamic_window_increment = 1
    retransmit_count = 8

```

```

receive_window_count      = 1
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
comments                  = ""

```

Chapter 8. Network Management

We use NetView Service Point in this chapter to communicate with Host NetView.

The AIX NetView Service Point V1.2.1 has been updated to work with SNA Server for AIX V3.1. This refresh does not work with SNA Services/6000 V1.

The Host Data Facility that allows applications to transfer files between the AIX NetView Service Point and the host CICS/DDM facility has been removed.

The SSCP-PU sessions can then be started on any of the link stations active at that time. The factor deciding which link station is used is the SSCP ID specified in the Service Point Profile Summary. Note that the same link station might be used for either an MDS session or an SSCP-PU session.

The Service Point refresh requires few SNA profiles. The user no longer needs to provide any LU definitions for the Service Point.

AIX NetView Service Point V1.2.2 has the following prerequisites:

- NetView V1.3 or later when using SSCP-PU transport from the Service Point
- NetView V2.3 or later when using MDS transport from the Service Point
- AIX V4.1.4 (or later)
- SNA Server for AIX V3.1 (or later)

The AIX NetView Service Point V1.2.2 is much simpler to set up than V1.2. For our test we used a token-ring and only needed the following four SNA profiles:

- SNA Node Profile
- Control Point Profile
- Token Ring SNA DLC
- Token Ring Link Station

Before SNA Server for AIX profiles are configured you will need the VTAM definitions. The example in this section uses a token-ring connection to the host.

To establish MDS LU 6.2 sessions with the host, you must ensure that independent LUs and XIDs for these sessions are defined at VTAM, as shown in Figure 90 on page 188.

```

*** RA60012 IS FOR RA600012
RA6RS12 VBUILD MAXGRP=10,
          MAXNO=18,
          TYPE=SWNET
RA60012 PU  ADDR=13,
          CPNAME=RA6012CP,
          MODETAB=AMODETAB,
          PUTYPE=2,
          MAXPATH=2,
          MAXDATA=265,
          MAXOUT=7,
          PACING=7,
          ISTATUS=ACTIVE,
          IRETRY=NO,
          DISCNT=NO,

RA600122 LU  LOCADDR=2,USSTAB=US327X,SSCPFM=USSSCS,MODETAB=AMODETAB,
          DLOGMOD=M2SDLCQ
RA600123 LU  LOCADDR=3,USSTAB=US327X,SSCPFM=USSSCS,MODETAB=AMODETAB,
          DLOGMOD=M2SDLCQ

```

Figure 90. VTAM Definition for NetView Service Point

The VTAM definition defines a PU name RA60012 with no XID. The independent LU 6.2 is RA6012CP. Also, dependent LUs for terminal sessions to the host are defined as RA600122 and RA600123. You will also need to know the following information about your VTAM and focal point definitions:

1. The name of the SNA network to which you are connecting. Our NETID is USIBMRA.
2. The destination address of the 37xx communications controller, which was 400002070000.
3. When using the MDS transport, the COS focal point and the ALERT focal point are required. The COS focal point and the ALERT focal point do not necessarily have to be to the same host. Our values are shown below:
 - COS FP NETID = USIBMRA
 - COS FP NAU = RAPAN
 - ALERT FP NETID = USIBMRA
 - ALERT FP NAU = RAPAN
4. The CP name of the focal point host system. For the token ring setup, our CP name is RA6012CP.

When using the MDS transport to send RUNCMDS, specify the CP LU name RA6012CP as the destination. When using the SSCP-PU transport to send RUNCMDS, specify the Service Point node's PU name RA60012.

If we are running SSCP-PU, then we will also need an SSCP ID. Our SSCP ID is 25 or X'19'. The full SSCP ID entered into the Service Point Profile Summary would be X'050000000019'. Again this information would come from your local VTAM administrator.

```

DYNASSCP=YES,          ** DYNAMIC SESSION ESTABLISHMENT ** X
HOSTSA=25,             ** SUBAREA - UNIQUE NETWORK VALUE **
NETID=USIBMRA,         ** SNI - UNIQUE NETWORK IDENTIFIER ** X
SSCPDYN=YES,          ** ADD ENTRIES TO ADJ SSCP TABLE **

```

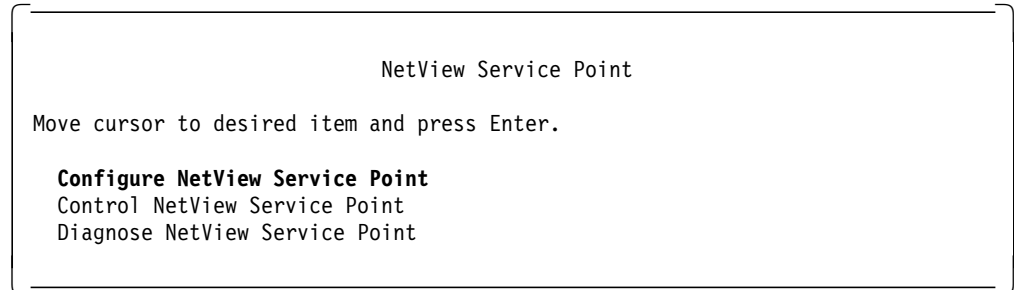
Figure 91. VTAM Definition for NetView Service Point

Note: For more information please see *AIX NetView Service Point Installation, Operation, and Programming Guide*, SC31-6120-02.

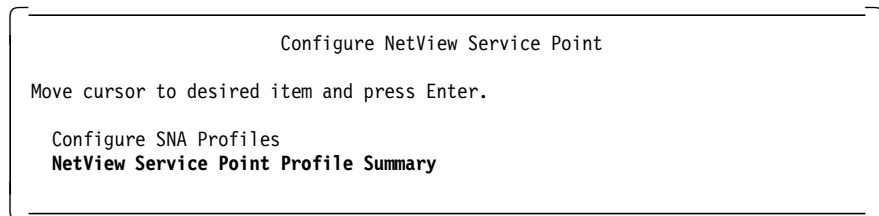
8.1 Configuring the AIX NetView Service Point

Invoke `nvix_customize_sp` script to customize the AIX NetView Service Point.
`/usr/lpp/nvix/scripts/nvix_customize_sp`

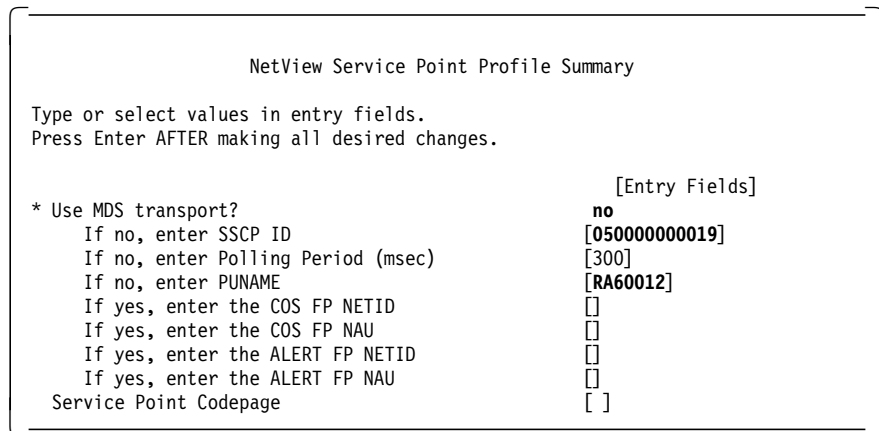
Follow the steps below.



1. From the next SMIT menu, select NetView Service Point Profile Summary as highlighted.



2. Enter the following parameters in order to use SSCP-PU for AIX NetView Service Point:



3. Once the profiles are set up, we can switch from MDS to SSCP-PU by only changing the SMIT Service Point Profile Summary. If MDS is desired, make sure the Use MDS transport? field is set to yes. Once this is done, you should stop the Service Point and SNA Server for AIX and then restart them for the changes to take effect. Figure 92 on page 190 shows the parameters for MDS transport.

```

NetView Service Point Profile Summary

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

                                     [Entry Fields]
* Use MDS transport?                yes
  If no, enter SSCP ID                [05000000ffff]
  If no, enter Polling Period (msec)  [300]
  If no, enter PUNAME                  []
  If yes, enter the COS FP NETID      [USIBMRA]
  If yes, enter the COS FP NAU        [RAP]
  If yes, enter the ALERT FP NETID    [USIBMRA]
  If yes, enter the ALERT FP NAU      [RAP]
Service Point Codepage                [ ]

```

Figure 92. NetView Service Point Profile for MDS

4. Add the following lines in the /etc/services file to specify the socket addresses that are used by AIX NetView Service Point.

```

nvixacm      7111/tcp
nvixclb      7112/tcp
nvixcr       7113/tcp
nvixsp       7115/tcp
nvixspc      7116/tcp

```

5. You will have to run the command `refresh -s inetd` in order for the above modification in /etc/services file to be effective.

8.1.1 Configuration of SNA Server for AIX

You need to configure SNA Server for AIX in order to support AIX NetView Service Point. This section gives the steps to configure SNA Server for AIX.

8.1.1.1 Configuration of Control Point

We used the following command to change the control point profile:

```
chснаobj -t'control_pt' -e 'USIBMRA' -a 'RA600012' -A 'RA600012' node_cp
```

8.1.1.2 SNA DLC Profile

We used the following command to add an SNA DLC token-ring profile:

```
mkснаobj -t'sna_dlc_token_ring' -J 'no' RS12
```

8.1.1.3 Link Station Profile

We used the following command to add a token-ring link station profile:

```
mkснаobj -t'link_station' -w'token_ring' -y 'RS12' -d '400002070000' RS12
```

The token-ring address for the host controller is 400002070000.

8.1.2 Testing of AIX NetView Service Point

This section outlines the steps to test the configuration.

1. Verify and update the SNA profiles.

```
verifysna -U
```

2. Start SNA.

```
sna -s
```

3. Start the link station.

```
sna -s 1 -p RS12
```

4. Start AIX NetView Service Point by entering the following command:

```
cd /usr/lpp/nvix/scripts  
nvix_control start
```

Figure 93 shows an example of the messages you will get when you start AIX NetView Service Point.

```
nvix_control start  
  
Checking pre-requisite software. Please wait ...  
  
Starting NetView Service Point processes ...  
  
  starting Send/Receive Daemon  
0513-059 The evp_nvixSrd Subsystem has been started. Subsystem PID is 37948.  
  starting Command Router Daemon ...  
  starting ACM Daemon ...  
0513-059 The evp_nvixCrd Subsystem has been started. Subsystem PID is 38465.  
  
0513-059 The evp_nvixAcmd Subsystem has been started. Subsystem PID is 40515.  
For additional status and error information refer to  
your system error log.
```

Figure 93. AIX NetView Service Point Startup Messages

5. Issue the following command to check the status of the AIX NetView Service Point:

```
nvix_control status | pg
```

Figure 94 on page 192 shows an example of the messages you will get when you check the status of AIX NetView Service Point.

```

nvix_control status

*** Status of NetView Service Point Processes ***

Subsystem      Group          PID    Status
evp_nvixSrd    37948         active

Subsystem      Group          PID    Status
evp_nvixCrd    38465         active

Subsystem      Group          PID    Status
evp_nvixAcmd   40515         active

*** Status of SNA Server, and SSCP-PU Session: ***

SNA is active

SSCP-PU session is active

On SSCP-PU sessions, use SP=RA60012 in RUNCMDS
and use Applications shown in
*** Applications registered to receive commands from Host: ***
for appl= in RUNCMD

*** Status of Portmapper ***

/usr/etc/portmap is active.

*** Applications registered to receive commands from Host: ***

no information is currently available

For additional status and error information refer to
your system error log.

```

Figure 94. AIX NetView Service Point Status Messages

8.2 Using AIX NetView Service Point

We have to run an AIX NetView Service Point application to communicate with the host; we will use the host connection daemons of NetView for AIX:

- The tralertd daemon receives events from the trapd daemon, converts the events and SNMP traps to SNA alerts, and sends the alerts to the AIX NetView Service Point program to be sent to the host.
- The spappld daemon provides communication between the AIX NetView Service Point program and the NetView for AIX program. The spappld daemon receives and executes NetView RUNCMDS and sends responses to the NetView programs through the AIX NetView Service Point program.

Enter the following command at AIX command line to access SMIT:

```
smitty nv601ac
```

Select Set options for tralertd daemon.

Set options for host connection daemons

Move cursor to desired item and press Enter.

Set options for tralertd daemon
Set options for spappld daemon

1. Enter RS6K12T for the Service point application name field.
2. Enter rs600012 for the Service point host name field.

Set options for tralertd daemon

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

	[Entry Fields]
Tracing mask:	[0]
Full path name of trace file:	/usr/0V/log/tralertd.t>
Service point application name:	[RS6K12T]
Service point host name:	[rs600012]
Are you using NetCenter?	no
If yes:	
Domain name:	[SNMP]
Standalone timeout:	[90]

For the SMIT menu Set options for host connection daemons, select Set options for spappld daemon.

Set options for spappld daemon

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

	[Entry Fields]
Service point host name:	[rs600012]
Service point application name:	[RS6K12S]
Execute shell state:	bsh(Bourne)
Execute shell path:	[/bin:/usr/bin:/usr/0V/>
Log service point transactions?	yes
Full path name of log file:	[/usr/0V/log/NV390.log]
Tracing mask:	[0]
Full path name of trace file:	[/usr/0V/log/NV390.trac>
Are you using NetCenter:	no

To start the host connection daemon(s), enter the following command at the AIX command line:

```
smitty nv602dc
```

Select host connection daemon(s) to stop or restart

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

	[Entry Fields]
tralertd daemon status/operation:	restart
spappld daemon status/operation:	restart

You can use the RUNCMD command on NetView host to execute a program on the RS/6000. Figure 95 is an example of running a RUNCMD on the NetView host, which executes df on RS/6000 using the SSCP-PU transport.

We also check the status of the RA60012 PU with the command DISPLAY NET,ID=RA60012,SCOPE=ALL to verify that the status of the PU RA60012 is ACTIV.

```
NCCF                                N E T V I E W    RAPAN WTWKSH3  04/26/95 15:50:45
C RAPAN    DISPLAY NET,ID=RA60012,SCOPE=ALL
  RAPAN    IST097I DISPLAY ACCEPTED
' RAPAN
IST075I   NAME = RA60012           , TYPE = PU_T2.1
IST486I   STATUS= ACTIV           , DESIRED STATE= ACTIV
IST1043I  CP NAME = RA6012CP, CP NETID = USIBMRA , DYNAMIC LU = YES
IST1105I  RESOURCE STATUS TGN CP-CP TG CHARACTERISTICS
IST1106I  RA60012 AC/R    21 YES   902D0000000000000000000017100808080
IST136I   SWITCHED SNA MAJOR NODE = RS600012
IST081I   LINE NAME = J0007021, LINE GROUP = EG07L02 , MAJNOD = RA7NCPX
IST654I   I/O TRACE = OFF, BUFFER TRACE = OFF
IST355I   LOGICAL UNITS:
IST080I   RA600122 CONCT          RA600123 CONCT
IST080I   RA6012CP ACT/S----Y
IST314I   END
* RAPAN    RUNCMD SP=RA60012,APPL=RS6K12S,DF
-          Executing RUNCMD "DF" *
-          Filesystem    Total KB    free %used    iused %iused Mounted on*
-          /dev/hd4        12288      2560 79%      1093 26% /*
-          /dev/hd9var     53248    36644 31%      1600 11% /var*
-          /dev/hd2       1024000  115148 88%     33248 12% /usr*
-          /dev/hd3        12288      9664 21%       185  4% /tmp*
-          /dev/hd1         4096       3800  7%         44  4% /home*
???
```

Figure 95. Example of RUNCMD Command on NetView Host with SSCP-PU Transport

Figure 96 is an example of running a RUNCMD on the NetView host, which executes `ls /var/sna` on RS/6000 using the MDS connection.

```

NCCF                                N E T V I E W   RAPAN WTWKSH3  04/26/95 15:52:43
* RAPAN   RUNCMD SP=RA6012CP,APPL=RS6K12S,LS /VAR/SNA
-         Executing RUNCMD "LS /VAR/SNA" *
-         .sna.status
-         SNA_ABEND.dmp
-         snaservice.1
-         kernel_ras.log
-         sna.stderr
-         snaservice.2
-         snaservice.3
-         snaservice.4
-         snaservice.5
-         snaservice.6
-         snaservice.7
-         snaservice.8
-         ???

```

Figure 96. Example of RUNCMD Command on NetView Host with MDS Transport

You can send an event to the NetView host by using the following command on the AIX command line:

```
event -d "OK"
```

Figure 97 is an example of an event received by the host.

```

N E T V I E W           SESSION DOMAIN: RAPAN   WTWKSH3  04/26/95 16:18:53
NPDA-45A              * RECOMMENDED ACTION FOR SELECTED EVENT *   PAGE 1 OF 1
RAPAN      RA6012CP    RS6K12T    RS600012    RS600012
              +-----+ +-----+ +-----+ +-----+
DOMAIN      | SP  |---| TP  |---| DEV  |---| DEV  |
              +-----+ +-----+ +-----+ +-----+

USER        CAUSED - NONE

INSTALL     CAUSED - NONE

FAILURE     CAUSED - REMOTE NODE
ACTIONS    - I144 - IF PROBLEM REOCCURS THEN DO THE FOLLOWING
              I142 - REPORT THE FOLLOWING:
                  LOCATION
                  DEVICE ADDRESS <none>

ENTER ST (MOST RECENT STATISTICS), DM (DETAIL MENU), OR D (EVEN DETAIL)

???
CMD==>

```

Figure 97. Example of Event Received by the NetView Host

Chapter 9. XSNA

XSNA is a new utility that provides an X-windows-based interface to manage SNA Server for AIX resources. The advantage of XSNA over SMIT for managing SNA Server for AIX is that XSNA can be run on any workstation client that supports X-clients.

It provides the following functions:

- Start, stop and display status of SNA Server for AIX subsystem
- Start, stop and display status of link station
- LU 1, 2, and 3 session information (managing sessions)
- APPN information
- Gateway information
- AnyNet information (if installed)

9.1 Starting XSNA

To start XSNA, enter the following command:

```
xsna
```

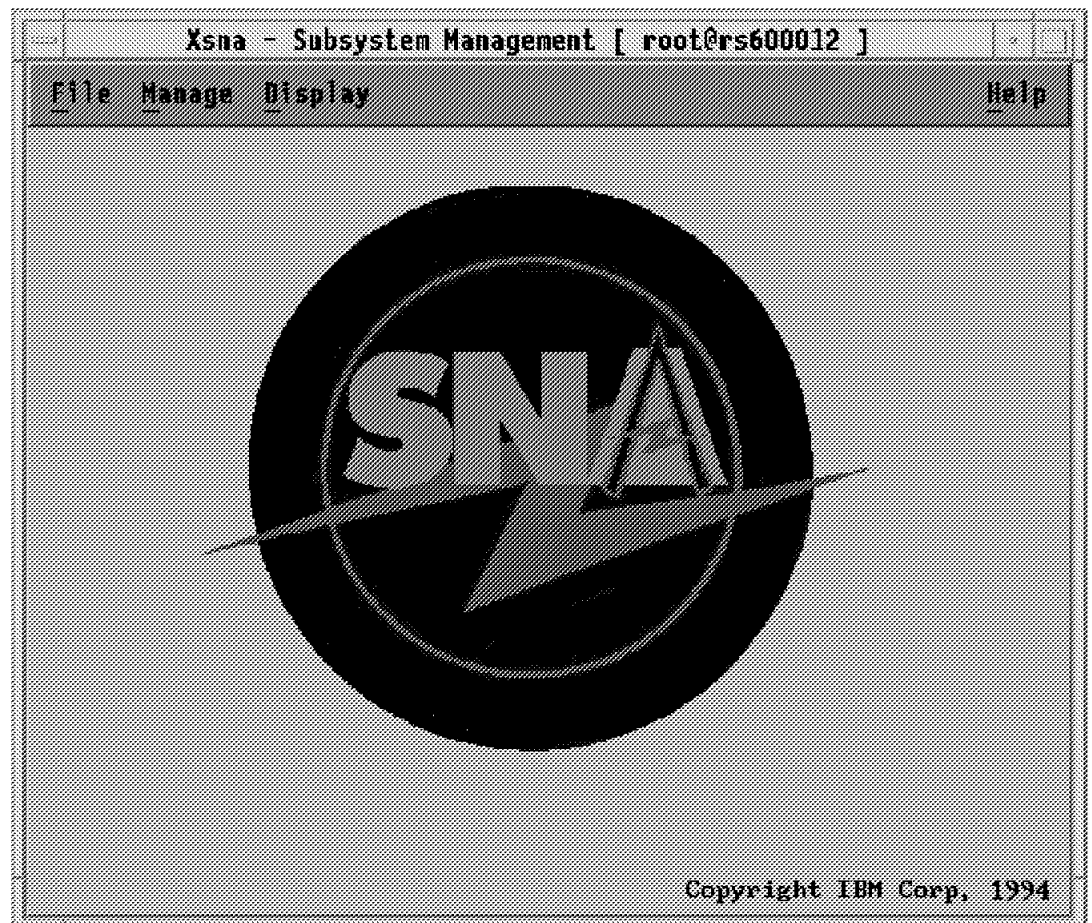


Figure 98. XSNA Initial Menu

9.2 Managing the SNA Server for AIX Subsystem

Start SNA Server for AIX by clicking on the **Manage** and **Start SNA** buttons.



Figure 99. Start SNA

Stop SNA Server for AIX by clicking on the **Manage** and **Stop SNA** buttons.

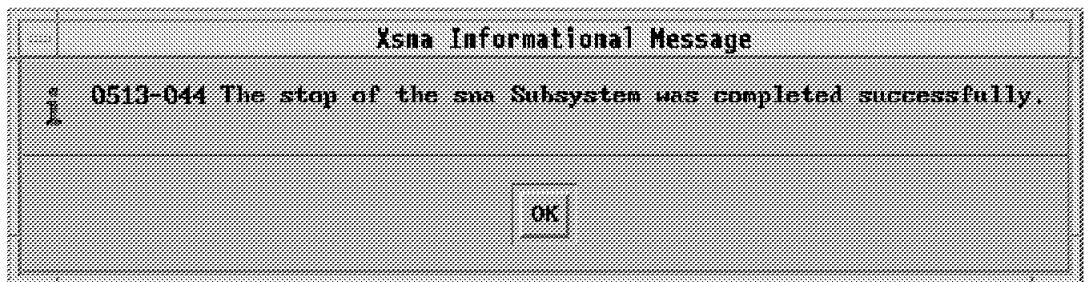


Figure 100. Stop SNA

Display the status of SNA by clicking on **Display** and **SNA Status**.

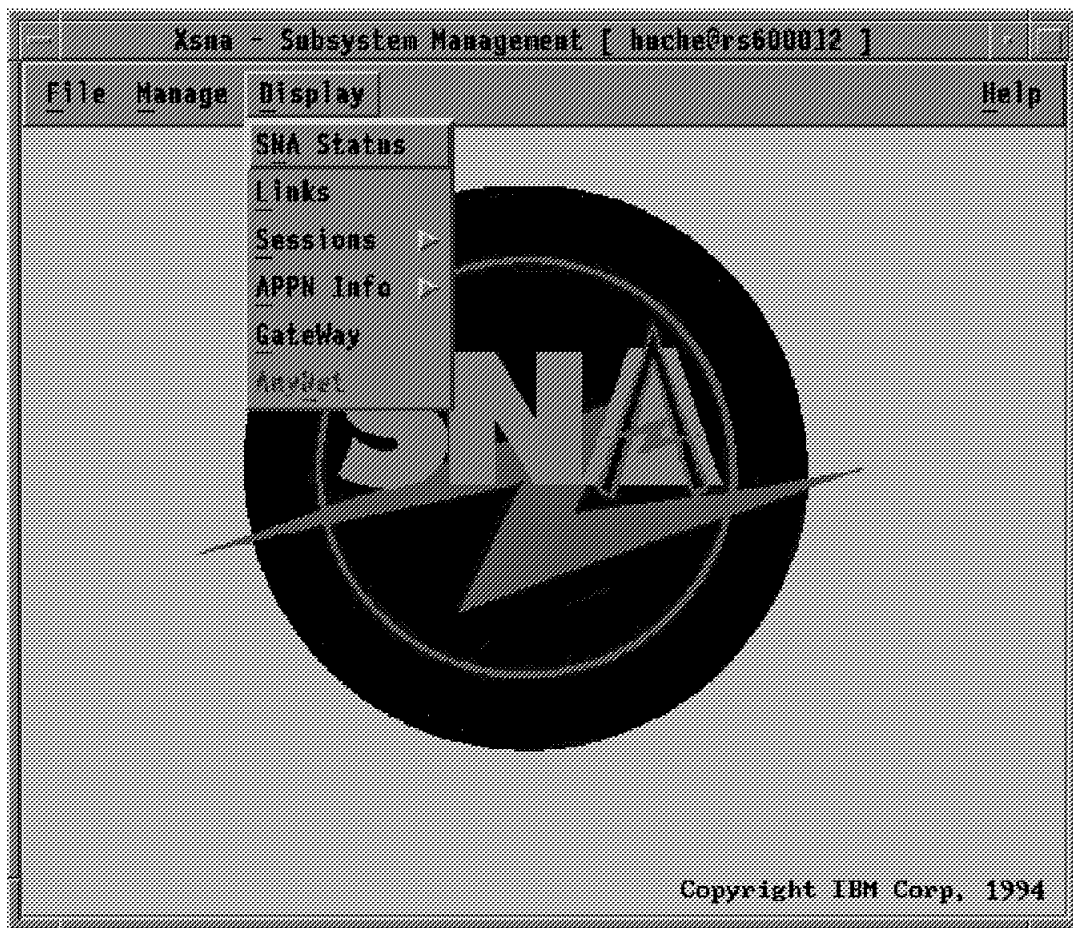


Figure 101. Display Menu

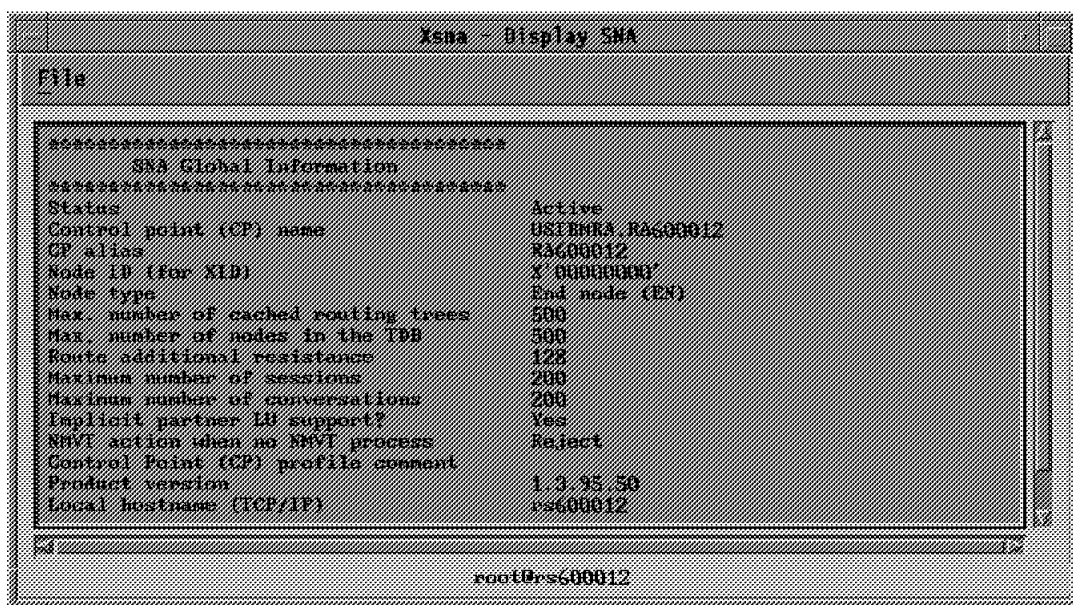


Figure 102. Display SNA Status

9.3 Managing Link Stations

Start a link station by clicking on the **Manage** and **Activate a configured link** buttons; you will get the window shown in Figure 104.

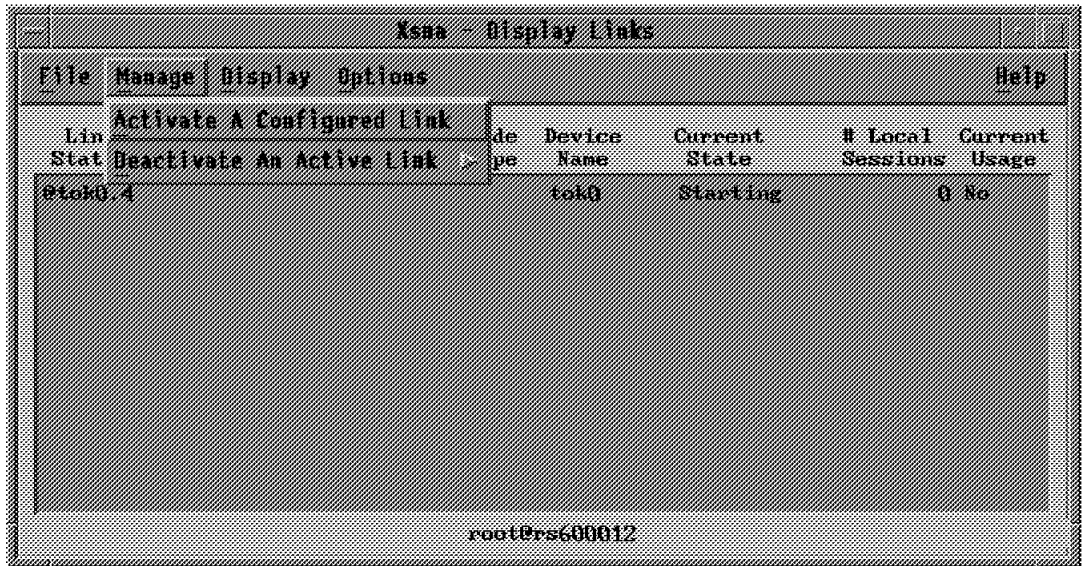


Figure 103. Links Menu

You can activate a configured link station by selecting it and clicking on the **Manage** and **Activate** buttons.



Figure 104. Activate a Configured Link

You will get the following window with the Active status for the RS12 link.

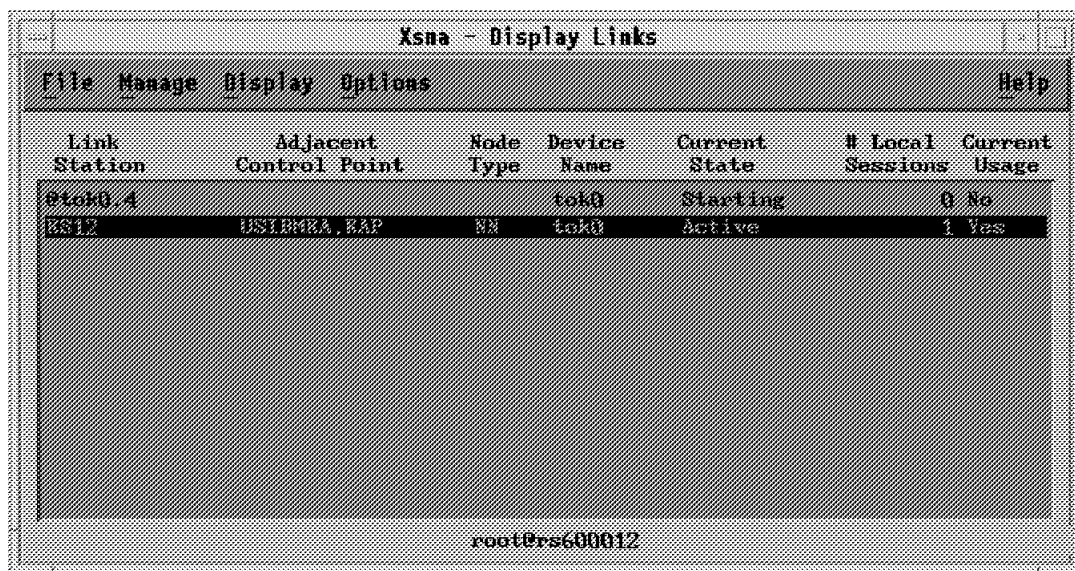


Figure 105. Link Active Window

You can deactivate an active link station by selecting it and clicking on the **Manage, Deactivate an active link** and **Normal** buttons.

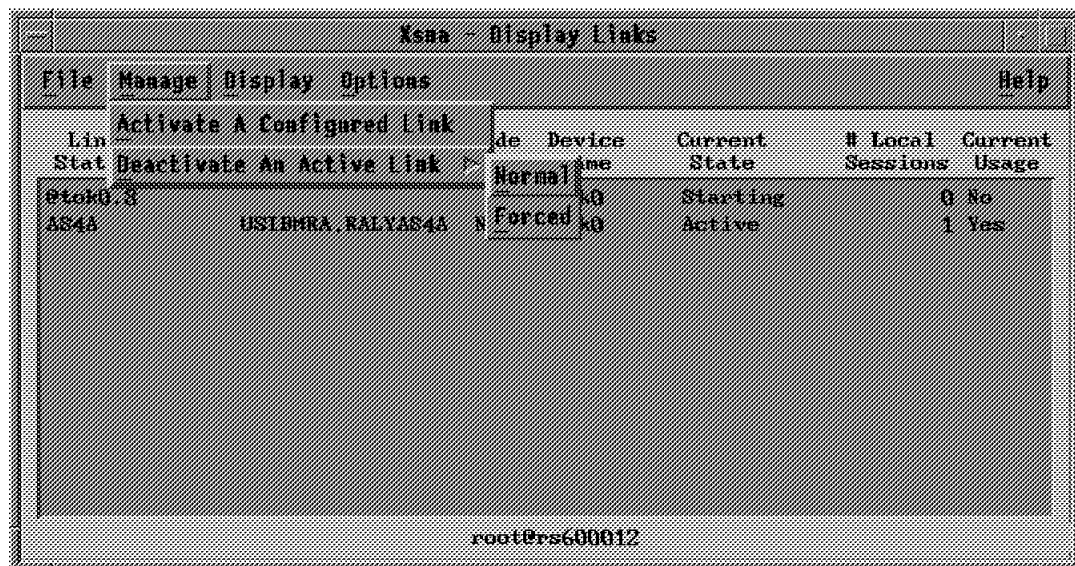


Figure 106. Deactivate an Active Link

To get more details about a link station, click on the **Display** and **Detail** buttons.

```
Xsna - Display links (detailed)
file
Detailed display for link [ RS12 ]
*****
Active Links Information
*****
Number of active data link devices          1

1.>Data link device name                    /dev/dlctoken/tok0
  BLC profile name                        RS12
  Device type                             Token ring
  Line type                               Switched
  Local link name
  Maximum number of link stations         100
  Minimum number of inbound links         0
  Minimum number of outbound links        0
  Dynamic link stations supported?        No
  Number of active links on this device   1
  Total bytes transmitted correctly       141699769
  Total bytes received correctly          213345116
  Total frames transmitted correctly       901839
  Total frames received correctly         1983284
  Total frame transmit errors             0
  Total frame receive errors              0
  Max. netid's ever in use                25
  Max. transmits ever queued              1
  Max. receivers queued                   0
  Max. status blocks queued               0

1.1.>Link station profile name              RS12
  Destination BLC address                 X'4000207000004'
  Remote link name                        (not applicable)
  Link tracing active?                    Yes
  Verify adjacent node?                   No
  Adjacent node CP name                   USIBMRA.RAP
  Adjacent node type                       Network node (NN)
  Adjacent PU type                         Type 4/5
  Adjacent node ID (for XID)              X'FFFFFFFC'
  CP-CP sessions supported?               No
  Solicit SSCP-PU session                 Yes
  Host SSCP ID                             25
  Link activated                           Locally
  Link state                               Active
  Local active and activating session      1
  Number of ISR sessions                   0
  Link in use by Gateway                   No

root@rs600012
```

Figure 107. Display Link Detailed

You can get information about the following sessions on a specific link station:

- APPC
- LU 1, 2, and 3
- Session limits

Click on the **Display** and **Sessions** buttons.



Figure 108. Display Link Sessions Information

9.4 Session Information

You can get information about the following sessions:

- APPC
- LU 1, 2, and 3
- Session limits

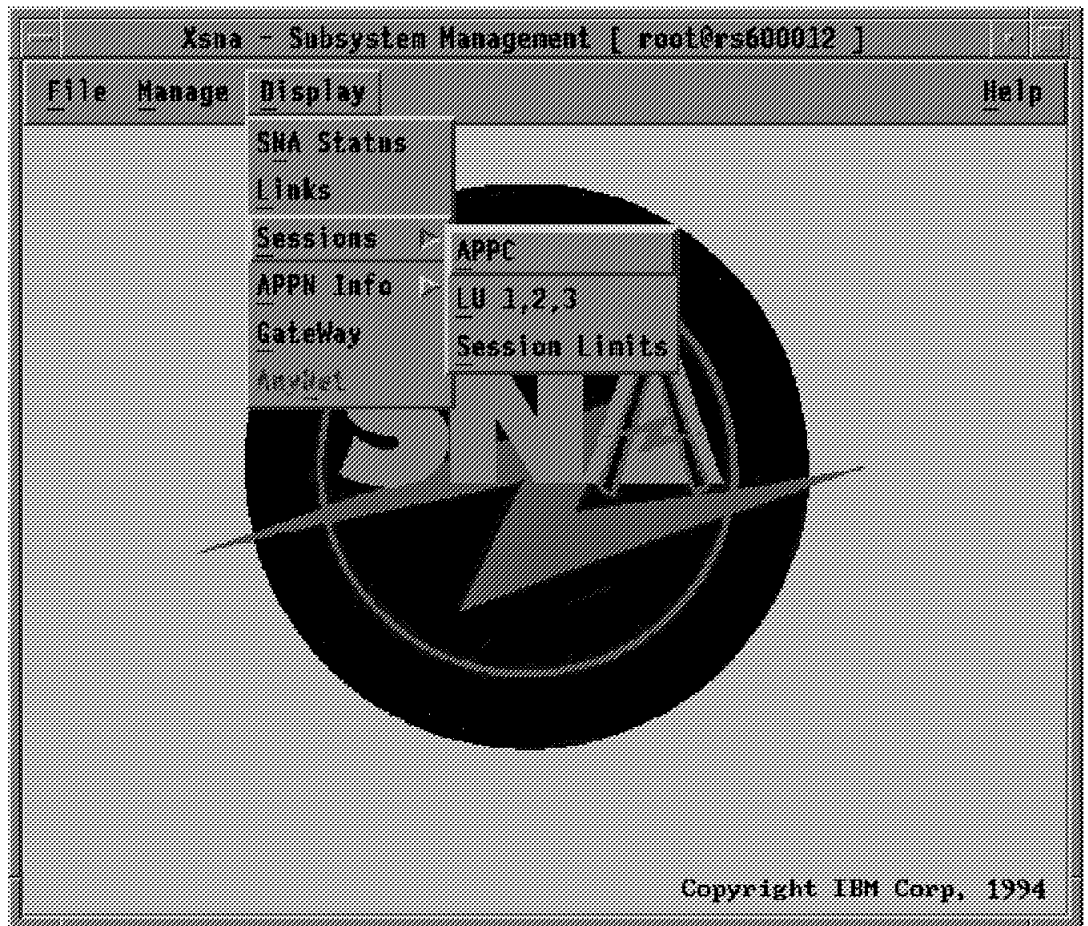


Figure 109. Sessions Menu

To display the APPC sessions, click on **APPC**.

CGID	Local LU Name	Partner LU Name	Mode Name	Link Station	State
7	USEDMRA.RA600012	USIBMRA.RALYAS4A	QPCSUPP	AS4A	Available
6	USEDMRA.RA600012	USIBMRA.RALYAS4A	QPCSUPP	AS4A	Available
5	USEDMRA.RA600012	USIBMRA.RALYAS4A	QPCSUPP	AS4A	Allocated
4	USEDMRA.RA600012	USIBMRA.RALYAS4A	SNASVCMG	AS4A	Available
2	USEDMRA.RA600012	USIBMRA.RALYAS4A	CPSVCMG	AS4A	Available
1	USEDMRA.RA600012	USIBMRA.RALYAS4A	CPSVCMG	AS4A	Available

root@rs600012

Figure 110. Display APPC Sessions

You can deactivate a session by selecting it and clicking on the **Manage, Deactivate Session** and **normal** buttons.

CGID	LU Name	Partner LU Name	Mode Name	Link Station	State
7	USEDMRA.RS12	USIBMRA.RALYAS4A	SNASVCMG	AS4A	Available
5	USEDMRA.RS12	USIBMRA.RALYAS4A	CPSVCMG	AS4A	Available

root@rs600012

Figure 111. Deactivate a Session

To display detailed information about a session, click on the **Display** and **detail** buttons.



Figure 112. Detailed Session Information

To display information about the LU 1, 2 or 3, click on the **LU 1,2,3** button.

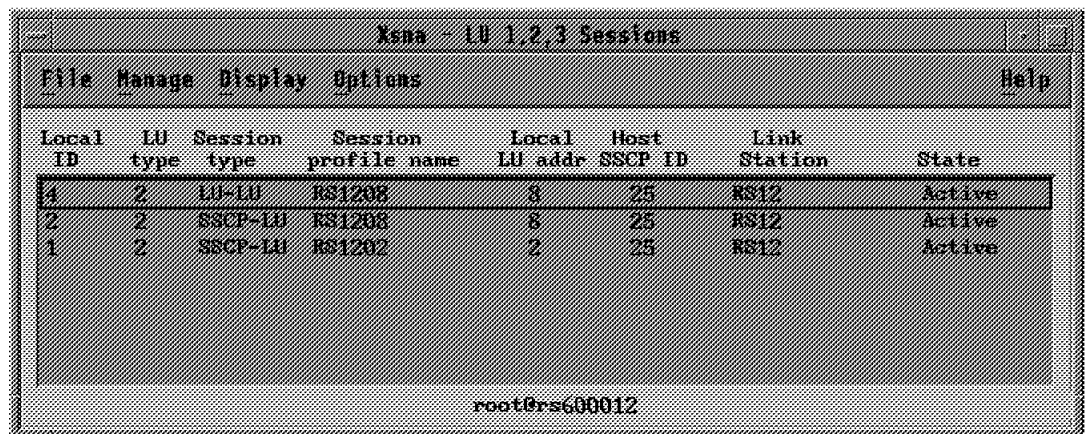


Figure 113. Display LU 1,2,3 Sessions

9.5 APPN Information

You can display the following information about the APPN network:

- Directory
- Topology
- Sessions

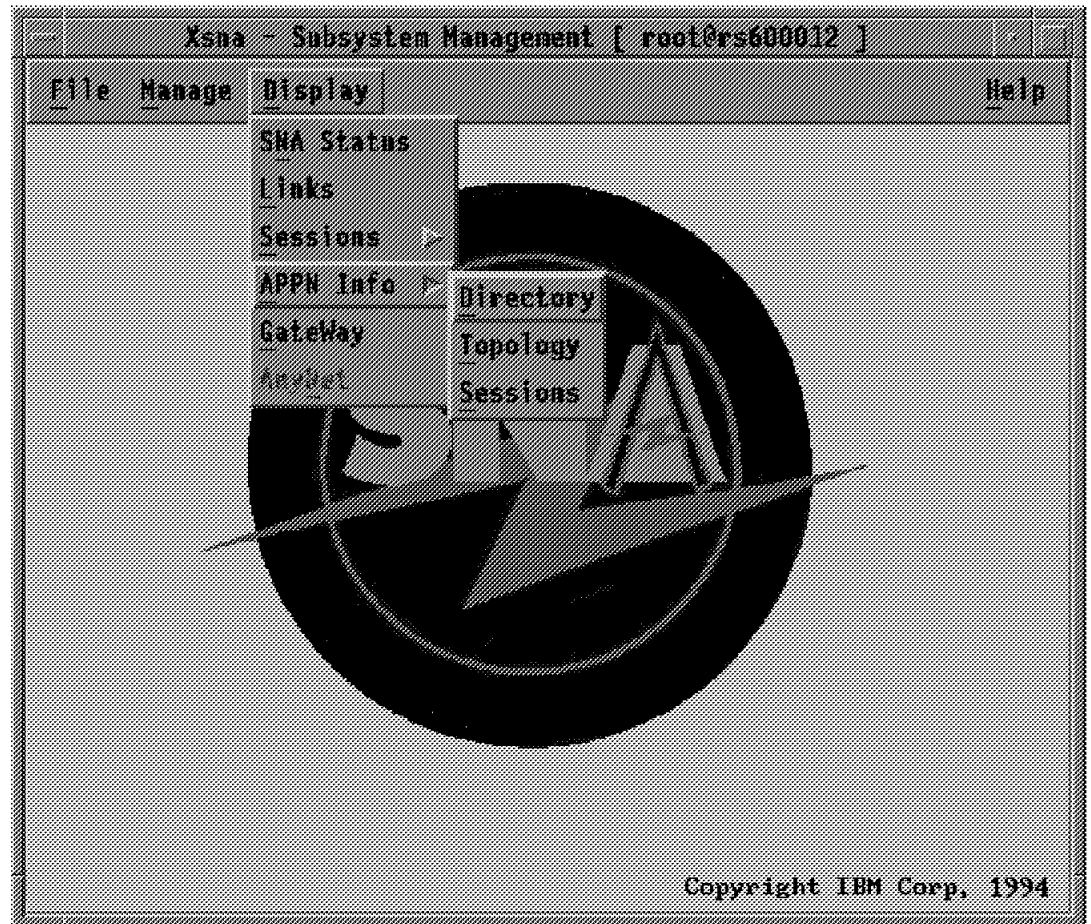


Figure 114. APPN Info Menu

To display the APPN directory, click on **Directory**.

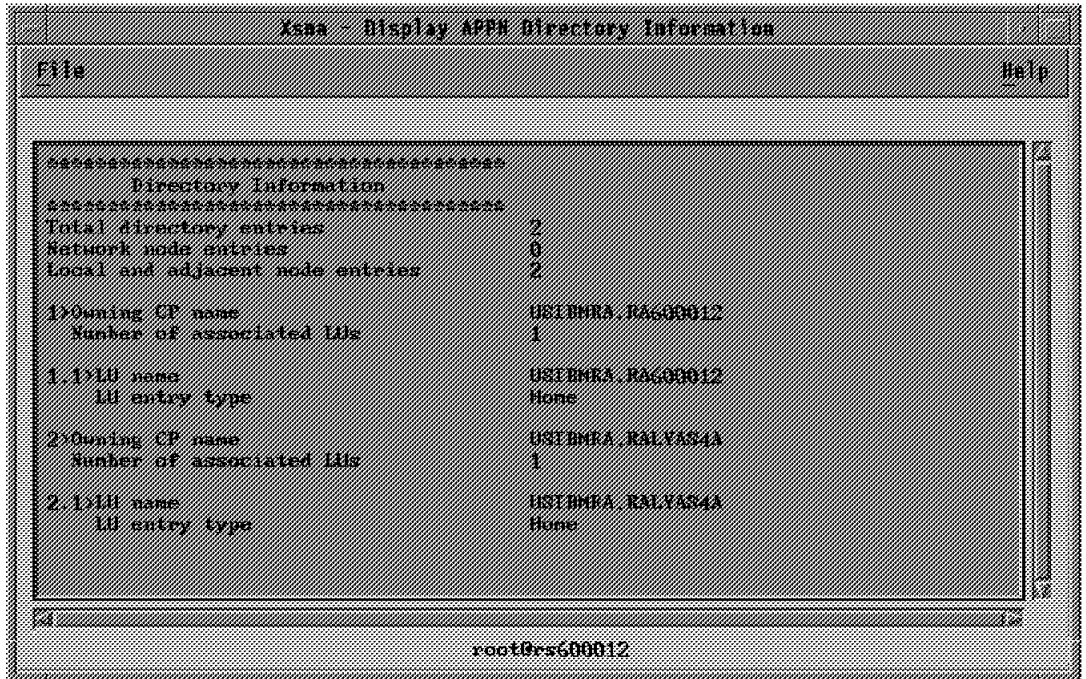


Figure 115. Display APPN Directory Information

To display the APPN topology, click on **Topology**.

```
Xsna - Display APPN Topology Information
File Help
*****
Topology Information
*****
Number of nodes                2

1>Node name                     USIBMRA.RALYAS4A
Node type                      Network node (NN)
Node quiescing?                No
Route additional resistance     128
Congested?                     No
Intermediate sessions (IS) supported? Yes
IS resources depleted?        No
End point resources depleted?  No
APPN gateway supported?       No
Central directory supported?   No
Number of TGS                  0

2>Node name                     USIBMRA.RAG00012
Node type                      End node (EN)
Node quiescing?                No
Route additional resistance     128
Congested?                     No
Intermediate sessions (IS) supported? No
IS resources depleted?        Yes
End point resources depleted?  Yes
APPN gateway supported?       No
Central directory supported?   No
Number of TGS                  1

2. 1>IG partner CP name        USIBMRA.RALYAS4A
Transmission group number     21
IG partner node type          Real
Operational?                  Yes
Activate on demand?          No
IG quiescing?                 No
CP-CP sessions supported?     Yes
IG type                       End point
Effective capacity             4.30 megabits per second
Cost per connect time         0
Cost per byte                  0
Security                      Nonsecure
Propagation delay             384.00 microseconds (lan)
User defined parameter 1      128
User defined parameter 2      128
User defined parameter 3      128
DLC data                      (not applicable)

root@rs600012
```

Figure 116. Display APPN Topology Information

Chapter 10. Guidelines to Problem Determination

This chapter outlines some of the debugging procedures used while testing the configuration examples that are provided in this document. This chapter also includes a procedure to back up and restore SNA Server for AIX profiles.

10.1 SNA Profiles Maintenance

It is important to properly maintain the SNA profiles for SNA Server for AIX. This section provides some guidelines to maintain these profiles.

10.1.1 Backing Up Configuration Profiles

You should periodically make a backup copy of the SNA Server for AIX configuration profiles to protect against loss of data. In addition to the periodic backups, you should back up these profiles under any of the following conditions:

- Before installing a new level of the AIX base operating system
- Before installing AIX Sockets over SNA, a new release of SNA Server, or any other SNA Server feature
- After you add a set of configuration profiles
- Before and after you update or change a current set of profiles
- Before and after you change the SNA Server communication authority password (to protect against forgetting the password)

Use the following procedure to back up all SNA Server for AIX profiles, including any AIX Sockets over SNA profiles. For the Filename variable, substitute the full AIX pathname and filename of the file that is to contain the profiles to be backed up. Because SNA Server for AIX profiles can be large, be sure there is enough space to create the file.

1. To export the files, enter the following command on the AIX command line:
`exportsna -A -f Filename`
2. To back up the files, enter the following command on the AIX command line:
`backup -i Filename`

The backup -i command copies the backup file containing the profiles to a diskette in /dev/fd0.

If the configuration database becomes corrupted during installation, you can restore backed up profiles to recover your profile definitions. If you have not backed up SNA Server profiles, you must reinitialize the configuration database to create a new set of default profiles (see 10.1.2, "Restoring a Backup Copy of Configuration Profiles").

10.1.2 Restoring a Backup Copy of Configuration Profiles

If the profile database is damaged by the installation of a new Communications Server for AIX software, you can restore SNA Server for AIX profiles from a backup copy. To restore SNA Server for AIX profiles that were backed up, do the following:

1. Ensure that SNA Server for AIX is not active. To determine whether it is, enter the following command:

```
sna -display global
```

If SNA Server for AIX is active, enter the following command to deactivate it:

```
sna -stop sna -t normal
```

2. Insert the floppy that contains the backup of the exported SNA profiles.
3. Enter the following commands:

```
restore -x  
importsna -f Filename  
verifysna -U
```

For the Filename variable, use the full AIX pathname and filename of the file containing the restored profiles.

10.1.3 Reinitializing the Configuration Profile Database

If the SNA Server for AIX configuration profile database is inadvertently modified so that the information in it can no longer be used, you may need to reinitialize the profile database. This should be done only if you are sure the configuration information cannot be salvaged.

If the SNA Server for AIX configuration database is corrupted, you receive an error message indicating a problem with the SNA subsystem, with a particular profile type, or with a specific profile. See *SNA Server for AIX Diagnosis Guide and Messages*, SC31-8215 (available only on CD-ROM, SK2T-6012) for diagnosing the problem before you perform the procedure described in this section.

Perform the following steps to reinitialize the configuration database:

1. Issue the command `exportsna -A -f Filename` to back up as many of the original profiles as possible.

If a particular profile type is corrupted, the `exportsna` command may fail when it reaches that profile type. (In most cases, only a single profile type in the database is corrupted.) Perform the following steps to ensure that all uncorrupted profiles are saved:

- Issue the `helpsnaobj -h` command to get a list of SNA Server for AIX profile types.
 - Export any remaining profiles individually for each profile type.
 - Combine all exported profiles into a single file that contains all uncorrupted profiles.
2. As root, remove the contents of the `/etc/objrepos/sna/work` and `/etc/objrepos/sna/verified` directories.
 3. Issue the `/usr/lpp/sna/bin/mksnadb` command to rebuild the database and restore the default and system-defined profiles.

Note: The `mksnadb` command rebuilds the entire SNA Server for AIX database and restores all default and system-defined configuration profiles, including AIX Sockets over SNA profiles.

4. If you exported any profiles, reimport them by issuing the following command:

```
importsna -f Filename
```


5. Reconfigure the profiles for the profile type that was corrupted.

10.2 SNA Server for AIX Data Gathering Tool getsnapd

This section describes an important tool for data collection for SNA Server for AIX problems. The tool getsnapd has the full pathname `/usr/lpp/sna/bin/getsnapd`. This is a Korn shell script file.

10.2.1.1 When to Run getsnapd

You will normally use getsnapd to collect data for IBM support to analyze, when you have any problem with SNA Server for AIX. This is utility that will gather all the traces, information about the installed software, error logs, SNA profiles, SNA service logs, etc. and copy them to a single output file.

Please note that you will have to set up and start traces separately. The script getsnapd may stop the link station and traces.

You may use the following rough guideline in your problem determination:

- Stop SNA and set the desired traces
- Start SNA and the link stations
- Recreate the problem
- Stop the traces, link stations
- Stop SNA if needed
- Run the tool getsnapd to gather all the data
- Analyze the expanded files of pd.tar.Z

Please note that you need to recreate the problem, with the necessary traces running. Then you must stop the traces, so that the trace buffer will write to the trace files completely. Then you should run getsnapd.

10.2.1.2 getsnapd Output

The tool getsnapd produces a file pd.tar.Z in the current working directory. Ensure that you have enough free space to write this output file, in the current file system. This file is compressed tar file. This could be expanded into individual files by issuing the following commands:

```
uncompress pd.tar
tar -xvf pd.tar
```

When you expand the file pd.tar.Z, it contains a file called README, which gives a list and description of the files that were created by the script getsnapd. This README file also includes the commands that were run to generate these files.

10.3 SNA Channel for AIX getchanpd Tool

An additional tool getchanpd available in Communications Server for AIX to gather channel traces and data. This tool has the full pathname `/usr/lpp/devices.mca.8fc3/tools/getchanpd`. This is a Korn shell script file for ESCON adapter.

A similar tool is available for block multiplexer with the full pathname `/usr/lpp/devices.mca.fe92/tools/getchanpd`.

10.3.1.1 Output of getchanpd

You should set the appropriate SNA Server for AIX, link station and channel traces first. Then recreate the problem, stop all traces and run getchanpd. This tool creates a file called pdchan.tar.Z in the current directory. Please ensure that you have enough free space in the file system to create this file.

Use the following commands to expand this output file:

```
uncompress pdchan.tar.Z
tar -xvf pdchan.tar
```

The expanded files contain a file called README which contains a list of files contained in pdchan.tar.Z. This README file also has the commands that were used to create these files.

Note: You may have to use getsnapd and getchanpd either separately or together to determine the cause of your problem.

10.4 Useful Tips for Problem Determination

The following documentation is useful in determining the cause and nature of the problems that you may encounter in SNA Server for AIX V3.1:

Error description

Describe your problem giving as much detail as possible. This could be entered into a README file in a specific directory.

System history level

It is important to have the correct levels of software installed on the system. The software levels could be listed using the following command:

```
lslpp -ha
```

This command produces a complete listing of all the products installed on your system. A file containing this listing is created by the tool getsnapd.

System error log

Use the AIX command `errpt -a` to look at the system error log. Look for any errors that may be associated with either the hardware or software resource that you are currently testing. The tool getsnapd copies the unformatted errorlog to the file pd.tar.Z.

Standard output

You can configure the standard error output file for SNA Server for AIX by specifying a file in the Standard output file/device field of the SNA Node Profile. The default file is `/var/sna/sna.stderr`. You may either browse this file for any problems or redirect to any other filename for later use. The default stderr file is copied to pd.tar.Z by running the tool getsnapd.

SNA profiles

To save all the profiles in the allprofile file, enter the following command:

```
exportsna -A -f allprofile
```

The tool getsnapd exports the currently committed SNA profiles and copies them to the file pd.tar.Z.

10.4.1 SNA Service Log

This section looks at using the snaservice log for problem diagnosis.

1. Use the following SMIT fast path command to configure SNA log and trace files:

```
smitty _snasetlogs
```

Figure 117 shows the default SNA Log and trace setting.

Configure SNA Log and Trace Files

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

[Entry Fields]

Set file names and sizes

Use SNA or System file as service log?	1	SNA
Service log file name	2	[/var/sna/snaservice]
Service log file size	3	[150000]
SNA event/flow trace log file name	4	[/var/sna/snatrace]
SNA event/flow trace log file size	5	[0]
SNA failure log file name	6	[/var/sna/snafailure]
SNA failure log file size	7	[0]
File wrap limit	8	[10]

Figure 117. SNA Log and Trace Files SMIT Screen

Note:

- 1** Select either a value of SNA or system for this field.

SNA SNA Server for AIX data goes to a separate file. This option uses a generic trace channel obtained for the BOS. By default this includes all SNA Server for AIX data. You can also redirect SNA Server for AIX internal trace data and failure data to separate files. Choose this option if you need to use the BOS trace command for other application needs while SNA is running.

system SNA Server for AIX data goes to the AIX system event trace file. That file receives all trace channel zero data. If the system event trace daemon is not running, one is started. Choose this option to enable any SNA API tracing (command, generic or CPIC), or to mix SNA trace data from other applications.

2 System default is /var/sna/snaservice. The actual actual filename has a numerical suffix added to the name specified in this field, to indicate the instance of the file. SNA Server for AIX creates another instance of the file when it restarts, when API trace selections are changed or when you switch the active logs.

3 This field specifies the number of bytes of input that can be stored in the snaservice log file, before SNA Server for AIX wraps to the beginning of the file.

4 This field specifies the filename for the internal trace (event/flow) log.

5 The number of bytes of input for internal trace log, before wrapping occurs.

6 This field specifies the filename for the failure log.

7 The number of bytes of input for the failure log, before wrapping occurs.

8 This field specifies the maximum number of instances of each type of SNA Server for AIX logs. When the maximum number is reached, the suffix used for current service log files returns to "1" and SNA Server for AIX begins overwriting logs with names of the form Filename.1.

2. You have to switch the service log file, before you can run the `trcrpt` command. To switch the log use the following command:

```
sna -setlogs -t
```

3. Use the following command to view the SNA Server for AIX service log:

```
trcrpt snaservice.2
```

Figure 118 shows a sample SNA Server for AIX service log report.

```
Mon May 1 16:44:43 1995
System: AIX rs600012 Node: 3
Machine: 000075657500
Internet Address: 0918687C 9.24.104.124

Version: 1 Release: 3 Mod: 95 Fix: 50

/bin/trace -a -g -o /var/sna/snaservice.8 -L 1500000 -T 131072 -m Version: 1 Release: 3 Mod: 95 Fix: 50

ID    ELAPSED_SEC    DELTA_MSEC    APPL    SYSCALL KERNEL INTERRUPT
27B   0.228218368    0.000000     Mon May 1 16:44:43 1995
                               Init SNA. max conv: 200, max sess: 200
27B   0.625622784    397.404416   Mon May 1 16:44:44 1995
                               Control point: USIBMRA.RA6012CP (end node) V
Version: 1 Release: 3 Mod: 95 Fix: 50
27B   16.595481600   15969.858816 Mon May 1 16:45:00 1995
                               ***>Failure: Link error
                               Component: SNACR - Command Router
                               file: xxxcrpar.c
                               Error/Message code: -755 (FFFFFFD0D)
                               link station - SDLC
                               0105-2905 Physical link control
                               experienced an unusual network condition.
                               rc in HEX: FFFFFFF7
```

Figure 118. SNA Server for AIX Service Log Report Example

10.4.2 API/Event Traces

To start the traces use the following SMIT fast path command:

```
smitty _snatrace
```

Select on to enable the traces.

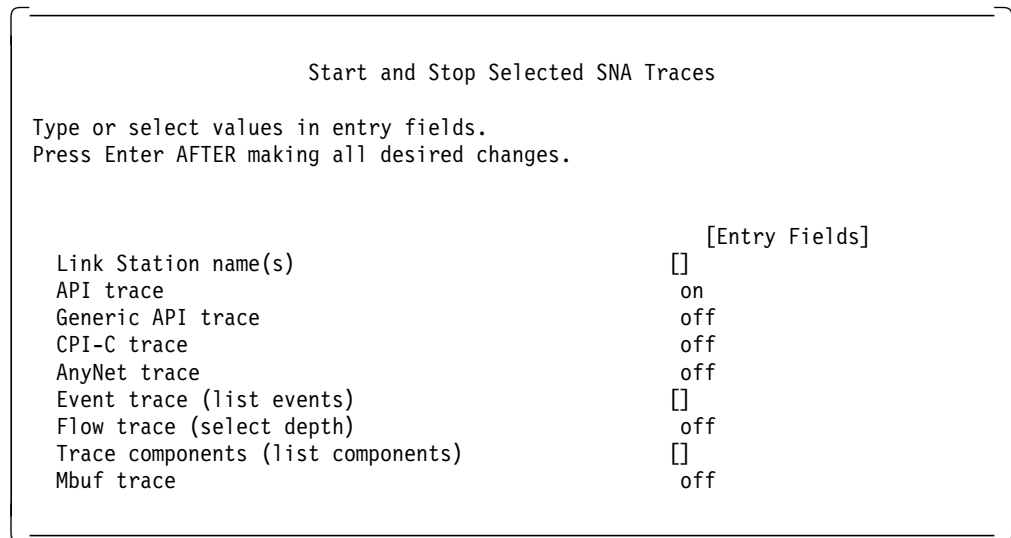


Figure 119. SNA Traces SMIT Screen

In this example, we start the API trace on the RS12 link station.

To stop the trace, use the following command:

```
sna -trace off
```

10.4.3 Link Station Trace

The link station traces can be controlled by the `sna` command. To start a link station trace while the link station is starting, you have to specify `yes` for the Trace link field in the link station profile. You need to stop the link station, verify and update the profiles and then restart the link station.

The trace file is located in the `/var/sna` directory and has the name of the link station profile.

10.4.4 Get Sense Information

The `sna -getsense` command was added in this release and it is an online display of the sense code text. For example, `sna -getsense 084B0000` displays an explanation of that sense code. It provides the same function as the host NetView SENSE command.

10.4.5 Trace Report

The common tool to read AIX and SNA traces or log files is as follows:

trcrpt This reporting tool reads and formats the file you specify and writes to the standard output. You can redirect the output to a file if you wish.

Since the SNA link traces have a lot of SNA protocol-specific information, a special tool is available to read them, as follows:

snaformat With this tool you can format each type of link trace, select specific entries, or make summaries or detailed reports.

The `snaformat` tool is one of the most important tools for debugging SNA errors.

```

USAGE: snaformat -A -d -h -i key=value <key2=value ... keyN=value>
        -l -p -s file <file2 ... fileN>
-A      All entry types
-d      detail output
-h      hexadecimal output
-i      include only entries matching key=value pair
-l      SNA link station entries
-p      physical link events
-s      summary output

```

Figure 120. *snaformat* Syntax

10.5 SNA Application Access for AIX Log and Trace

SNA Application Access for AIX has several tools to aid in problem determination:

- Message Database (BMD). This gives you more details about an error and describes the cause, effect and recovery action.
- Tracing. Each component of the SNA Application Access for AIX product has a debug option; the default installation is no tracing. To turn on all the traces, specify the **-t -1** option when starting a specific process in the startup script `/usr/lpp/SNA_AA/bin/sna_aa.start`.
- Data Link Scope (snascope). This tool shows all of the frame on the link used by SNA Application Access for AIX.

10.5.1 Message Database

To get more information about a specific message, use the command `/usr/lpp/SNA_AA/bin/sna_msg` and enter your error message. Figure 121 on page 219 shows an example of using `sna_msg`.

```

%s failed in %s - %s

PARAMETERS:

1. PLU2 API routine
2. Calling routine
3. PLU2 API error text

CAUSE:

A PLU2 API call has failed. The PLU2 API is used to handle SNA-TN3270's
interface with the snapu5 Server.

EFFECT:

If the failure occurs on an LU-LU session, the session will terminate.
If the failure occurs on the PLU-SSCP session the program usually exits.

ACTION:

Contact IBM Technical Support.

Please enter message identifier (Q to quit):

```

Figure 121. *sna_msg* Command Example

10.5.2 Tracing SNA Application Access for AIX

Different trace files are created for each of the components of SNA Application Access for AIX in the process working directory:

SNA Application Server:

snapu5 process, the trace files are named pu5_trace and cp5_trace.

SNA Application gateway:

vtEmulatorMgr process, the trace file is named vtEmulatorMgr_pid and is in /tmp directory, *pid* is the process ID of the vtEmulatorMgr process.

SNA Passthru:

ptMgr process, the trace file is named ptMgr_pid, where *pid* is the process ID of the ptMgr process.

Dependent LU:

sna_dlu process, the trace file is named trace.sna_dlu.brx_pu2_esp.pid where *pid* is the process ID of the sna_dlu process.

Telnet 3270 Access:

snatnMgr process, the trace file are named brxsnatnCld_pid and brxsnatnMgr_pid and are in the /tmp directory, *pid* is the process ID of the snatnMgr process.

10.5.3 snascope

The snascope command is a data link-level scope program that shows all transmitted and received frames on SNA SDLC and token-ring data links. Use the following command to start tracing a token-ring data link:

```
snascope -d /dev/tok0 -t -e|tee tracefile
```

Figure 122 on page 220 shows an example of an snascope report.

```

S:10005ab155da4100 000000010404bf          ..!.
R:4100000000011000 5ab155da0405bf          .....!
S:10005ab155da4100 000000010404bf34 43fffffff000070
8800000000000000 010b710001090000 000007000e11f4e4
e2c9c2d4d9c14bd9 c1f6f0f1f2c3d710 11f110110e0d06c2
d9e7d7e4f540e5f2 4bf0
R:4100000000011000 5ab155da0404bf32 5500000000000080
1b000000000080ff 010b71000f800000 000001000e0cf4e4
e2c9c2d4d9c14bd9 e2f5102800161101 130012f7f0f1f3f0
f0f0f0f0f0f0f0f0 f0f0f01111040e02 f5f7f6f5f2f4f7f0
f0f1f0f3
S:10005ab155da4100 000000010405bf34 43fffffff000070
8400000000000000 010b710001090000 000007000e11f4e4
e2c9c2d4d9c14bd9 c1f6f0f1f2c3d710 11f110110e0d06c2
d9e7d7e4f540e5f2 4bf0
R:4100000000011000 5ab155da0405bf32 5500000000000080
1b000000000080ff 010b71000f800000 000001000e0cf4e4
e2c9c2d4d9c14bd9 e2f5102800161101 130012f7f0f1f3f0
f0f0f0f0f0f0f0f0 f0f0f01111040e02 f5f7f6f5f2f4f7f0
f0f1f0f3
S:10005ab155da4100 000000010405bf34 43fffffff000070
8400000000000000 010b710001090000 000007000e11f4e4
e2c9c2d4d9c14bd9 c1f6f0f1f2c3d710 11f110110e0d06c2
d9e7d7e4f540e5f2 4bf0
R:4100000000011000 5ab155da0404bf32 5500000000000080
1700000000008000 010b41000f800000 000001000e0cf4e4
e2c9c2d4d9c14bd9 e2f5102800161101 130012f7f0f1f3f0
f0f0f0f0f0f0f0f0 f0f0f01111040e02 f5f7f6f5f2f4f7f0
f0f1f0f3
S:10005ab155da4100 000000010405bf34 43fffffff000070
8400000000000000 010b510001090000 000007000e11f4e4
e2c9c2d4d9c14bd9 c1f6f0f1f2c3d710 11f110110e0d06c2
d9e7d7e4f540e5f2 4bf0
R:4100000000011000 5ab155da0405bf32 5500000000000080
1700000000008000 010b41000f800000 000001000e0cf4e4
e2c9c2d4d9c14bd9 e2f5102800161101 130012f7f0f1f3f0
f0f0f0f0f0f0f0f0 f0f0f01111040e02 f5f7f6f5f2f4f7f0
f0f1f0f3
S:10005ab155da4100 0000000104047f          ..!.
R:4100000000011000 5ab155da0404bf32 5500000000000080
1700000000008000 010b41000f800000 000001000e0cf4e4
e2c9c2d4d9c14bd9 e2f5102800161101 130012f7f0f1f3f0
f0f0f0f0f0f0f0f0 f0f0f01111040e02 f5f7f6f5f2f4f7f0
f0f1f0f3
R:4100000000011000 5ab155da040573          .....!

```

Figure 122. Example of snascope Output

10.6 SNA Client Access for AIX Log and Trace

SNA Client Access for AIX has several tools to aid in problem determination:

- Message Database (BMD). This command gives you more details about an error and describes the cause, effect and recovery action.
- Tracing. Each component of the SNA Client Access for AIX product has a debug option; the default installation is no tracing. To turn on all the traces, specify the **-t -1** option when starting a specific process in the startup file */usr/lpp/SNA_CA/bin/snaca*.
- Data Link Scope (snascope). This tool shows all the frame on the link used by SNA Client Access for AIX.

Note: See 10.5, “SNA Application Access for AIX Log and Trace” on page 218 for details about the Message Database and snascope commands.

Different trace files are created for each of the components of SNA Client Access for AIX in the process working directory:

Independent LU Server:

sna_ilu process, the trace file is named trace.sna_ilu.pid, where *pid* is the process ID of the sna_ilu process.

Dependent LU Server:

sna_dlu process, the trace file is named trace.sna_dlu.brx_pu2_esp.pid, where *pid* is the process ID of the sna_dlu process.

Telnet 3270 Server:

sna_telnet process, the trace file is named brxlib_pid and is in /tmp directory. *pid* is the process id of the sna_dlu process.

Telnet 5250 Server:

sna_tnet52 process, the trace file is named brxlu62l_pid, where *pid* is the process ID of the sna_tnet52 process.

10.6.1 SNA Trace Samples

This section provides some sample SNA traces. Some steps to start and stop the traces are given in this section.

Let us consider the most common problem of unable to start the link station.

1. Look at the error message received when trying to start the link.

0105-2920 Start link station cannot find the specified remote station.

This message indicates that the destination address could not be found within a specified time limit.

2. The SNA log file may give more data. You need to toggle the file before running trcrpt on that log file.

```
# sna -setlogs -t
```

SNA log files toggled.

SNA Service Log switched from /var/sna/snbservice.5 to /var/sna/snbservice.6

3. Use the command trcrpt to format the log file, as follows:

```
trcrpt /var/sna/snbservice.5
```

Figure 123 on page 222 shows an example of an SNA log report.

```

Thu Jun 30 16:52:47 1994
System: AIX rs60005 Node: 3
Machine: 000014723800
Internet Address: 00000000 0.0.0.0

Version: 1 Release: 3 Mod: 94 Fix: 231

/bin/trace -a -g -o /var/sna/snbservice.1 -L 1500000 -T 131072 -m Version: 1 Release: 3 Mod: 94 Fix: 231

ID      ELAPSED_SEC    DELTA_MSEC    APPL  SYSCALL KERNEL  INTERRUPT
27B    18.372129280  18372.129280  Thu Jun 30 16:53:06 1994
      Init SNA. max conv: 200, max sess: 200
      Component: SNACR - Command Router (NOF)
      file: mptninit.c line: 115
      mptn_enabled is true but mptn is not running
27B    19.341953536   82.298624    Thu Jun 30 16:53:07 1994
      Control point: USIBMRA.R5N (network node) Version: 1 Release: 3 Mod: 94 Fix: 231
27B    64.478032640  45136.079104  Thu Jun 30 16:53:52 1994
      ***>Failure: System error
      Failure ID: 0105-1018 Request Failed, see other return codes
      Component: SNACPS - Config Services
      file: newcsdlc.c line: 1647
      0105-2920 Start link station cannot find the specified remote station.
      Error: LS closed with an error indicated by RC
      Return code/value: hex: FFFFC68 dec: -920
      link station name: RA62225
27B    64.529300736   51.268096    Thu Jun 30 16:53:52 1994
      ***>Failure: Link error
      Component: SNACR - Command Router (NOF)
      file: xxxcrpar.c line: 144
      Error/Message code: -755 (FFFFD0D)
      link station - RA62225
      0105-2920 Start link station cannot find the specified remote station.
      rc in HEX: FFFFC68

```

Figure 123. SNA Log Display

4. You may take a link station trace to find additional information regarding the problem. To trace the link station when it is starting, please see 10.4.3, “Link Station Trace” on page 217.
5. The link trace will be written to /var/sna. The file name is the name of your link station profile. Re-create the error and stop the trace with the following command:


```
sna -t off
```
6. Then you can display a formatted trace with the following command:


```
trcrpt /var/sna/RA62225
```
7. The link station raw trace file can either be formatted with the standard AIX tool trcrpt or with an SNA Server for AIX tool snaformat. With snaformat, you may either get a detailed trace report or a summary trace report. Examples are shown below.
8. Use the summary option for snaformat:


```
snaformat -A -s RA62225
```

For the link station raw trace file RA62225, this command will create an outout file RA62225.sum in the current directory.
9. The contents of this summary file are shown in Figure 124 on page 223.

```

snaformat
(C) Copyright IBM Corporation 1993

file: RA62225 Thu Jun 30 16:53:12 1994
-----
Summary trace output

-Line- ---DLC--- -----DA----- I/O/D -----Flow-----
 309 TokenRing 200002070000 -----TEST----->
 311 TokenRing 200002070000 -----TEST----->
 327 TokenRing 200002070000 -----TEST----->
 331 TokenRing 200002070000 -----TEST----->
 334 TokenRing 200002070000 -----TEST----->
 339 TokenRing 200002070000 -----TEST----->
 342 TokenRing 200002070000 -----TEST----->
 349 TokenRing 200002070000 -----TEST----->
 357 TokenRing 200002070000 -----TEST----->
 362 TokenRing 200002070000 -----TEST----->
 364 TokenRing 200002070000 -----TEST----->
 369 TokenRing -----Close Link-----

```

Figure 124. Snaformat Summary Display

- The summary output shows the SNA flow on the link station. To get a detailed formatted output of the link station trace, use the command `snaformat -A -d RA62225`. The detailed report is shown in Figure 125 on page 224.

```

snaformat
(C) Copyright IBM Corporation 1993

file: RA62225 Thu Jun 30 16:53:12 1994
-----
Detailed trace output

Line: 309      Send MU
Time stamp: 16:53:14.461872384
DLC type: TokenRing
  Destination address: 0x200002070000      DSAP: 0x0
  Source address:      0x10005AB155DA      SSAP: 0x4
TEST

Line: 364      Send MU
Time stamp: 16:53:53.754154240
DLC type: TokenRing
  Destination address: 0x200002070000      DSAP: 0x0
  Source address:      0x90005AB155DA      SSAP: 0x4
TEST

Line: 369
Time stamp: 16:53:56.255852544
DLC type: TokenRing
  Destination address: 0x          DSAP: 0x0
  Source address:      0x          SSAP: 0x0
Close Link
[ 002A0007 0008746F 6B302E30 30303031 ]
[ 00000000 00002000 02070000 00000000 ]
[ 00000000 00000000 0000 ]

```

Figure 125. Snaformat Detail Display

A close look at the token-ring addresses revealed that the destination address was wrong. Instead of 400002070000, the address was specified as 200002070000. This was the reason why the link station could not find the specified remote station.

10.6.2 IP Trace

The `iptrace` command is useful for determining problems with IP traffic. It shows IP traffic over configured interfaces. Command flags provide a filter so that `iptrace` only traces packets that meet specific criteria. The syntax to start the trace is shown below:

```

iptrace [ -a ] [ -P Protocol ] [ -i Interface ] [ -p Port ]
        [ -s Host [ -b ] ] [ -d Host [ -b ] ] LogFile

```

To format the output file *LogFile*, use the following command:

```
ipreport LogFile
```

Note: The IP trace may generate large amounts of data if left to run for a long time.

The script below can be used to start, stop, and show an IP trace. The syntax for this shell script is as follows:

iptr - to start the tracing.
iptr show - to stop and view the trace output.

```

#*****
# IP trace start and view
# type "iptr" to start the trace
# type "iptr show" to stop the trace and view
#*****

prefl="$0: ***"
echo "$prefl ..... IP - TRACE Protocol Start"
"
werda=whoami
editor="vi"
if [ $DISPLAY"*" = "*" ] ; then
    DISPLAY=:0 ; export DISPLAY
fi
log="/tmp/IPTRACE.LOG"
vilog="/tmp/IPTRACE.viLOG"
if [ $# = 0 ]
then
    fill=" ***** \c"
    echo "$prefl USER = $werda $fill"
    echo "DISPLAY = $DISPLAY $fill"
    echo "EDITOR = $editor"
    rm -f $log
    touch $log
    chmod 666 $log

    iptrace $log

    if [ $? -eq 0 ] ; then
        echo "$prefl IP-TRACE started - Logfile = $log"
        echo "$prefl To read / stop TRACE enter:'$0 show' <-----"
        else
            echo "$prefl *****"
            echo "$prefl *** I think you are not the ROOT user ?"
            echo "$prefl *** $werda ,YOU are not allowed to do this!!"
            echo "$prefl *****"
            fi
    else
        ipreport $log > $vilog
        rm -f $log
        typeset TRAPRO=$(ps -e | grep iptrace |grep -v grep | awk '{print $1}')
        echo "$prefl IPTRACE wird nun gestoppt "
        for PROCS in $TRAPRO
        do
            ps $PROCS | grep $PROCS
            kill $PROCS
        done
        echo "$prefl IP-TRACE stopped - Report = $vilog"
        $editor $vilog
    fi
echo "$prefl ----- IP - TRACE Protocol Ends"

```

Figure 126. Sample Script to Start and Stop IP Trace

10.7 ESCON Adapter Startup Sequence

This section provides the correct startup sequence for ESCON channel used in SNA Channel for AIX.

1. Ensure that the channel is online at the mainframe. For MVS this can be done via TSO with the following commands:

```
sdsf
```

```
log
```

Once in the log, issue the command `/d u,,560,2`. In this example, 560 is our channel ID and it is online as shown in the figure below.

```
RESPONSE=SA25
IEE450I 12.48.52 UNIT STATUS 879
UNIT TYPE STATUS  VOLSER VOLSTATE  UNIT TYPE STATUS  VOLSER VOLSTATE
0560 3791 A                0561 3791 OFFLINE
```

Figure 127. MVS SDSF Log Output for Channel Display

2. Bring the ESCON adapter online on RS/6000.
3. Start SNA Server for AIX.
4. Start the link station.
5. While the link station is in starting state, bring the VTAM Major node active in VTAM on the mainframe.
6. If the LUs defined in VTAM are not defined on RS/6000 session profiles, then when you activate the major node, these LUs will give a sense code of 084B0000.

```
* RAPAN V NET,INACT,ID=RS6KLOC
RAPAN IST097I VARY ACCEPTED
RAPAN IST1133I RA6KESC IS NOW INACTIVE, TYPE = PU_T2
RAPAN IST1133I RS6KLOC IS NOW INACTIVE, TYPE = LCL SNA M
* RAPAN D NET,E,ID=RS6KLOC
RAPAN IST453I ID PARAMETER VALUE INVALID
* RAPAN V NET,ACT,ID=RS6KLOC
RAPAN IST097I VARY ACCEPTED
RAPAN IST1132I RS6KLOC IS ACTIVE, TYPE = LCL SNA MAJ NOD
* RAPAN V NET,INACT,ID=RS6KLOC
RAPAN IST097I VARY ACCEPTED
RAPAN IST1133I RA6KESC IS NOW INACTIVE, TYPE = PU_T2
RAPAN IST1133I RS6KLOC IS NOW INACTIVE, TYPE = LCL SNA M
* RAPAN V NET,ACT,ID=RS6KLOC
RAPAN IST097I VARY ACCEPTED
RAPAN IST1132I RS6KLOC IS ACTIVE, TYPE = LCL SNA MAJ NOD
' RAPAN
IST1139I ACTLU FOR USIBMRA.RA6KESC3 FAILED - SENSE: 084B0000
IST1045I NODE TYPE = LOGICAL UNIT
IST314I END
RAPAN IST1132I RA6KESC IS ACTIVE, TYPE = PU_T2.1
```

Figure 128. NetView Display of Activating Major Node

10.7.1 ESCON Adapter Stopping Sequence

This section explains the correct sequence to stop the ESCON adapter when running SNA Server and HCON over it.

1. Users should log off the host application.
2. Users should terminate all the HCON sessions.
3. Stop SNA Server for AIX.
4. Inactivate the Major node.
5. Stop the subchannels on RS/6000.
6. If you are running TCP/IP over the adapter, then bring down the network interface.
7. When you are sure that the adapter is free, bring it offline.

10.7.2 Tracing SNA over the ESCON Adapter

Tracing SNA over the ESCON adapter is the same as tracing SNA over any adapter.

1. You will need to set the trace option to "yes" in the link station profile.
2. Verify and update the profiles.
3. Start the SNA link station.
4. Recreate the problem.
5. Stop the link station.
6. Generate a formatted trace output with either *trcrpt* or *snaformat*.

10.7.3 Problem Determination for an ESCON Channel Adapter

Use the SMIT fast path command `smit escaRAS` to get into the problem determination menu.

```
Problem determination for an ESCON Channel Adapter

Move cursor to desired item and press Enter.

Show ESCON Channel Adapter RAS indicators
Set the Debug Mask for an ESCON Control Unit Device Driver
Generate an Error Report for an ESCON Channel Adapter
Device Driver Trace for an ESCON Channel Adapter
Microcode Trace for an ESCON Channel Adapter
```

You may choose an appropriate trace depending on the type of the problem that you currently have. Please refer to *SNA Server for AIX Channel Connectivity User's Guide*, SC31-8219 for a detailed discussion regarding these options.

10.7.4 Other Diagnostics That Can Be Linked with the ESCON Adapter

You may have to take a DLC trace for SNA or an IP trace for TCP/IP for the ESCON adapter. This section shows both cases.

Follow these steps to take a DLC trace:

1. To take the DLC trace, issue the command `smitty _snatrace`.

2. You will be presented with the following screen and will need to fill in the fields, as displayed in the example below.

```
Start and Stop Selected SNA Traces

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

                                     [Entry Fields]
Link Station name(s)                 [RS6007LS]
API trace                            off
Generic API trace                    off
CPI-C trace                          off
AnyNet trace                         off
Event trace (list events)            [dlc chl_dlc_mbuf]
Flow trace (select depth)            off
Trace components (list components)   [chl_dlc]
Mbuf trace                           off
```

3. To stop the trace again use the command `smitty _snatrace`.
4. Format the trace by using the SMIT Show Event and Flow Traces panel.

Follow these steps to take an iptrace:

1. To take an iptrace, issue the iptrace command in one of the following formats:

```
iptrace -a -i es0 /tmp/iplogfile
```

This traces the es0 interface for TCP/IP and puts the unformatted data in the /tmp/iplogfile file.

```
iptrace -a -s Sourcehost -d Destinationhost -b /tmp/iplogfile
```

This traces the bidirectional data flowing between Sourcehost and Destinationhost and puts the unformatted data in the /tmp/iplogfile file.

2. To stop an iptrace, issue `ps -ef |grep iptrace`.
This will give you the process ID of iptrace, which you can kill.
3. To format the iptrace data, issue the following command:
`ipreport /tmp/iplogfile > /tmp/trace.report`
This puts the output into a file called /tmp/trace.report.

10.8 BLKMUX Adapter Problem Determination

This section provides some problem determination steps for the block multiplexer.

10.8.1 Tracing SNA over the Block Multiplexer

Tracing SNA over the ESCON adapter is the same as tracing SNA over any adapter.

1. You will need to set the trace option to "yes" in the link station profile.
2. Verify and update the profiles.
3. Start the SNA link station.
4. Recreate the problem.
5. Stop the link station.
6. Generate a formatted trace output with either *trcrpt* or *snaformat*.

10.8.2 Tracing the BLKMUX Microcode

If you are having problems with the BLKMUX adapter, you might be asked to trace the BLKMUX Channel Attach Adapter microcode. Normally you would run this trace at the request of IBM support.

Use the SMIT fast path command `smit blkmux` to get into the block multiplexer configuration menu.

1. Select the following from the SMIT panels to start the trace.

```
The BLKMUX Channel Adapter .. Diagnostic and RAS Functions.  
Problem Determination for the BLKMUX Channel Attach Adapter  
Microcode Trace for a BLKMUX Channel Attach Adapter  
Start a Microcode Trace for an BLKMUX Channel Attach Adapter  
cat0
```

2. Carry out the function which you want to trace (for example, bring the adapter online).
3. Select the following from the block multiplexer menu and stop the trace.

```
The BLKMUX Channel Adapter .. Diagnostic and RAS Functions.  
Problem Determination for the BLKMUX Channel Attach Adapter  
Microcode Trace for a BLKMUX Channel Attach Adapter  
Stop a Microcode Trace for an BLKMUX Channel Attach Adapter  
cat0
```

4. Select the following from the block multiplexer menu to generate a trace report.

```
The BLKMUX Channel Adapter .. Diagnostic and RAS Functions.  
Problem Determination for the BLKMUX Channel Attach Adapter  
Microcode Trace for a BLKMUX Channel Attach Adapter  
Dump Microcode Trace Data for an BLKMUX Channel Attach Adapter
```

5. You could redirect the dump file to an output file as shown below.

```

Dump Microcode Trace Data for a BLKMUX Channel Attach Adapter

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

                                     [Entry Fields]
*The Adapter name ... Pres List to choose      cat0
Output filename                                [/tmp/blkmux.micro]
Amount of SRAM to dump (in hex)                [3F000]

```

6. There are currently no command line options available to take a microcode dump.

10.8.3 Tracing the BLKMUX Device Driver

If you are having problems with the BLKMUX adapter or the SNA link station, you can see if the data is being passed from RS/6000 to the mainframe channel. To start, stop and review the BLKMUX Device Driver trace data, you can perform either of the following procedures:

Use the SMIT fast path command `smit blkmux` to start SMIT menu for block multiplexer configuration.

1. Select the following to start the trace.

```

The BLKMUX Channel Adapter .. Diagnostic and RAS Functions.
Problem Determination for the BLKMUX Channel Attach Adapter
Device Driver Trace for a BLKMUX Channel Attach Adapter
Start a Device Driver Trace for an BLKMUX Channel Attach Adapter

```

2. Carry out the function that you want to trace (for example, bring the adapter online).
3. Select the following from the block multiplexer menu to stop the trace.

```

The BLKMUX Channel Adapter .. Diagnostic and RAS Functions.
Problem Determination for the BLKMUX Channel Attach Adapter
Device Driver Trace for a BLKMUX Channel Attach Adapter
Stop a Device Driver Trace for an BLKMUX Channel Attach Adapter

```

4. Select the following from the block multiplexer menu to generate a trace report.

```

The BLKMUX Channel Adapter .. Diagnostic and RAS Functions.
Problem Determination for the BLKMUX Channel Attach Adapter
Device Driver Trace for a BLKMUX Channel Attach Adapter
Generate a Device Driver Trace for an BLKMUX Channel Attach Adapter

```

5. You could redirect the output to an AIX file as shown below.

```

Generate a Device Driver Trace report for an BLKMUX Channel Attach Adapter

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

                                     [Entry Fields]
Output filename                        [/tmp/blkmux.trcfile]

```

You could also take block multiplexer device driver trace from the command line, as shown below.

1. Start the trace with the command `trace -a -j 358`.

2. Carry out the function that you want to trace (for example, bring the adapter online).
3. Stop the trace with the command `trcstop`.
4. Generate the trace report with the command `trcprt -d 358 > /tmp/blkmux.trace`.

10.8.4 Set the Debug Mask for BLKMUX Adapter

In some cases, you may be asked to set the debug mask as a part of the problem determination procedure. To set the Debug Mask, you should perform the following:

1. Select the following from the block multiplexer menu, to set the debug mask.

```
The BLKMUX Channel Adapter .. Diagnostic and RAS Functions.
Problem Determination for the BLKMUX Channel Attach Adapter
Set the Debug Mask for a BLKMUX Channel Attach Adapter
```

2. Select the masks from the following screen.

```
Set the Debug Mask for a BLKMUX Channel Attach Device Driver

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

                                     [Entry Fields]
* The Adapter name ... Press List to choose      cat0
Select the Masks .... use List
```

3. You have the following list of available masks.

```
Selection of Masks are.....
x  DB_CDT      0x00000001   /* Debug flag for the Dump Data Module */
x  DB_CLOSE   0x00000002   /* Debug flag for the Close Module */ x
x  DB_CONFIG  0x00000004   /* Debug flag for the Config Module */ x
x  DB_GLOBAL  0x00000008   /* Debug flag for the Global Data Area */ x
x  DB_INTR    0x00000010   /* Debug flag for the Interrupt Routines */ x
x  DB_IOCTL   0x00000020   /* Debug flag for the Ioctl Module */ x
x  DB_KPROC   0x00000040   /* Debug flag for the Kernel Process */ x
x  DB_MPX     0x00000080   /* Debug flag for the Mpx Routine */ x
x  DB_OPEN    0x00000100   /* Debug flag for the Open Module */
x  DB_PCADIO  0x00000200   /* Debug flag for the PCA I/O Routines */ x
x  DB_RECV    0x00000400   /* Debug flag for the Receive Module */ x
x  DB_SELECT  0x00000800   /* Debug flag for the Select Module */ x
x  DB_UTIL    0x00001000   /* Debug flag for the Utility Routines */ x
x  DB_XMIT    0x00002000   /* Debug flag for the Transmit Module */ x
x  DB_ALL     0xFFFFFFFF   /* Debug flag for everything(default) */
```

Note: The default mask is `DB_ALL`.

4. Select appropriate mask(s) as suggested by IBM support and run your tests, traces and `getchanpd` tool.

10.8.5 BLKMUX Adapter DLC and IP Trace

You may take a DLC trace for SNA and an IP trace for TCP/IP with the block multiplexer.

Follow the steps below for a DLC trace:

1. Use the following SMIT fast path command:

```
smitty _snatrace
```

2. Fill up the fields as shown below.

```
Start and Stop Selected SNA Traces

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

                                     [Entry Fields]
Link Station name(s)                 [RS6002LS]
API trace                            off
Generic API trace                    off
CPI-C trace                          off
AnyNet trace                         off
Event trace (list events)            [dlc ccw ch1_dlc_mbuf]
Flow trace (select depth)           off
Trace components (list components)   [ch1_dlc]
Mbuf trace                           off
```

3. Stop the trace using the same SMIT menu for SNA traces, which is obtained by issuing `smit _snatrace`.

4. Format the trace by using the SMIT Show Event and Flow Traces menu.

To take an `iptrace`, you could issue the `iptrace` command in one of the following formats:

```
iptrace -a -i ca0 /tmp/iplogfile
```

This traces the `ca0` interface for TCP/IP and puts the unformatted data in the `/tmp/iplogfile` file.

```
iptrace -a -s Sourcehost -d Destinationhost -b /tmp/iplogfile
```

This traces the bidirectional data flowing between `Sourcehost` and `Destiniationhost` and puts the unformatted data in the `/tmp/iplogfile` file.

5. To stop an `iptrace`, issue `ps -ef |grep iptrace`.

This will give you the process ID of `iptrace`, which you can kill.

6. To format the `iptrace` data, issue the following command:

```
ipreport /tmp/iplogfile > /tmp/trace.report
```

Appendix A. Special Notices

This publication is intended to help customer and IBM systems engineers to get a basic understanding of some of the new functions available in Communications Server for AIX. The information in this publication is not intended as the specification of any programming interfaces that are provided by Communications Server for AIX and SNA Server for AIX. See the PUBLICATIONS section of the IBM Programming Announcement for Communications Server for AIX for more information about what publications are considered to be product documentation.

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Appendix B. Related Publications

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

B.1 International Technical Support Organization Publications

For information on ordering these ITSO publications see "How to Get ITSO Redbooks" on page 237.

- *A Guided Tour of SNA Services/6000 V 2.1*, GG24-4189
- *AIX SNA Services V1.2*, GG24-4129

A complete list of International Technical Support Organization publications, known as redbooks, with a brief description of each, may be found in:

International Technical Support Organization Bibliography of Redbooks, GG24-3070.

B.2 Other Publications

These publications are also relevant as further information sources:

- *Communication Server for AIX: Up and Running*, SC31-8247
- *SNA Server for AIX General Information Manual*, SC31-8198
- *SNA Server for AIX Planning and Performance Guide*, SC31-8220
- *SNA Server for AIX User's Guide*, SC31-8211
- *SNA Server for AIX Configuration Reference*, SC31-8213
- *SNA Server for AIX Command Reference*, SC31-8214
- *SNA Server for AIX Diagnostic Guide and Messages*, SC31-8125 (available only on CD-ROM, SK2T-6012)
- *SNA Server for AIX Transaction Program Reference*, SC31-8212
- *SNA Server for AIX Introduction to CPI Communications Programming*, GC31-8210
- *SNA Server for AIX Gateway User's Guide*, SC31-8216
- *SNA Server for AIX Channel Connectivity User's Guide*, SC31-8219
- *SNA Application Access for AIX User's Guide*, SC31-8087
- *SNA Client Access for AIX V 1.2 User's Guide*, SC31-8085
- *APPC Application Suite for AIX User's Guide*, SC31-8218
- *SNA Server for AIX AnyNet Guide to Sockets over SNA*, SC31-8217
- *SNA Server for AIX AnyNet Guide to APPC over TCP/IP Access Node and Gateway Support*, SC31-8221-01
- *AIX NetView Service Point Installation, Operation, and Programming Guide*, SC31-6120-02.

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 URL <http://www.redbooks.ibm.com/redbooks>.

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- **Redbooks Home Page on the World Wide Web**

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- **IBM Direct Publications Catalog on the World Wide Web**

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See explanation under "How Customers Can Get ITSO Redbooks" on page 238.

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